EDEN 2006 ANNUAL CONFERENCE

E-Competences for Life, Employment and Innovation

"E" is more! E-learning Enabling Education in Evolving Europe

Proceedings of the EDEN 2006 Annual Conference

Vienna University of Technology
Vienna, Austria

14-17 June, 2006

Edited by

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on behalf of the European Distance and E-Learning Network

European Distance and E-Learning Network

EDEN 2006 Annual Conference
Vienna, Austria

Published by the European Distance and E-Learning Network

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ISBN 963 06 0063 3

Introduction

Experience and understanding of the knowledge society is taking ever greater root in Europe. Globalisation, technology development, and changes in the economic and social environment are modifying the ways in which the knowledge society is developing. The accelerating development of information and communication technologies is creating way forward to new solutions.

The impact of economic challenges, market developments and policies at national and European levels has considerably influenced these processes. Growth and employment are the present keywords, that embody the strong message of the relaunched Lisbon strategy, and innovation is one of the core factors for modernisation and economic growth. Innovation systems and industrial policy share common interests, and there is an ever stronger demand for the integration and more effective use of innovation in the economy, particularly in the knowledge industries. According to the recent EU Economic Policy Guidelines, all forms of innovation should be facilitated and the development of ICT and content industries make up key areas to be promoted. Increased performance in these fields is expected to contribute to the creation of the sustainable knowledge economy.

The academic and professional community is continuously at work on developing efficient solutions and identifying new, creative forms of education. It is becoming increasingly clear that *the new learning space* will be realised in the context of its contribution to employment and economic development. E-competences and professional development are important elements in establishing the background for competitiveness and economic growth. The need for flexible response to new challenges, for better adaptability, for training the workforce with renewed competences, and above all the broad concept of lifelong learning, make up the key terms in the new generation EU educational programmes.

E-competences are essential for successful careers and for the promotion of links between education, training and business. *E-learning is the major enabling factor for the efficient involvement in the new competence development process, contributing also to the mainstreaming of innovation.* A developing consensus is confident that e-learning has moved from vision to reality, accompanied by the evolution of its practical meanings and concepts. The new competency system is strongly rooted in and related to e-learning, using collaborative and knowledge management tools, in the increasingly integrated contexts of *education – training – work – home*.

Proper identification and development of competences, and e-competences in the digital economy requires the reconsideration of different modalities of achieving knowledge and integrating it into personal portfolios. The ongoing Bologna process is adding further requirements to the new structuring of skills and competences, with creative contributions from the educational community. Recognition of informal and non formal learning is becoming a massive movement, incorporated in educational and employment policies, and with the prospect of leading to a European qualification framework. An even more confident approach to issues of quality in learning is a pre-requisite for consolidated implementation.

The EDEN 2006 Annual Conference in Vienna, announced with the above concept, welcomes the European professional and academic community and acknowledges with pleasure their positive feedback expressed by the high interest and the many valuable submissions received. We hope to contribute to the organic development and successful integration of knowledge in the field of e-competences, open, distance and e-learning.

Ingeborg Bø and Andras Szűcs

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SHORT PAPERS

TEACHING AND LEARNING AFTER THE KNOWLEDGE ECONOMY DIGITAL CHALLENGES AND NEW STRATEGIC OPPORTUNITIES

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Abstract

Many educators still struggle to understand the implications of the continuing development of information and communication technologies. While some tend to assume that the knowledge economy will continue to evolve as a human centric communications network between teacher and student, this paper argues that education in the future increasingly will be conducted through "software-based teachers" on ubiquitous networks of digital knowledge components managed and maintained by autonomous agents. Such object centric networks will be operated by new and powerful computer technologies with little or no human interaction, linked across the planet on a new ubiquitous network of autonomous objects. It will change virtually every aspect of our lives; business, investing, science, health care, entertainment, teaching, learning and more.

Introduction

The prevailing economic and organizational paradigm has always influenced profoundly teacher education. Advances in information and communication technology continue to be the key driving forces behind each new paradigm. During the industrial economy of the early and middle part of the last century teacher education was organized around the fact that knowledge resources had a physical presence and co-existence in time and space (documents, books, teachers, students), and that a hierarchical command and control structure (the sage on the stage) were essential prerequisites for teaching and learning.

In the latter part of the 20th century we witnessed enormous developments in information and communication technologies. This lead to virtually networked organizations of today's knowledge economy enhanced by ICT and thus made independent of time and space. This was accompanied by an evolution in teacher education from a teacher centric to a more learner centric paradigm, sometimes characterized with the expression "from the sage on the stage to the guide on the side". Teacher education today seems to reflect the basic premise of this new economic paradigm. The traditional role of the teacher as a "sage on the stage" is increasingly seen as a legacy from the industrial economy, and we are now increasingly focusing on ICT enabled knowledge networks rather than hierarchies. The emphasis seems to be on the more active role of the learners and the teacher is increasingly seen more as a guide than a commander (the guide on the side).

Faced with the emerging technologies of tomorrow, we see the contours of yet another such paradigm change. With the gradual convergence of new, miniaturized, extremely powerful and cheap technologies, we see the outlines of completely "individualized learning" in a "ubiquitous global network" in an object networked economy based on "automata relationships". The next economy will be dominated by ubiquitous technologies and pervasive computing partly independent and to a large degree beyond direct human control and interaction. The old industrial style dichotomy of the human teacher's role vis-a-vis the learner will loose its relevance and seize to be a valid concern in the completely wired world of the future. It will be entirely "learner centric" and the "guide on the side"will not be a human but an intelligent automated software agent; "the ghost in the machine". The coming of the object network economy will challenge our powers of creative imagination to a point not at all foreseen, nor even partly understood, by most educators today.

Visioning

In a 1997 paper in Harvard Business Review by Peter Drücker, Esther Dyson, Charles Handy, Paul Saffo and Peter Senge, entitled "Looking Ahead: Implications of the Present", Drücker states the following: "In human affairs – political, social, economic, or business – it is pointless to try to predict the future, let alone attempt to look ahead 75 years. But it is possible – and fruitful – to identify major events that have already happened, irrevocably, and that will have predictable effects in the next decade or two. It is possible, in other words, to identify and prepare for the future that has already happened." (Drücker *et al.,* 1997).

New technologies emerge (ETC, 2004) and become realities (Roush, 2003) long before they gain attention and wide application in business and industry. Some emerging technologies are science fact today, and the potential impact of these and other emerging technologies is up to our imagination and ability to vision the future.

In 1985 in two consecutive landmark articles in Harvard Business Review, Pierre Wack, former head of the business environment division of the Royal Duch/Shell Group planning department, demonstrated the power of scenarios in envisioning and preparing for the 1973 oil crisis well in advance of this devastating incidence for the global economy (Wack, 1985). Since then, scenarios have come to be regarded as a sober and effective tool for well founded visioning of plausible futures.

In 1995 Accenture, then Andersen Consulting, developed a series of scenarios under the name "DAVINCI; Virtual Corporation", outlining how present and future technology was changing the way business and industry organized for creating value. Subscript to these scenarios was: "Challenging Your Assumptions", a telling expression testifying to the onset of the knowledge economy, and the need for a new outlook, a new perspective and new solutions to old problems.

The Future is Already Here…

"The future is already here, it's just unevenly distributed." This famous quote from science fiction writer William Gibson rings as true today as when it was first published (Gibson, 1984).

At the Norwegian University of Science and Technology (NTNU) we have, since 1999, experimented with new methods for sourcing, processing and distributing knowledge. One of the courses in this experiment, entitled "Digital Communication and Organizational Challenges", is designed to serve as an example of its own name. The course illustrates in practice how modern information and communication technologies challenges accepted organizational theory in general and the current educational paradigm in particular, and outlines scenarios for how new and emerging technologies will change organizing in the future. It uses most available information and communication technologies including online multimedia demos, web based streaming video, live web casts, and video conferences, and is built entirely around a virtual value chain sourcing absolutely all its knowledge content in a global knowledge network.

The bulk of the course consist of up to twenty virtual guest lectures by educators, researchers, consultants and industry executives around the world. The digitized knowledge products made available by these resource persons make up the core value of the courses and represents its intellectual capital. Traditionally, guest lecturers would have to be physically present in the class room. However, new ICTs are used to make all guest lecturers available real time, via video conference and real time web cast for a global audience authorized to access to the course web. In addition, recordings of all lectures are made available on the course web as streaming video synchronized with slides and accompanying multimedia demos for later perusal at the students' leisure. This year we are experimenting with streaming recorded and live broadcasts via cell phones on the new 3G network and on the newest wireless and Bluetooth enabled PDAs.

Supplementing this main core of digital knowledge products are the traditional reading assignments, all of whom are made available or accessible as digital full text documents or books via the course web. Many science journals now offer online copies of their articles for teaching purposes, and while online bookstores make it possible to purchase most traditional books online, many are now offering an

increasing number of e-books for purchase and download online. Most university libraries offer online access to a large number of digital full text documents and books.

The traditional reading assignments normally constitute the bulk of the knowledge transfer in a traditional course-based learning experience. However, the new multimedia technologies make it possible to substitute much of the traditional written text with rich and powerful multimedia demos offered online as streaming video. These courses use online multimedia demos from a global network of suppliers as a test for this new concept. Multimedia demos can be short recordings edited and cast especially for teaching, communication and demonstration purposes, or they can be ad-hoc recordings illustrating real-life processes and occurrences, much like TV reports and features.

All in all, the course illustrates the concept of virtual learning enterprises. Operating almost exclusively in "marketspace", and built around a "virtual value chain" characteristic of the knowledge economy, it uses ad-hoc or permanent knowledge networks for its incoming and outgoing logistics. Based on initially unstructured information and unrefined knowledge components as its basic resource and raw material, it can easily be viewed as the first modest precursor of a virtual learning enterprise.

These budding virtual "learning enterprises" are mostly based on a personal professional network, taking advantage of generous "pro bono" knowledge input. However, we clearly see the contours of an evolving knowledge market where unstructured information and unrefined knowledge components will be available in digital form on open or proprietary networks at market prices following normal market mechanisms. Such digital knowledge components can easily be accessed, sourced, configured and distributed using automated software agents tailored to each student's individual needs and requirements.

After the Knowledge Economy

While the onset of the knowledge economy challenged the assumptions of both industry leaders and educators with an industrial economy paradigm outlook for how their respective activities should be organized, so will the new paradigm after the knowledge economy. Most educators today, despite experiencing first hand the digital revolution that is hurling us forward through the knowledge economy, still envision the next economy as a continuous function of the present, interpolated linearly into the future. One of the most common but erroneous assumptions is that human-centric networks and human relationships will continue to be key drivers in the next economy as they are in the present knowledge economy.

Some technologies are science fact today, and the potential impact of these and other emerging technologies is truly awesome. New breakthroughs in bandwidth-, transistor-, network-, and software-technologies, the four key technologies for further advances in ICT, are making present day capabilities obsolete before business and industry have managed to come to terms with "what is", and much less so of "what will be". Wireless and optical fiber networks of unimaginable bandwidth, and transistor capacity pushing Moor's law towards its quantum limits and beyond will greatly enhance, not only human communication, but communication with and between any hardware object and software agent in the world.

Such capabilities, morphing into ubiquitous- and pervasive computing, will revolutionize education once again. Tomorrow, the traditional as well as today's advanced concepts of education will be obsolete. In the next five years, a number of powerful, miniaturized and cheap technologies will converge to gather and intelligently deploy vast amounts of information, enabling a world in which objects can sense, reason, communicate and act. Where, for every physical entity or event, there will be a virtual collaborating double. Where the time between stimulus and response will approach zero. Where information, insight and knowledge will be bought and sold in a market that rewards those who build trust and harness the real-time economy.

Ray Kurzweil, one of the world's leading authorities on artificial intelligence, reflects on the future in his 1999 book "The Age of Spiritual Machines" (Kurzweil, 1999). In this book he builds powerful arguments for some staggering visions. "Five years from now computers will be able to perform a trillion calculations per second, and will enable simultaneous translation of most language pairs. Fifteen

years in the future computers will enable the memory capacity and computational ability of the human brain, and interaction with computers will involve gestures and two way spoken communications. Most learning will be conducted through "software-based teachers".

Twenty five years from now computers will have the capacity of 1.000 human brains, and the majority of communication does not involve a human. Computers will have read all available human- and machine-generated literature and will be learning on their own. Machines will claim to be "conscious".

James Martin, the author of the 2000 book "After the Internet: Alien Intelligence" (Martin 2000) states that most computing today is used merely to emulate human thought processes. He also predicts that the next economy will see machine/alien intelligence feeding on itself and growing like a chain reaction, linked across the planet on a ubiquitous Internet. This will change virtually every aspect of our lives: business, investing, science, health care, entertainment, and more. Instead of merely following human logic, computers will develop an alien intelligence that is radically different from human intelligence and incomparably more powerful in its focused areas.

Scenario: Working in an Object Networked Economy

Imagine a world in which most objects embedded with tiny computers will manage most daily tasks, and organizations will deliver goods and services business-to-object, rather than business-to-business or business-to-consumer. The overall effect will be the emergence of an Object Networked Economy based on ubiquitous integration with portfolios of online realities and automata relationships as the new organizing logic. New types of organizations Ubiquitous Corporations, "UbiqCorp" for short – will deliver goods and services to an ever-growing number of objects, all around us. Business-to-object data will flow both ways through wireless and Internet connections, and all scheduling, record-keeping, invoicing and payments will be fully automated. The need for costly, time-consuming person-to-person transactions will be minimized, freeing workers for more productive decision-making activities, which are in turn empowered through superior insight into real-time business activity.

These are just some of the effects of a coming technology revolution, driven by the ubiquitous presence of microprocessors in homes, offices, vehicles, appliances – or any object, large or small, inorganic or organic, that surrounds us in our daily life or makes up our global micro- and macro-environment. And remarkable as it is that virtually every object in our daily lives and in our world may soon have a mind of its own.

The implications and opportunities for business and for education and teachers are even more stunning. In this world all knowledge will be available world wide as high quality digital knowledge components on high speed wireless networks and can be accessed any time anywhere with any suitable object. Everybody can be life time students with their own private dedicated software based tutor and teacher that will guide us through individually designed learning environments, supplying knowledge from a world wide network, demanding our attention, monitoring our individual learning curves and rewarding our achievements.

What does all this mean for teacher education? Basically it means the same as for any organization, a totally new business model that require new thinking, new assumptions and an entirely new outlook on the current value proposal. Just as businesses seeking to understand and leverage the opportunities of the coming business-to-object era, teacher education should consider these basic "UbiqCorp" principals: your biggest and best customers will be objects. Your profits will come from value propositions rather than products. There will be no up-front payment; everything will be paid per use. You will monitor and track all your assets. You will always know what you have, where it is and what it is doing. There will be no waste-inventory based on real data, rather than plans. You will not be working as an employee, rather according to dynamic personalized contracts, or as "freelancers".

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UBIQUITOUS LEARNING
AN EDUCOLOGICAL QUESTION

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Abstract

In this short paper a view, based in a constructivist understanding of learning and knowledge development, is presented on the process of designing new digital technology with the purpose of enhancing ubiquitous learning. This perspective focuses the space used by the learner for task orientated action as part of the learning process. Designing new educational techniques from this perspective can be understood in analogy with an architect's work in designing a room for human activity.

The idea that we ought to enhance learning in all places of life has emerged during the last couple of years, especially with the development of electronic tools that make it possible for people to engage in learning activities in hitherto unconventional places for learning. The concept of ubiquitous learning becomes in this sense synonymous with what one could call learning in everyday settings. Following this line of thought we are therefore not talking about the type of learning that occurs in traditional school settings with teachers and pupils. It is rather in line with the learning activity that we all are engaged in or become engaged in when trying to cope with various tasks in daily lives.

The questions one can raise are "Where does the educational perspective fit into this line of thinking?", "What could be the character of the activity associated with a teaching ambition?" and "What criteria ought we to apply in order to evaluate an educational activity?"

I would like to follow this line of thought from an *educological perspective* using the term "educological" in the sense that Qvarsell (2000) uses it, that is to high-lighten education as a science in contrast to education/teaching as a practical activity.

Let me begin by outlining what I mean with an educological approach, followed by what this implies when it comes to a perspective on human learning in terms of constructivism and how we can conceive the prerequisites for human learning. I will end by discussing what function new digital techniques can have in order to enhance these prerequisites.

Educology and the science of education

By using the concept educology I want to emphasize that the science of education or inquiries into educational issues is not only a question of attaining technical knowledge of how to proceed in order to carry through a preconceived educational strategy. What I am trying to avoid is the idea that basically education is the technique needed in order to transmit knowledge. In order to fully understand the educational issues involved when considering the possibilities of new digital techniques for communication it is necessary to take a much broader approach that involves questions of human learning and what human knowledge construction is all about.

To me an educological approach implies openness to the whole question of human growth, for individuals as well as for people as parts of a social community. In other words, it is an open field of inquiry where we must allow ourselves to address fundamental questions of human development of knowledge. A better understanding of how we as individuals and members of social groups build knowledge will also increase our ability to evaluate the implementation of new technique for human development.

In the following argumentation I will allow myself to approach the question of human learning from a constructivist perspective and briefly present what this perspective implies, and the consequences I can see when considering using new techniques as means to enhance ubiquitous learning.

Constructivism

I would like to refer to an article I wrote (Löfberg, in press) for an anthology that is under publication and where I discuss the appropriation of digital technique from a constructivist perspective on human learning. The main issue that I raise in this article is the difference between focussing on external stimuli and human reaction (on the one hand) and focussing human perception and action as a paradigm for trying to understand human learning (on the other).

When we focus stimuli and reactions we are actually focusing on how learning appears to us from an outside perspective which easily leads over to the question of what type of external stimulation we can provide in order to enhance learning. As an educational issue it goes hand in hand with the idea of transmitting pre-formulated knowledge which at the same time is the traditional view on education that I want to question. I do not want to argue against the idea of providing knowledge as an educational issue. The issue I want to raise is that this as an educational perspective has its limits. There is more to human learning than providing already formulated knowledge to someone that seemingly lacks that knowledge.

By focusing perception and action we are approaching the issue of learning and human development of knowledge from the learner's perspective. The basic question is how we as humans construct our knowledge about the world we live in. For me this perspective goes back to Piaget, especially as he puts forward this line of reasoning in his work on genetic epistemology (1970, 1972). It is in interaction with our world that we can obtain the necessary experience or elements that can be used as building blocks for constructing an adequate way to perceive and understand the world around us. By adequate I mean a world that we can act in and act towards in such a way that it meets our expectations. One could say that we appropriate our world or take it into possession by building our own specific human knowledge about what the world in fact affords us.

The central elements in this perspective on human learning are therefore such qualities of the world that can afford meaning to us and can be used by us in order to attain what we aspire when acting in and on the world. It is through our actions we gain experiences about what the world affords, and these experiences become the building blocks in the knowledge we build up and construct about the world we live in. Knowledge is therefore, in accord with this line of reasoning, nothing that lies out there for us to discover. It is a result of our own construction based in our action in the world and our experiences of this world. This line of reasoning is built on Gibson's (1979) concept of affordance but also on Peirce's pragmatist view on knowledge explicated during the late 1800´s, especially in his article *The architecture of theories*, published in the Monist, 1891, according to which knowledge can never be understood as a mirror of the world as it is, in any absolute sense. Knowledge ought therefore to be understood as always delimited by the range of our possible actions and our capacity to perceive the consequences of our actions.

In my view I would therefore argue that learning, when used to describe the process of acquiring knowledge, must always be understood as the result of action in and towards the world in combination with our perception of the world. What we actually do when we learn is building knowledge about the world that leads to the construction of a liveable context and in that sense a meaningful context for us as humans. Before we act we can never know what elements of the world can come to afford experiential qualities that can be assimilated by our existing knowledge or logical system. I would therefore argue that the most essential prerequisite for learning is, in fact, action.

Room and place – an arena for action

Based in the previous reasoning it seems feasible to conceive that what actually happens during the process of learning and construction of knowledge is that we are in fact perceptually differentiating our environment. Perception is not primarily discovering new aspects of our environment or using our senses in a more and more refined way. It is rather a function of applying the knowledge of what to expect out there for us to see. From this point of departure it is reasonable to think that in order to differentiate the environment so that it becomes perceptible in any meaningful way, we must involve a long process of learning from early childhood. It is a process of both individual learning and socialisation, and the world we live in as grown-ups is not the same world we lived in as children. At least not in the sense of the

world we perceive and hold meaning to us, as humans. This is also the reason why I prefer to use the concept "context" or better still *"liveable context"* to designate the differentiated environment as we perceive it.

I use the concept liveable because our orientation to the world around is not hap hazardous. The world or rather the context we create is a context that affords us possibilities to carry out the tasks needed in order to live the way we desire or need in order to grow and survive. Our actions towards the world we live in are best conceived as task orientated, where tasks must be understood very broadly. We carry out both mental and physical tasks, both individual and social tasks.

In order for learning and knowledge construction to be possible we need to have access to a room or place that provides the opportunity for task-oriented actions. By acting in the world we create the information we need in order to carry out our tasks, and it is the available room for action that provides the substance that we transform into information.

It is unrealistic or impossible to understand information as something that is transmitted as such. As educators we may perceive and understand something as informative, but it is only by expanding someone's room for action with the specific information's actual substance that we may hope to transmit our own view on what has informational meaning to us. Our task as educators or the task that confronts any teacher is to try to conceive what constitutes a specific pupil's room for action at a given moment, and it is by interacting with that specific room that we may in fact cause a substantial change in that room that will or may allow such action by the pupil that this substantial change is perceived and becomes part of his or hers liveable context. This pertains to whom so ever we see as receiver of the information we feel we want to transmit, either we talk of pupils, students, adult learners, a general public that we feel we want to inform or the person we are having a conversation with.

The above may sound a bit abstract and unduly philosophical, but what I want to say is that as an educator or as an informant we must focus a possible room for action for learners or for those we intend to inform rather than asking how we should design the information so that it becomes transmittable as such.

Designing a room for learning

Considering the foregoing reasoning, especially the notion that from a learner's perspective all learning takes place in relation to task-oriented actions within the space for action allowed or afforded by a learner's liveable context, I would like to launch the following idea: as educators, especially when we develop new techniques in order to enhance ubiquitous learning, we are in fact, together with the learner, participating in building up the learner's room for action.

When addressing the question of designing techniques to enhance learning from an educational perspective there is a tendency to focus on techniques as such. We may ask ourselves how this technique is viewed by the learner or we may ask questions about how this technique can carry certain information. In whatever way we phrase our questions, the technique is often regarded as a mediating link between the learner and the educator, a link that promotes direct communication.

The conceptual frame of reference, I would like to put forward, is the idea that when talking about how new techniques ought to be designed we should recognise that we are involved in designing a room for action. In fact I think it would be fruitful to draw an analogy to the role of an architect who is designing a room for human living, the difference being that the architectural challenge is designing a room for task-oriented action and the questions we should phrase is where and how new technique is related to this room. What changes in the room for task orientated action do we introduce when launching techniques that supposedly are intended to enhance learning? What is the design challenge facing us when we talk in terms of ubiquitous learning?

The crucial issue is that we should be aware of the fact that we are introducing a new aspect in a space for action. As educators we are not involved in transmitting knowledge or information. Instead it could be fruitful to view us as architects participating in the design of the learner's space for task-oriented action.

A central and overarching criterion to take into consideration when introducing this new aspect in the learner's space for task-oriented action is to ask ourselves in what way this technique enhances perceptual differentiation of the learner's liveable context in the sense I used the term earlier.

Having said this, I briefly want to return to the idea of education as a science, that is to educology. The aforementioned frame of reference does not stop as a way to view the question of designing new technique with educational ambitions. To my mind it is also an interesting approach to deepen our understanding of what human knowledge construction is all about. The new digital technique and its application in daily life and its consequences for ubiquitous learning give us a unique opportunity to deepen our understanding of human knowledge construction.

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TOWARDS CATEGORISATION OF PROFESSIONAL LEARNING PROJECTS

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Introduction

Professional learning contains many overlapping areas and many researchers have differing views about what constitutes professional learning. This paper introduces two complementary categorisations of the broad subject area of research and development projects of professional learning. The purpose of the categorisations is to provide a system for grouping projects. The categorisation is much needed. It helps to classify projects and makes it easier to identify different areas of research which, in turn, helps collaboration between researchers. The need for workplace learning and together with it the need for research in the field has grown recently due to technological changes and the tremendous growth of global competition. As, for example Marquardt and Kearsley (1998) point out, corporate training has increased 30 times the rate of college education in recent years.

The two models of categorisation of research and development projects in the field are the one elaborated by prof. Jari Multisilta (2004) and the one developed within the framework of ProLearn Network of Excellence project by Helsinki University of Technology.

Model of levels in learning research

The model elaborated by prof. Multisilta is known as the model of levels in learning research (Figure 1.). The work is done for the University of Helsinki and it is a proposal for clarify interdisciplinary learning research at the university. The model consists of five stages (levels) (Multisilta, 2004).

The research focus on the first level is on brains and learning. The level includes the discipline of researching the biological basis of learning. For example neuroscience is on this level. In the second level, learning is viewed as a process, learning theories from the interdisciplinary starting point, evaluation of learning and knowledge, motivation, effects of culture on learning as well as value-, attitude- and emotional dimensions of learning are examined. On this level the research is interdisciplinary, especially in the area of education, psychology and sociology. In the third level learning is viewed from a technological point of view. Learning machine, materials and technologies are central areas in this level. There are many disciplines within the third level, for example, in learning technology technical and data processing sciences are studied and research concerning learning machines includes technical sciences and neuro-computing. Research uses the results of the previous level research. The fourth level contains learning research through real-world problems. Important questions are, for example, collective learning (interface to the second level), learning organisations, expertise, learning and control of knowledge (interface to the third level) and learning at work. The fifth level perspective is social. How knowledge or know-how and innovations influence the development of society and what economical influences can be seen? What additional values learning gives to society? Is it possible to predict and prevent marginalisation by education?

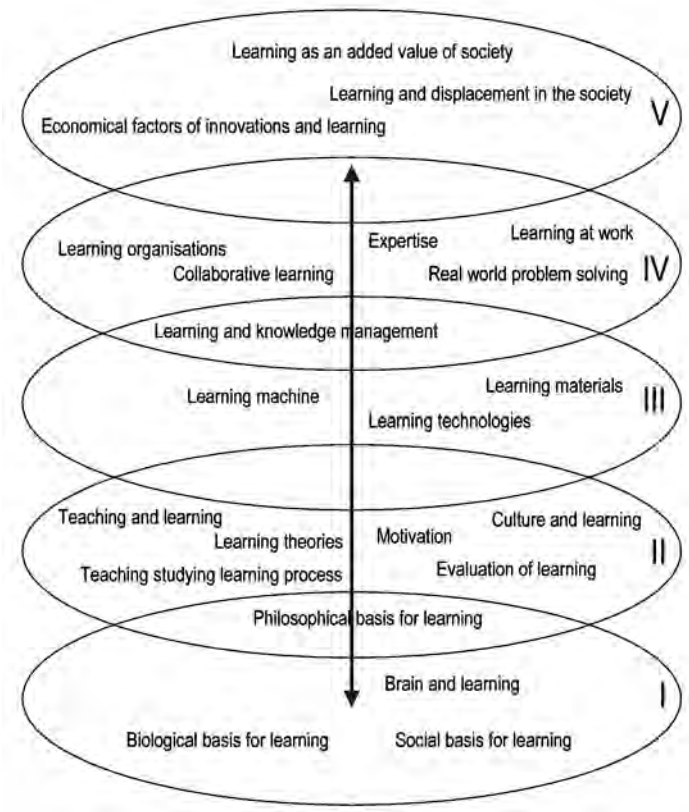

Figure 1. Model levels in learning research (Multisilta 2004)

Categorisation of professional learning

For the purposes of classifying professional learning projects we have developed another type of categorisation. We have tried to construct a classification which is based on several well-known researchers' views. The first task was to define professional learning within the broad domain of learning. The most common theories aiming at determining the nature of learning are behaviourism, cognitive and constructivism. However, when we limit our discussion to professional learning, we can use the learning concept as a basis and forget the above mentioned theories. This categorisation is based on our own views and reasoning using, for example, Sydänmaanlakka's (2001) theories as a source. Management forms a large part of professional learning. Järvinen, etc. (2002) have written about personal and organisational learning. Senge (1990), Pedler (1997) and Kotter (1990) have pointed out that organisation culture has a great effect on learning. Mental models, motivation and emotions also affect learning. They are, however, matters that can be controlled or modified in work situations and that is why we have included them in our categorisation. Communication and information transfer are essential activities in workplaces and represent further factors making learning possible.

Methods

We have collected information describing over 150 professional learning projects in Finland. As the first step we have used the "grounded theory's" submethod "open coding", which resembles a system.

We have crudely classified our findings and tried to find interrelationships between the research projects we had collected. As a second step we have not tried to define the concepts based on those findings, even though that is a part of the "grounded theory". Instead, we have taken a theoretical approach and used qualified theories in deciding on the categories and subcategories.

Categorization

We have reviewed a learner in the workplace environment as an actor, not as a passive receiver. An organisation is a basic unit in this categorisation. "Organisations are social entities that are

goal-directed, deliberately structured activity systems with an identifiable boundary" (Bedeian co. 1991). Because an organisation is a basic learning system, the third concept in this categorisation is "Organisational learning". Organisation theory is concerned with the structure and management of organisations (Malcom, 1994). Management is an essential part of a learning system. It can make learning possible or we can think of a manager as a learner (Ruohotie, 1996). Therefore, within the first heading of this categorisation we have considered a manager as an enabler. A manager can also be seen as an individual learner or as being a part of the organisation.

Naturally, an organisation also contains workers or individuals. A workplace can also be only one person unit, in which case the organisation is missing. Personal learning is, therefore, an obligatory concept, and in this categorisation it is the second heading. Mental models, motivation and emotions are abstract concepts connected to people. They can greatly affect the individual's, and also his/her partner's, learning. An organisation has an organisation culture and tacit values. Kotter (1990) has noted how essential they are, when we talk about change and learning. Outside the organisation there is the outside world, e.g. competitors, clients and consultants. Communication inside the enterprise takes place at all levels. Also all the units of the organisation, individuals and management, communicate with the outside world. Communication is a tool or enabler and has, therefore, a relationship to learning.

Since there are many overlapping areas in this categorisation we have had to do some compromises. One of them is that some personal learning elements can be found in several categories. For example an organisation can get feedback and formal learning can be considered within management and organisation. We have regarded the individual as a basic unit. Every time when we talk about feedback we can return to the individual (Senge, 1990 "Organisations learn through learning individuals").

Table 1: The categorization comprises five main categories each including 3-7 sub-categories

1. Management and leadership
   - A Knowledge management/leadership
   - B Competency management/leadership
   - C Performance management/leadership
2. Personal learning
   - A Self-developmental opportunities for all
   - B Training or non-formal learning
   - C Formal learning
   - D Informal learning or learning through experience
   - E Feedback
3. Organisational learning
   - A Collective learning
   - B Single-loop learning
   - C Double-loop learning
   - D Deutero learning
   - E Managers/leaders and specialists learning
   - F Community of practice (COP)
4. Organisation culture, visions and budgeting
   - A Participative policymaking
   - B Enabling structures
   - C Formative accounting and control
   - D Learning through reward
5. Mental models, motivation and emotions
   - A Mental models
   - B Motivation and emotions
6. Communication enabled learning
   - A Learning through technologies
   - B Verbal face-to-face communication
   - C Written form of communication
   - D Distance learning

1. Management and leadership

The first main category is based on Pentti Sydänmaanlakka's (2001) description of an intelligent organization and his views on how learning can be supported in organisations. He has divided the learning processes into three categories; competence-, knowledge- and performance management. Although the three areas of management overlap to some degree, this is useful as a ballpark categorisation in the area of management or leadership.

2. Personal learning

A discipline of aspiration, concerning what an individual wants to achieve (Senge, 1990). This main-category is based largely on Jyrki Kasvi's (2003) theories about learning at work, namely training, support and feedback. Because support is included in other categories, especially in management and leadership, we did not include it in this category. Moreover, we decided to include self-development opportunities for all from Pedler and co. (1997) and learning through experience and teaching to others from Sydänmaanlakka (2003). We wanted to stress the importance of self-development. It is also important to note that professional development of adults is typically defined by three concepts; formal learning, non-formal learning and informal learning. It is difficult to make a clear distinction between formal and informal learning as there is often a crossover between the two (McGivney, 1999).

3. Organisational learning

Senge (1990) defines learning organisations as "Organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to learn together" (Kasvi, 2003). Organisational learning means that an organisation is capable of regenerating and changing its actions (Sydänmaalakka, 2000).

The organisational learning concept is a metaphor and a working tool. According to Kasvi (1993) "Employees' individual learning is important, but it does not necessarily improve the performance of the organisation they work in. The organisation itself does not learn, that is, integrate new knowledge learned by its members and change its ways accordingly. Individuals working within the organization may not be able to exploit the lessons they have learned." Organisational learning builds on past knowledge and experience, which depend on institutional mechanisms (policies, strategies, individuals and explicit models…), used to retain knowledge (Kasvi, 2003).

The sub-categorization of organisational learning is based on the views of several researchers. We have used mainly Argyris' and Schön's (1978) models. They have emphasized the "single-loop", "double-loop" and "deutero" models. This model is originally based on Bateson's learning model, which is generally accepted and valued (Järvinen, 2002). Many texts have also discussed collective learning and therefore it have been included it in our categorisation. Järvinen et al. (2002) has included management and specialists' learning as a part of organisational learning. Revans (1982, 1983) has brought up the aspect of managers' and experts' learning. "The problem with Argyris' and Schön's (1978) levels of organizational learning is that they are reactive. In their model learners require a stimulus, and learning is a response to that stimulus. In order to be proactive, a learning organisation should be able to create, acquire and transfer knowledge and change its behaviour accordingly" (Kasvi, 2003). It is therefore important to investigate organizational learning separately, especially from collective learning, but also from management- and expertise learning. We have also noted the proactive aspect of learning when including the organisation culture in the categorisation.

4. Organisation culture, visions and budgeting

"Organisational culture is a phenomenon that involves beliefs and behaviour; it exists at different levels in organizations; and manifests itself in a wide range of features of organizational life such as structures, control and reward systems, symbols, myths, and human resource practices" (Pettigrew, 1990). Therefore it has a dramatic influence on professional learning. We have been greatly influenced by Pedler and co. (1997). They have noted that organisations and their cultures are important factors in professional learning.

5. Mental models, motivation and emotions

According to Mezirow (1981) adult learning does not focus only on actions. Adult learning is connected to motivation, values, beliefs and data structures. Important issues in adult learning are meanings and perspectives (Järvinen co. 2000). Emotions and learning occur in the brain. Learning means acquiring knowledge or skills. Learning requires thinking. Our thoughts influence how we feel. How we feel influences how we think. The connections between emotion and learning are bi-directional and complex (Lawson).

6. Communication enabled learning

We have divided communication enabled learning in three categories; learning through technologies, written form of communication and verbal face-to-face communication. The idea came from Stina Immonen's (1993) lecture. The development of technology and worldwide networking together with innovative pedagogical changes, have made a transformation of conventional distance education (Dede, 1996a, 1996b) possible. Distance education is primarily used to overcome the barriers of time and place (Silván, 1999). Written forms of communication and verbal, face-to-face communications are traditional forms of communication.

Conclusions

Learning in a workplace research and development projects can be reviewed from many different perspectives. We have approached this task from two different perspectives. Those two models can be thought of as a kind of "fishing net". It looks different depending on which way you hold it. Accordingly the purpose of using the models is to illustrate the same idea, but from a different perspective. Therefore, two different models would offer users of e.g. a search system a possibility to view items in ways that are more familiar to them.

Multisilta constitutes a continuum from brain function to the entire society. It takes into consideration the learning aspect as a whole in the research field while our main model concentrates on the professional learning areas. Our model also, conversely to the model of Multisilta, divides the area into the sections. In our opinion the models complete each other successfully. By using those models the viewer is more likely to get a better understanding of the project he or she is searching for.

Apart from this, one question arises: is something missing, do we need some other approaches, as well?

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ADAPTIVITY IN E-LEARNING – PROVIDED BY KNOWLEDGE MAPS

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Abstract

Besides the often-cited advantages of independence of place and time, e-learning holds a further large degree of potential in comparison to conventional class teaching: adaptivity in terms of content. This idea describes the ability of a teaching concept to offer support for the learner that is fully adapted to the individual knowledge level. The current contribution presents an innovative system to assure adaptivity with regard to content for an e-learning application. Robust Nonmetric Multidimensional Scaling (NMDS) allows the knowledge of a learner to be visualized as a knowledge map. These maps are especially sensitive to relational connections of the declarative knowledge contents, which are depicted in a two-dimensional space. Based on the comparison of a learner model with a target model (by means of Procrustes transformation), individual knowledge deficiencies can be detected. This constitutes the basis for specific feedback, learning recommendations, and individualized exercises. The delineated procedure is presented in the framework of the e-learning environment "Psychopathology Taught Online (PTO)", within which it faces its first practical application.

Introduction: Concept and Requirements of Adaptive Knowledge Transfer

Computers offer considerable potential for an application as a flexible learning and teaching medium. Besides the possibility of designing lessons independently of place and time, and a number of other advantages, computerization (the employment of digital learning systems) provides the technical basis for an individually adapted learning process. Based on the reactions of a learner, intelligent software is able to dynamically adapt the lessons to the current knowledge level and hence optimally foster an individual's learning. Such Adaptive Tutorial Systems (ATS) are characterized by algorithms, which react to the individual behavior of the user autonomously and in an appropriate manner (cf. Lesgold 1988a, 1988b; Lesgold, Eggan, Katz & Rao, 1992; Leutner, 1992; Rüschoff, 1989).

The challenge is to find an optimal balance between the learner's need for support and the material offered in the teaching situation. Adaptivity in the learning process denotes, in its simplest meaning: the system meets the learner, based on a diagnosis of his or her learning status, where he or she is currently situated (Leutner, 1992, 1993, 2002). The tutorial system translates the knowledge diagnosis into corresponding teaching, for instance into giving feedback about the current knowledge level to the learner, into recommending contents which should be repeated, and/or into putting together exercises specifically tailored to the inadequately known contents. This ability of the tutorial system is the result of the employment of the knowledge expertise inherent in the system, which constitutes the above-mentioned "intelligence" of an ATS (Leutner, 1992). This procedure promises a fast learning progress. Repeated learning of already known contents is reduced to a minimum, which results in a higher efficiency compared to a learning curriculum structured in a linear fashion. Further advantages can be seen in the increased motivation and attention of the learner as a result of the feedback about the current knowledge level. The tutorial support facilitates the user's feeling of being taken seriously and is able to tackle the difficult problem of finding the appropriate learning path. These arguments have an increased relevance in particular in asynchronous and non-cooperative applications of e-learning such as "Psychopathology Taught Online" (PTO), which will be used to demonstrate the implementation of adaptivity. In such an application, the tutorial support facilitates the semantically meaningful (intelligent) interaction of the allegedly passive, computer-based medium with the user. The aim is to (re)organize, stabilize and differentiate the cognitive structures of the learner, based on the detection of contents that are falsely known or not known and the resulting reactions[1].

[1] This procedure corresponds to the stimulus-centered approach (cf. Crowder, 1959; Leutner, 2002).

To meet the briefly mentioned requirements and aims, the system has to comprise the following elements:

- Target model
- Image of the learner's knowledge and diagnosis of the quality of knowledge
- Feedback and instructions on how to act

The following section explains how the various elements are implemented and how the adaptivity is accomplished by their interplay.

Implementation

Target Model

As described above, the "intelligence" of an ATS is constituted in the knowledge expertise inherent in the system. The expert model therefore represents a crucial element. There are various approaches for collecting data and translating it into such an expert model: one possibility, for instance, is an information retrieval technique such as automated text analysis. Another possibility is a data collection method that is based directly on expert opinions. It can be expected that the latter method would prove to be more resource consuming but would result in more stable expert models. For PTO, the expert model was calculated based on the judgments of leading experts in Switzerland and their collaborators and was visualized as a cognitive map (Figure 1). The construction and implementation of such a cognitive map of experts and learners is described in detail in the section below.

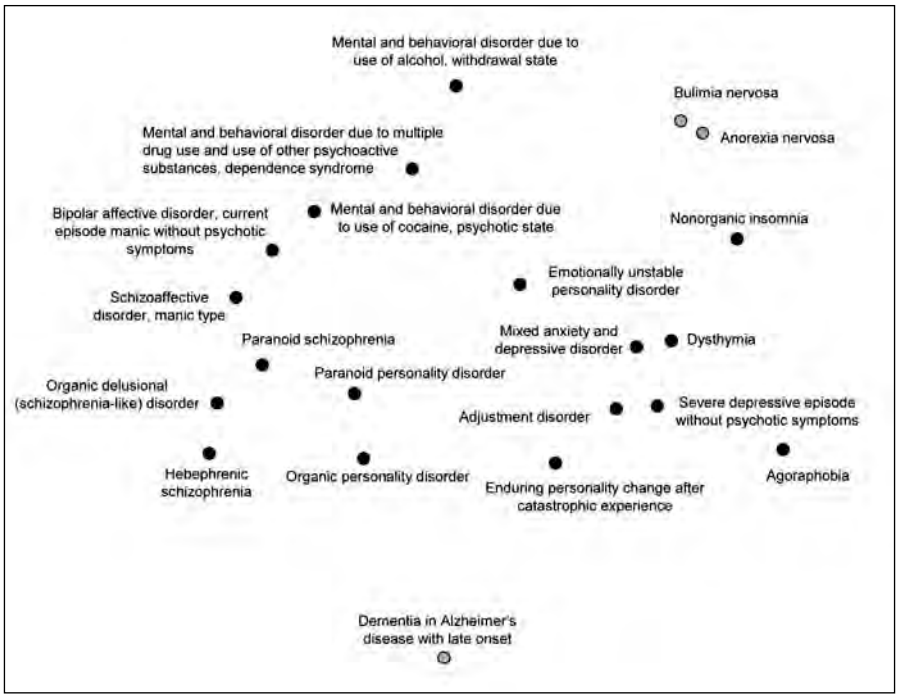

Figure 1. Two-dimensionally scaled NMDS map based on similarity judgments. The dots represent the position of the mental disorders from the point of view of the experts (adapted and modified from Egli, Schlatter, Streule & Läge, 2006). The gray dots represent the examples described in the text

Image of the Learner's Knowledge and Diagnosis of the Quality of the Knowledge

The declarative factual knowledge of a person about a number of objects (in PTO: mental disorders = knowledge units) can be described as a "cognitive map" (Läge, 2001, Marx & Hejj, 1989, Marx & Läge, 1995). A cognitive map is a dimensional structure, which depicts the relations that a person perceives between the objects in the map as smaller and larger distances. This visualization allows inferences about individual memory representations to be made.

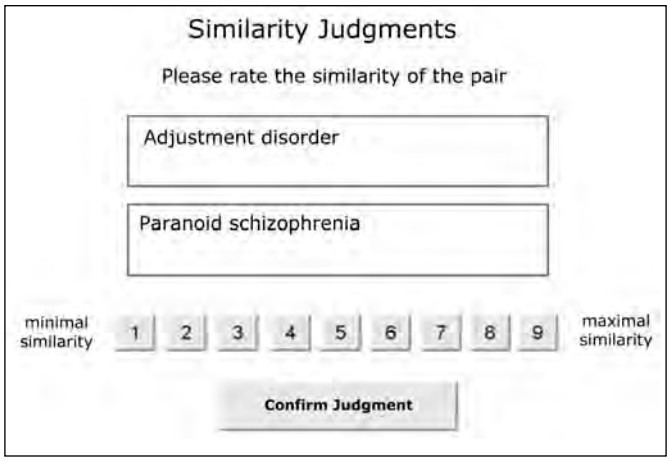

Figure 2. System interface of the similarity assessment from the point of view of the user

Relational, pairwise judgments (similarity judgments: SJ) of a person about a set of objects constitute the data basis of the knowledge diagnosis. The global SJ's between the objects are built more or less automatically by a person, on the basis of the attributes that were considered and the differences in the characteristics of the attributes (cf. Klauer, 1989 und Smith, Shoben & Rips, 1974). These SJ's are relatively independent of expertise, although it can be expected that the judgment of an expert should have a higher quality. An assessment of similarity measures the entire knowledge about two elements and is therefore efficient. Figure 2 shows the viewpoint of the user regarding the nine-point SJ scale. The task for the learner is to provide judgments on the basis of the memorized factual knowledge. One run of data collection containing 20 objects (=190 judgments) takes between 10 and 20 minutes according to experience.

The pairwise assessments are interpreted as distance values and are translated into a two-dimensional space by Nonmetric Multidimensional Scaling (NMDS; Borg & Groenen, 1997; Läge, 2001). The example in Figure 1 shows the result of such a two-dimensionally calculated NMDS, based on expert judgments (expert model/target map). Closely positioned dots (i.e. disorders) were judged to be similar, while objects positioned far part were judged not to be similar. For instance, anorexia nervosa (restricted eating) and bulimia nervosa (binge eating and vomiting) are similar disorders and belong to the same category of the WHO classification system ICD-10 (WHO, 2005). These two objects show only small discrepancies in terms of phenomenology, etiology, and other judgment criteria. The similarity, which was assessed to be very close, is reflected in the close position of these two disorders. Bulimia nervosa and dementia in Alzheimer's disease, on the other hand, show few similarities with regard to the potential judgement criteria (such as phenomenology, etiology, etc.). The pronounced non-similarity that is consequently judged is therefore reflected in far apart positions of the two disorders.

The assessment of the quality of knowledge is achieved by comparison of a learner map with the target/expert map by means of Procrustes transformation (Gower & Dijksterhuis, 2004). In such a comparison, it is noticeable even without mathematical calculations which objects are well known by the learner (i.e. correctly positioned) and which ones are wrongly positioned (as an example, see Figure 3). Of course, this distance information of the target/actual value comparison can also be expressed numerically. This is the basis for a fully automated analysis, which can be applied in computer-assisted education. The overall divergence is expressed as the AverageLoss (AvgLoss), which corresponds to the mean of the individual divergences (ObjectLoss; Läge, 2001).

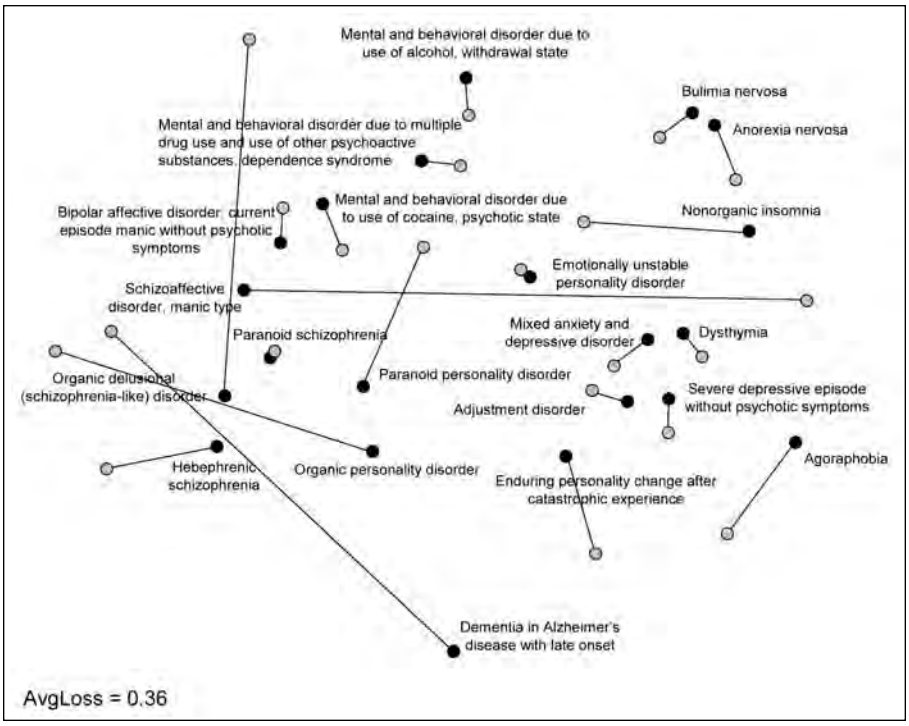

Figure 3. Result of a Procrustes transformation of the knowledge map of a learner (gray dots) and the target/expert map (black dots). The overall divergence in this example corresponds to an AverageLoss of 0.36

The Procrustes transformation is not dependent on different orientations of the object configurations resulting from the scaling algorithm of the NMDS in the maps compared. To put it simply, the Procrustes transformation rotates, mirrors, stretches, and compresses the learner map, while maintaining the object relations, in order to achieve a maximal fit with the target map. The remaining deviations between the corresponding objects are reflected as the ObjectLoss values. If the ObjectLoss of an object in the learner map exceeds a predefined criterion, the system interprets this as inadequate knowledge. More detailed criteria for the assessment of inadequate knowledge such as a violation of a cluster membership or similar, are possible but are not considered in the current concept.

NMDS and Procrustes transformation are adequate instruments for knowledge diagnosis primarily for a medium-level knowledge. If a person possesses only rudimentary knowledge, a knowledge diagnosis offers no advantage of adaptivity, because any learning recommendation is helpful for the learner. If the person already exhibits a well established, integrated and elaborated factual knowledge with few deficiencies, his or her map will not selectively differ from the target map in a significant and statistical way.

Architecture, Feedback and Instructions How to Act in PTO

PTO promotes basic and detailed knowledge in the field of mental disorders. It pursues a constructivist didactical approach and consists of three self-contained learning phases/curricula: Curriculum 1: Basic knowledge; Curriculum 2: Assimilative learning; Curriculum 3: Detailed and additional knowledge.

Curriculum 1 (C1) provides a structured overview of the field of knowledge based on a selection of 20 mental disorders. As argued above, an adaptive learning system is not maximally effective if students have no or only rudimentary knowledge. Therefore, the learners start by thoroughly studying the 20 disorders. After this learning phase, the relational knowledge structure of the learner concerning the 20 disorders is assessed by means of similarity judgments and cognitive maps. If the deviations (AverageLoss) resulting from the comparison of the learner with the expert structure (Procrustes transformation of the corresponding cognitive maps) exceed the predefined threshold, they are followed by three steps of didactical instructions on how to act: first, those disorders that exceed the a priori defined threshold of the ObjectLoss, which were therefore inadequately positioned in relation to the overall expert structure, are recommended for learning and repetition, respectively (adaptive feedback

as a learning recommendation). The second instructional step follows if after the repetition of the recommended disorders and the renewed knowledge diagnosis by cognitive maps, the AverageLoss still exceeds the threshold: based on the orientation of the misplacement, the diagnosis allows specifically designed learning exercises to be constructed. The learner is asked to look for differences in the two contents if the positions of two disorders were significantly closer than in the expert model (depending on the criterion). Following the same logic, the learner is asked to look for similarities if the positions of the disorders were significantly further apart than in the expert model. The third instructional step follows if after working through the exercises, and the renewed knowledge diagnosis, the AverageLoss still exceeds the threshold: the learner then receives his or her current individual knowledge map as feedback about his or her cognitive representation in comparison with the expert representation. The knowledge is recurrently assessed until the deviation (AvgLoss) between learner and expert model are below the predefined criterion or until a certain number of knowledge diagnosis runs are completed. The learner can then enter the next Curriculum.

In Curriculum 2 (C2), the knowledge structure accurately built up beforehand is supplemented by the assimilative integration of 40 new mental disorders in explicit relation to the 20 disorders that have already been learned. This assimilative integration is also supported by the adaptivity of the tutorial system: new disorders are studied by the learner in groups of five disorders. After learning the disorders of a group, the relational knowledge of the learner is assessed, i.e. his or her cognitive map is compared with the respective expert model. As soon as one disorder falls below the threshold of the ObjectLoss, i.e. the disorder is correctly positioned, it is replaced by a new one. Thus, the theoretically derived advantages of assimilative learning put forward by Ausubel (1980/81, 2000) are implemented in PTO. The C2 learning contents are reduced to the amount and complexity that is necessary to properly position a disorder in the overview structure. During C1 and C2, the learning progress is monitored by a continuous relational knowledge diagnosis, and is adaptively guided until the cognitive representation of the student sufficiently matches the expert representation.

In Curriculum 3 (C3), some selected disorders are discussed in detail, and psychopathological knowledge that is not disorder-specific is taught. In C3, there are no adaptive measures implemented (cf. Streule, Egli, Oberholzer & Läge, 2005).

Concluding Remarks

The primary goal of a multimedia production in education needs not be restricted to the digitalization of conventional teaching materials and their enrichment with multimedia. An added value of the computer as a learning medium can only be a result of the appropriate usage of the newly available possibilities. An important difference between a book and a computer or between teaching in class and a personally utilizable computer is its flexibility. The system is not rigid, but can adequately ("intelligently") react to specific behaviors of a user. PTO achieves this intelligence by detecting cognitive structures of learners and by the comparison of these structures with the expert model. Additionally, the curricular architecture takes into account the current theory of assimilative learning to optimize the learning process for the student.

Adaptive knowledge transfer is conterminous with an individualization of knowledge acquisition. Just as a teacher in an individual teaching situation is able to adapt to the measured or observed strengths and weaknesses of the learner, the logic of adaptivity tries to do the same. It achieves this by NMDS and Procrustes transformation. Furthermore, this procedure goes beyond a mere reproduction of knowledge contents by focusing on the quality of the structural knowledge processing. Hence, the knowledge maps not only serve as passive blackboards, but also contain a didactical aspect, because the learner has to apply his or her entire knowledge to accomplish the diagnostic task.

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MODERN TEACHING DEPENDS ON A MODERN CURRICULUM

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In the European debate on education the pressure on the education system to modernise can be clearly felt. Students are to be educated to become citizens in a knowledge society. One tendency is towards wishing for more individual learning, with the active participation of students and the inclusion of new technology. Another tendency is towards increased knowledge, the expansion of the syllabus and centrally formulated final and threshold objectives, quality assurance and national tests. Teachers often perceive these wishes as being diametrically opposed. Increased knowledge, understood as a larger common syllabus, cannot be reconciled with a pedagogy based on time-consuming student-controlled learning processes.

The aim of this article is to discuss the role of educational programmes and teaching in tomorrow's society, using this dilemma as its point of departure. It will argue that the integration of convergent media and digital teaching materials in the education sector opens up the possibility for knowledge to be strengthened via increased student activity. But it depends on that the 'digitalisation of the school' is anchored in a constructivist, systemic understanding of learning.

The article also takes as its starting point the surprising fact that at last year's EDEN conference in Helsinki it was possible to come across the view that students can become competent citizens simply by playing and surfing on the Internet via a cell phone, because 'you can learn a lot from doing that'[1].

Well yes, fortunately it is possible to learn a great deal via one's own initiative, but one of the main points of pedagogy is that what one learns it is not a matter of indifference. Civilisation presupposes a certain consensus in society as to what it is desirable for children, young people and adults to learn (the educative aspect) and what competences they develop (the action perspective).

The question as to why we have schools must thus be answered in the field of tension between a discussion of the school's role as respectively conserving and changing society, while the question of what is to be learned is answered by the dialogue taking place in society at any given time between various views of personal development (Bildung), often referred to in the school world as the cultural struggle for the school's content. The result of these deliberations is summed up in a curriculum, a tool placed at the disposal of schools and teachers as a basis for their planning of teaching.

It is in the planning phase – with the curriculum as the point of departure – that schools and teachers find answers to how teaching is to take place.

The role of educational programmes and teaching in a digital future

It can be tempting to assume that the emergence of convergent media, the Internet, etc. is opening up so many new possibilities for learning of both a formal, non-formal and especially informal nature[2] that schools will become superfluous. But if we as a society continue to want to have even some degree of control over students' learning, there is reason to assume that the emergence of convergent media will increase the need for formalised learning via educational institutions in the future. The temptations of the Internet are so great that society's need to control children and young people's use of the Internet will increase. This is only possible by obliging young people to participate in formalised educational programmes, where the potential of convergent media is exploited to develop competence instead of for entertainment[3].

[1] First expressed by Professor Henry Tirri in the Opening Plenary Session

[2] Get started with distance learning, p. 13

[3] Hans-Peter Martin and Harald Schumann: The Globalisation Trap, 1997

In Denmark, we are in the middle of a process where the politicians are reformulating what content should form the basis of students' learning in the Folkeskole (compulsory primary and lower secondary education). Formerly, this issue was a matter for teachers and parents to decide, with the local authority as the supervising authority. In 2003, a political decision was taken to introduce nationally final and threshold objectives in the Folkeskole[4]. These have been followed by a decision to introduce national tests as a follow-up to the objectives. Both can be seen as an expression of the fact that society wishes the task of education to be taken seriously by students, teachers, parents and municipalities.

Teaching as a relation

The intentions underlying the curriculum are concretised in the teaching offered by the institutions. Teaching can be regarded as a relation between student, teacher and content. This can be illustrated by an equilateral triangle (Figure 1), where side 'a' is the relation between student and content, side 'b' the relation between teacher and content, and side 'c' the relation between teacher and student.

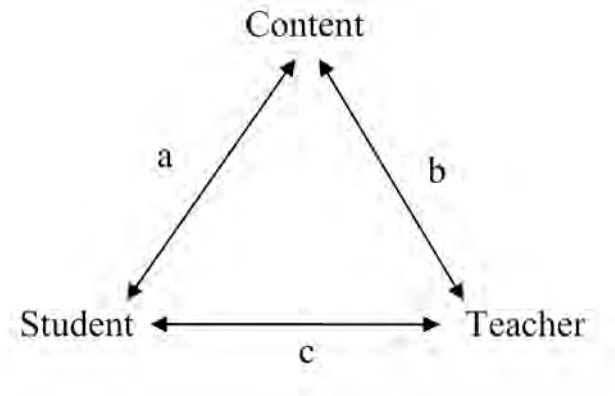

Figure 1. The didactic triangle[5]

But before looking more closely at these relations, it is worth taking a closer look at the apex of the triangle.

What is knowledge?

Part of our knowledge of the world is categorised in subjects and is stored and passed on in symbolic language (words, images, formulas, notation or patterns of movement). Howard Gardner[6] distinguishes symbolic systems of the first order, which are acquired via the body, and symbolic systems of the second order, which are acquired via the brain. One learns to speak, to count, to turn somersaults, to paint or to play the guitar by perceiving, observing others and practising. A book or a film can provide the necessary inspiration for beginning to practise. One can gain help and guidance by watching how other people do so, or by asking questions.

Symbols of the second order can only be learned via teaching. One cannot learn to read by looking at a person who is reading a book[7]. In the same way, it is impossible to interpret religious pictures if one has not learned what symbols are linked to the religious gallery of characters, or to read notation if one does not know the form of the notation. One has to learn to break the code in order to gain access to a world of symbols. These two orders of symbols can be referred to as *analogous* and *digital* symbolic systems respectively[8]. This ordering makes it possible to differentiate between analogous and digital

[4] Final and threshold objectives in all school subjects were introduced in 2002 by the Danish Government

[5] First introduced by Johan Friedrich Herbart (1776-1841)

[6] Per Fibaek Lauersen, Didaktik og Kognition

[7] I have borrowed this illustration from Per Fibæk Lauersen in Didaktik og Kognition

[8] Getting started with distance learning, p. 13

knowledge (Table 1). Digital knowledge in this context means that there is knowledge that can be noted in a symbolic language. Digital knowledge has existed, then, long before the computer was invented. But the strength of the computer is its ability to translate analogous and digital data into a completely new common symbolic language (registered in binary number codes), which opens up new possibilities for combining, analysing and processing data (media convergence). It is these possibilities we must learn to exploit in ways that can assist students' acquisition of various forms of knowledge.

Table 1: Forms of knowledge

Category[9] **aim**	**Content focus**	**First order analogous knowledge** **Such language subjects as:**	**Second order digital knowledge** **Such language subjects as:**
Factual knowledge Qualifications	Subject as material Fingertip knowledge and skills	Speak Understand Reproduce	Read Write Refer
Situative knowledge Competences	The subject as use Processes	Create a narrative	Analyse texts
Systemic knowledge Creativity (in the broad sense)	The subject as optic Products and results	Use language to explore the world with the intention of understanding it	Use language to explore the world with the intention of categorising it

How can content be described?

Table 1 sets up three main categories related to how content can be described: the subject as material, the subject as use and the subject as optic. The aims for what students can be expected to acquire can similarly be formulated in three categories: qualifications, competences and creativity. Finally, the model is linked to various possible methods of working that enable work on the content to be conducted in analogous and digital form at all three levels.

The computer opens up possibilities for increased student activity – individually or in groups – access to learning resources, ongoing assessment and registration of the students' progress. In that way, it is possible to organise thematic and problem-solving teaching, based on a curriculum that is described in terms of material, use and optic categories.

The relations of teaching

A curriculum formulated in such a way makes it possible to rethink the relations of teaching, so that the student's acquisition of subject content becomes the focal point and hub when teaching is being planned. The task of the teacher has the optic 'the double opening: to open up the world to the student and the student to the world'[10].

The student-content relation

The student-content relation focuses on the process where the student, via his or her working on a content area, constructs knowledge[11] and develops proficiencies. The learning process can be

[9] Lars Qvortrup, Det vidende samfund

[10] Wolfgang Klafki

[11] Reference is made here to a constructivist understanding of learning based on Piaget's theory of learning. Examples of theorists who have been involved with constructivist learning are Jens Rasmussen and Lars Qvortrup, inter alia in their articles in Paedagogiske Teorier

experienced individually, in collaboration with peers or in a dialogue with the teacher. The learning process can be chaotic or systematic.

In constructivist learning methodology an attempt is made to integrate chaotic types of tasks into structured learning sequences. By combining various types of tasks it becomes possible at one and the same time to acquire knowledge and to develop competences and creativity. Constructivism challenges the conception that the aim of education is for everyone to learn the same thing. The underlying idea is that when we know something different that has been brought about by our examining with the same optic various corners of reality, it is possible to increase knowledge of the social system and thereby reduce the complexity of the outside world.

The didactic efforts seek to find ways of exploiting in the education system the potential that lies in a combination of systematic and chaotic learning processes. This is where LMS systems and e learning come into the picture with organisational forms that make it possible to handle individual and collaborative learning processes. Digital learning applications (reusable learning objects) and digital evaluation concepts enable the combining of work sequences, where students work alternately with a chaotic acquisition of knowledge via problem-oriented tasks, systematic acquisition of knowledge via structured tasks and division of knowledge via media-convergent forms of presentation.

The student-teacher relation

In this optic, the student-teacher relation focuses on the dramaturgy and organisation of teaching. Together, teacher and students stage working processes and decide the way in which the content is to be dealt with, independently of the learning qualifications and preferences of the student, the nature of the content, its accessibility and, not least, the concrete learning aims. Teacher and students can derive support from both formalised and non-formalised learning processes. Table 2 offers some of the possible forms of learning.

Table 2: Forms of learning

Example of forms of learning	**Formalised**	**Non-formalised**
Learning via deductively mediated knowledge: in oral, written or electronic form	Lecture Reading of texts	Entertainment Documentary programmes, etc.
Learning via inductive learning processes	Dialogue-based teaching and task-solving	Social interaction
Experimental learning	Laboratory work Studies Research and development	Learning via play and games
Phenomenological or aesthetic learning	Practical & aesthetical work processes	Learning via practical training and artistic development

The task of the school and teachers here is to introduce students to the subject's material areas, use and optic, in order to take decisions with the students on the best way for the students to work on acquiring the content. It is furthermore the task of the school and teachers to have an overview of relevant learning resources and to ensure that students have access to these sources.

The teacher-content relation

The teacher-content relation has as its point of departure a dialogue between the teacher's understanding of his or her subject and that of the subject's curriculum. It is here that the educative and action perspective must be clear to both school and teachers. When the school and teachers are aware of why the subject assumes an important place in efforts to integrate students into civilisation, it also becomes easier for them to advise students about exemplary issues and appropriate working methods that can initiate and support students' work on the content. In that way, students can work with the content in a qualified way, one that is new to both teacher and student.

The digitalisation of teaching

As mentioned earlier, efforts to digitalise teaching must be included as part of a pedagogical context if we as a society wish to retain the educative and action perspective of teaching.

Computers, cell phones and other convergent media grant access to information that is new to both teacher and students. The computer places a number of tools at the user's disposal which are capable of processing data and information. It also opens up for communication between teacher and student and between students that are independent of time and space. And, not least, virtual space offers platforms where one can present the knowledge generated in connection with a learning process, after which it can be documented and shared with others.

Virtual space also grants access to more structured virtual learning fora that are designed as actual teaching fora. This could take the form, for example, of a producer of electricity that offers school pupils a learning forum about electricity, a museum that offers such a forum about the Middle Ages or the Danish National Board of Health that offers a forum about diet and health.

If the school and teachers are to be able to exploit the potential offered by the new technology, this depends on an alteration to the contract between society and school. It depends on politicians with the courage to formulate a new vision for the school. It depends on curricula that are based on a new understanding of knowledge, where the aims of teaching are formulated in categories of knowledge and exemplary themes instead of content categories and syllabuses. And it depends on means being earmarked for school development and teachers' in-service training that keeps pace with schools developing their technological infrastructure. If the school is not given the opportunity to exploit these possibilities, there is nothing to indicate that young people will turn their backs on convergent media. It is probably more likely that they will turn their backs on the school.

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THE OPENNESS OF OPEN EDUCATIONAL RESOURCES PROBLEMS AND POTENTIALS

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Hoping for OER

In 2002 the UNESCO defined Open Educational Resources (OER) as: "The open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes."[1] This covers a multiplicity of resources, contents and tools for the digital production of learning materials; published by individual teachers and lecturers, by networks, as well as by established institutions. Very influential was the MIT OpenCourseWare (OCW)[2] initiative because of the width and depth of the contents it provides. Now also less well-known initiatives, which e.g. show other organisational structures, concentrate on educational software or metadata standards, or do not come from the North American continent, come into focus.[3]

However the independent scientific reflection of these developments has hardly started. Whereas some coherent explanations regarding the specific effectivity and success of open networks, like e.g. OpenSource/Free software, wikis, or in the beginnings the usenet, can be found (e.g. Benkler, Demile/Lecocq, Kollock), such analysis is still missing in relation to OER. It is the aim of this article to show some of the problems, which OER will probably have to reach a similar grade of effectivity; but also it will be hinted at some potential, that might work out if certain conditions can be adjusted to the problems. The questions are: why and how people would work, in a certain sense, together for the improvement of teaching materials or learning objects, and how somebody would effectively find learning objects of high quality suitable for his or her ambitions. Also for institutions like the UNESCO or the OECD, which are interested in the development of OER, it is the main question how open educational resources can be used on a scale as global as possible, and how relevant international co-operation and usage can be initiated.

Hopes linked to the developments and initiatives in field of OER are thus based on comparisons with the success of other 'open' structures in the Internet, like the mentioned ones.[4] So on the one hand some kind of moral or non self-interested motivation is presupposed as a starting point for the global OER avalanche. Johnstone (2005) who is one of the leading figures in the OER-'movement states': "A major reason for sharing resources created for local communities is individuals' desire to make a difference in the lives of those less fortunate. […] The real vision for OER is the sharing in all directions of resources and approaches to teaching, not just North to South." On the other hand a functional argument is given for its evolutionary success: "Open Educational Resources have one very important impact on the cost curves. They have the potential to bring down sharply the initial investment cost of technology-mediated learning. This is revolutionary because it means you can offer appropriate eLearning to low

[1] http://www.unesco.org/iiep/virtualuniversity/forumsfiche.php?queryforumspages_id=13#

[2] http://ocw.mit.edu/index.html

[3] Already well known is the OpenCcourseWare initiative of the MIT (http://ocw.mit.edu/index.html); but there other providers e.g. Connexions of the Rice University (http://cnx.rice.edu) or the OpenKnowledgeInitiative (http://www.okiproject.org); also the African Virtual University (http://www.avu.org), the European Ariadne network (http://www.ariadne eu.org) or the Learning Objects Metadata network (e.g. http://www.cancore.ca) can be named here in line with many other institutions and individuals, that present learning or teaching materials and tools in the Internet.

[4] "What's in a Name? By analogy to the free and open source software development site, sourceforge, schoolforge is conceived of as a site where schools can be developed. "What?" I hear you say, "You're going to build schools?" Not exactly. We're going to build what goes into a school, particularly, the software and other learning content that is needed by teachers and students to get on with their work." http://www.schoolforge.net/what.php

numbers and make it locally relevant. You no longer have to recoup a large initial investment through the high enrolments that are a feature of the open universities." (Daniel 2005)

Network structure

We want to compare the (possible) network structures of OER and of OpenSource-Software as the latter is the economically most important and is therefore also the theoretically best described open network at the moment (if we took another open network the arguments would of course slightly differ, but we would have the same results regarding OER).

As a start we have to distinguish between the relation producers of a certain piece of information have among each other and the relation between the sponsoring producers and the adopters (in the case of OER: re-using teachers and self-learners). Both relations differ between the two forms of network in a way which is relevant for the success or failure of OER as a loose but self-sustaining social network. There are some structural features which are relevant for the working of open networks, which lie between the initial motivation and the evolutionary functionality. Besides the motivation to contribute or participate, networks have to provide a communication infrastructure in order to make it viable as well as some kind of control mechanism which adjusts the contributions or intentions to relevant tasks or aims (Powell 1990). If one takes the trias of communicational, motivational and control structure[5] as a framework to make a structural comparison between the different forms of 'openness', substantial discrepancies appear in the different structural fields. However there might be also some functional equivalents. They are though far from being implemented. They seem however implementable, because respective technology is not lacking.

Communication infrastructure

On the (technical) level of the communication structure regarding both the relation producer/producer and the relation producer/adopter it is the absence of a centric form of communication and publication which makes the crucial difference. OpenSource initiatives show a very centralistic attitude regarding the communication between the contributing 'hackers'. Responsibility for the coordination of one project is clearly given to one person and so called forking, i.e. looking for different solutions to the same problem, is held as an exception and needs very good reasons to be accepted by the community (Raymond 1998). With such a centric structure of communication the medial conditions of the Internet foster the production of common goods. In computer-mediated cooperations the information and transaction costs are very small (and almost independent of group size). By this the chances for a single person to create a considerable contribution to the common good are very high (Kollock 1999, Kollock/Smith 1996).

Also the publication of finished pieces of software is structured in a way that makes it quite easy for possible (non-professional) users to distinguish the relevant features and the quality of it, e.g. looking for manuals, commentaries and other sorts of quality control. Therefore contributions of programming time are also likely to have a substantial effect, which is important for the motivation to contribute in a manner suitable for public use.[6]

In contrast, the production of OER though based on the same Internet-technologies is highly dispersed. One can e.g. find a set of different statistics manuals or introductions to electronic engineering.

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[5] This 'trias' is of course dependent of general structural functionalist thoughts.

[6] The product copylefted by General Public Licence regulates the relation between the 'sponsor' and the 'adopter' of a piece of software. This rather lose relation is however also the backbone of the tremendous social and economical development of OS/FS. This is possible because governance created by the GPL "can generate transaction costs that are lower than those of other governance structures", and because: "under bazaar governance, the uncertainty attached to a given transaction with a given adopter is counterbalanced by the potentially high number of adopters able to produce the expected output." (Demil/Lecocq 2003) This implies a specific change of perspective regarding transaction costs, because it is not the single (improbable) transaction but the sum of transactions, which makes the difference. Even if the sponsor has no idea who might ever use his piece of work, he knows that there are so many possible adopters, that he might consider it worthwhile.

However educational resources are usually produced to fit to specific didactical contexts, consisting among other things of age and experience of students, course curriculum, preferred methods of the institution, and also very important the personality of the teacher. There is few and if rather informal and uncoordinated exchange of teaching materials between teachers. Even less is (public) peer review of teaching materials. If made publicly accessible in the Internet at all resources are to be found on the website of the teacher's employing institution. And even if a server for exchanges of materials exists resources will probably not be uploaded on this server in addition to the home server of the producer. With this it is very difficult for a learner finding such OER to estimate their quality and usefulness. He would have to take time to 'use' it, to know the quality. This is of course demotivating for both sides.

Individual motivation

As it has already become clear the division of the communicational and motivational infrastructure is mainly analytic. It is even a major condition for the success of open networks that the two dimensions interfere so much. However it is still one question, what is supporting or hampering motivations, and another, what is motivating in the first place. The success of the open networks in Internet can be seen in the amount of public (information) goods produces within these networks. This production is in contradiction with the dominant economic paradigm of the self-interested homo oeconomicus, as it provides competitive publicly accessible products without the contributors anticipating any reward (also the potential users are not expected – and because of the medial conditions cannot be expected – to reciprocate the received good).[7] Motivations for contributing to these open networks can be found in the general philanthropic area, in play like and creative attitudes especially combined with computers[8], or the specific wish to create some online persona (Remmele 2004).

The basic motivation does not seem to be the major problem to a successful OER movement. Usually teachers are paid – meanwhile many OS programmers are too – so they have to create teaching materials and learning objects in any case. And often enough teachers put more effort in their materials than they are paid for. Maybe because they like to teach, maybe because they compete with colleagues in certain ways. "The range of motivations will be diverse – from self-expression to love of knowledge, from participating in a community of teachers to frustration with the outputs of the tightly controlled textbook markets and a wish to have better materials to work with." (Benkler 2005) The motivational potential of the producers is thus not the problem. Also the motivation of re-users, i.e. teachers who want to apply OER for their teachings, and self-learners is obvious; but again the interference: only if they can realistically suspect to find something. However one motivation problem remains until now. As long as major incentives like reputation and scientific excellence are not related with the production of teaching materials, the full potentials are used. The motivational structure can thus still be optimized if the production of high standard OER is considered as a form of excellence. This is however a general problem of teaching, especially in the academic sector.

Control structure

The structures of control we are concerned with relate to different tasks and can be of varied nature. On the one hand we have the problem of how to control and organise the adequacy of motivation and possible contributions with the demands of a certain project. On the other hand there is the problem of controlling the quality of the product in way that is transparent for a potential user.

Benkler (2002) provides an exhausting explanation of how open networks manage to coordinate the contributions to their common products. What he calls "commons-based peer production" is a mechanism that coordinates on the basis of information-technology based communication structure large sums of individual work in a way that is impossible for markets or hierarchies to handle, because

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[7] "The initial contributions to the social science literature on open source and free software […] movements have been directed primarily to identifying the motivations that account for the sustained and many instances intensive engagement of (rational) agents in this non-contractual and unremunerated mode of activity. That focus reflects the view that widespread voluntary participation in the creation of economically valuable goods which will be made freely available for public use is an anomaly (at least from the viewpoint of mainstream microeconomic analysis)." (Dalle e.a. 2002)

[8] "It's an emergent property of human minds to create." (Moglen 1999)

a respective centralized representation of abilities, motivations, and tasks would be too ineffective and too expensive. "Peer production provides a framework within which individuals who have the best information available about their own fit for a task can self-identify for the task. This provides an information gain over firms and markets […]" Respectively a project based on peer production is not mainly limited by complexity, but its possible modularity and granularity, because the motivation to contribute might be rather small or very specific.

First of all, in view of OER there is no common project, which is the same as to say that there is no centralized publication of the product. Only perhaps there is a number of similar projects, which might benefit from the contributions of the others, if they know about each other. Because of that and because of the need of specific local adaptations the modularisation and the granularisation as well as the self-identification for appreciated tasks cannot be achieved in a way that the effective coordination mechanism of commons-based peer production will run like it does in the production of OpenSource software.[9]

Regarding the relation between the sponsor and adopter one crucial moment in the field of quality control is language in a wider sense. Software 'speaks' in a rather universal language to computers and it is quite easy and generalisable to find out if the computer 'understands' it correctly: the software works properly or it does not, and if this test has been done by somebody else before it is not necessary to repeat it. Educational resources have to be provided in different human languages, i.e. single resources are not understandable for all possible users. But even if they are in a language understood by the user or re-user, how good and useful they are, has to be determined by each of them according to his or her own needs. Not only in relation to language the generalisability of the quality of educational resources is rather limited compared to software. Especially self-learners cannot judge the quality of resources which they find somewhere in the Internet; and peers do not have the infrastructure and the motivation to provide reviews[10] – which would then be a kind of meta-OER facing similar problems, especially regarding decentralized publication structure.

Functional equivalents

There is a basic tension inherent in the concept of OER. The Openness of digital information networks implies a rather anonymous relation between involved persons, especially between the producer of the resource and the user/adopter. Educational resources are however usually made to fit into specific social context of teaching and learning, i.e. the production implies a certain concept of its usage. This relates to issues like mixture of online and classroom activities, timing, integratedness into the curriculum and administrative procedures, or just size and granularity – all these piecemeal didactics, that cannot be applied without a clear vision of the social setting in which the intended teaching and learning take place. It has to be noted, that this is problem both for the producer, who does not know how to make his materials publicly available in suitable and most effective manner, and for the user, who cannot judge the relevance and quality of a learning object he found. This might however be an analytical tension and not necessarily a practical one, if further conditions are taken into account.

A way to reduce the tension might be found in the development and usage of adequate meta-data and interoperability standards (including appropriate intellectual-property-rights-management). This might also be combined with a system providing personal or institutional accountability and responsibility. There are strong search engines nowadays, so the problem of finding relevant pieces of information in spite of the decentralized publication might be solvable, if meta-data and interoperability standards provided sufficient transparency in the Internet.[11] Connecting searchability and interoperability with

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[9] Thus also Benklers (2005) analysis of OER makes the reader not too enthusiastic about the future of OER: "The critical defining characteristic is that, in addition to being commons-based the activity involves at least concordant coordinated action of larger numbers of individuals, and, more often, actual cooperation among participants in a project or enterprise."

[10] "The more difficult task is to create a system for filtering and accreditation that would separate the wheat from the chaff. The sheer magnitude of the universe of materials that are and will likely be produced in an open network, particularly as the cultural habits of creative engagement diffuse in the population, suggests that the problem of accreditation and filtration will be a very large one." (Benkler 2005)

personally or institutionally accountable resources would probably also lead to the implementation of basic quality standards by the producers themselves, because more educational and scientific excellence could be attached to such resources.

One might even think of the possibility of automatic evaluations. If producers stick to certain standards regarding meta-data and a general structure (syllabus, reading list, mock examinations etc.), algorithms oriented at benchmarking user scenarios could be implemented in respective search engines. Or like in Google linking between resources could provide information about the quality through peer usage and appreciation without further effort. And as such an automatic evaluation could even provide an equivalent to citation indexes, again the motivation to adhere to relevant usability and quality standards would rise again.

The problem which the variety of human languages creates for OER cannot be solved without further effort. Somebody has to do translations in order to make foreign OER usable. By CORE (China Open Resources for Education) it is tried to organise the translation of MIT OCW courses into Chinese as a commons-based peer production. Judging from the general outlook this system does not seem suitable for liberal societies in general. The translation of a greater part of MIT OCW into Spanish and Portugese sems not to be done by re-users, thus reading list and other parts which needed a specific adaptation to the local context remain partly useless. "In order to be most effective, OER should be both culturally and linguistically "translated" so as to enhance greater understanding, relevance and adaptability within developing populations." (UNESCO Forum 2005) An adequate local adaption has to be done by re-users. If they understand the foreign language the problem is again at least partly reduced to finding relevant material and determining its quality.

Summary

Moglen's (1999) 'Metaphorical Corollary to Faraday's law' states: "if you wrap the Internet around every person on the planet and spin the planet, software flows in the network. It's an emergent property of connected human minds that they create things for one another's pleasure and to conquer their uneasy sense of being too alone" The only question left is: "What's the resistance of the network?" Whereas Moglen identifies the intellectual property rights system as the resistance to the OpenSource network, IPR is of course not the main problem for OER resources. As we have seen the main resistance to the flow of OER is its rather to be found in its dispersedness, i.e. its relation to a local context. Both in the field of their production and usage OER have to counterbalance this 'disadvantage' in relation to existing and successful open networks, because as long as the effort for finding suitable resources is expected to be higher than the expected effort to create them oneself, the network will not gain critical mass[12] and the potential of OER for global learning is not used optimally.

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[11] It is a very remarkable feature of the creative-commons-licence, that it is machine-readable, also respective search engines already exist. Bound together with a search- mechanism on the meta-data-structure of OERs this could provide a capable infrastructure for an educational bazaar, working with minimal transaction costs.

[12] Even though there are very supportive philanthropic funding schemes for the development of OER, especially by the Hewlett Foundation (http://www.hewlett.org/Default.htm).

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CREATIVE AND COGNITIVE ASPECTS OF E-LEARNING PROCESS

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1. Introduction

The very quick development of new information and communication technologies (ICT) has enabled the birth of new forms of education such as e-learning (very useful for Life Long Learning Process). Creation of an appropriate intelligent e-learning environment considering pedagogical aspects of learning process and enabling continuous adaptation to individual learners (their needs and possibilities) is very important to ensure high quality learning process.

From pedagogical point of view, learning process does not change, only tools that support such process change. Information and communication technologies, being used in education, are new tools added to existing tools that facilitate learning process. ICT tools should be used as a set of creative and cognitive tools not only tools for gathering, storage and transfer of information.

Educational application EDU (presented in the paper) has been created at National Institute of Telecommunications in Poland to ensure creative, cognitive and individualized e-learning process by the use of modern ICT tools.

2. Intelligent learning environments

Intelligent learning environments should ensure individualization of e-learning process (by continuous adaptation to individual learners) enabling creative and cognitive learning. They should be designed and built (by the use of modern ICT means) considering pedagogical theories of learning (ensuring good understanding of learning process). Such learning environments should stimulate learner cognitive curiosity, motivate learners to learn, enable active use of knowledge during learning process.

Kolb's pedagogical theory is very useful for creation of high quality e-learning environments (considering learners' styles and type of knowledge) that facilitate learning process. According to Kolb's theory, learning environments can be of the following types: behaviourally complex (the emphasis is on the active applications of knowledge and skills to a practical problem), symbolically complex (a learner is involved in trying to solve a problem for which there is a right answer), perceptually complex (the main purpose is to understand: to be able to define problems, to identify relationships between concepts), affectively complex (it emphasizes experiencing what it is like to be a professional in the field of study).

Kolb's theory classifies knowledge into one of the following types: convergent, assimilative, divergent, accommodative. Each didactical subject (academic field such as physics, mathematics, history, business, engineering, etc.) belongs to one knowledge type. Such classification is useful to design appropriate learning environments. For example: learning an engineering subject (that belongs to convergent knowledge) requires environment that is behaviourally and symbolically complex.

Each learning environment can be characterized by primary and secondary elements (ensuring, among others, realization of cognitive and creative functions). The selection of environment elements to build an appropriate learning environment, depends on the type of knowledge to which a didactical material belongs.

Rich methods and tools of artificial intelligence can be used to aid e-learning process. Use of artificial intelligence enables creation of high quality intelligent learning environments adaptable to learners needs and characteristics considering their current knowledge, experience, preferences, customs and learning styles. Artificial intelligence tools enable individualization of e-learning process (personalization of learning content and learning in own pace). Particular artificial intelligence domains can be used to facilitate different phases of learning process.

3. ICT tools for creative and cognitive e-learning process

It is possible to distinguish two concepts of teaching: passive teaching (ensuring passive receipt and passive assimilation of knowledge) and active teaching (ensuring creative learning process). E-learning gives large possibilities for creative and cognitive e-learning process by the use of modern ICT tools.

ICT tools should be used as creative and cognitive tools to support learners during learning process ensuring high quality and effective learning. They should support creative thinking process and facilitation of knowledge building in human brain. It is possible to distinguish two kinds of knowledge according to Anderson: declarative knowledge (to know that) and procedural knowledge (to know how). Process of information understanding enables creation of mechanism of automatic learning. D. H. Jonassen developed model for cognitive tools that is similar to Guilford model of three dimension structure of mind. Jonassen model assumes that cognitive tools are placed in three-dimension space (see Figure 1).

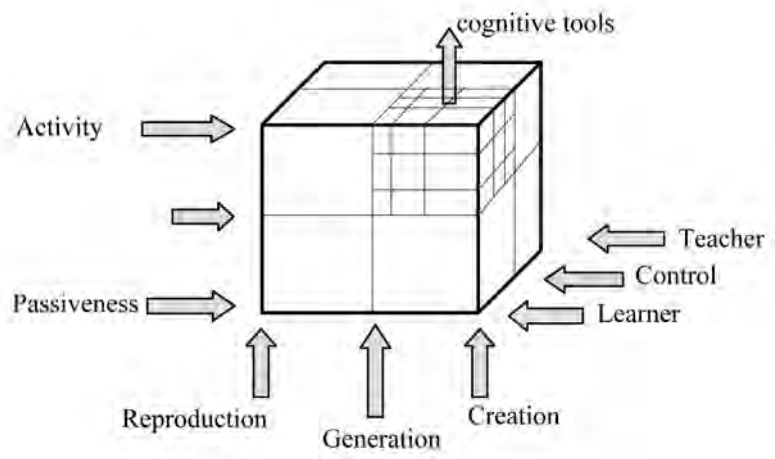

Figure 1. Cognitive tools

The use of ICT tools can ensure cognitive and active learning by: presentation of things and events impossible to see by people (because of human receptors' limitations), presentations of interdisciplinary knowledge and problems, presentation of problem complexity, rich and various didactical material, simulation and modelling functions, possibilities of learning by investigation, learner stimulation for imagination, problem reflective analysis, original problem solutions.

4. E-learning application EDU

Creative and cognitive e-learning application EDU has been elaborated at National Institute of Telecommunications in Poland for use in postgraduate studies and courses offered by National Institute of Telecommunications. It ensures high quality e-learning process.

4.1 EDU structure

Educational application EDU contains the following components: Learning Engine, Learner Model, Presentation, Evaluation, Communication, Didactical Method Base, Domain Knowledge. Learning Engine ensures steering, control and co-ordination of all components. Learner Model stores information (set of parameters) about individual learner reflecting state of learner current knowledge. Presentation component allows generation and presentation of didactical material in different formats on the base of currently updated learner model. Additionally, it enables learner to select his/her own learning path. Evaluation component determines learner performance using tests (also enabling individualized evaluation of learning process results). Communication component determines the level of interactivity. Didactical Method Base contains different didactical methods and strategies supporting educators. Domain Knowledge contains didactical material.

Didactical program (enabling own learning path) is based on the structure of node points. Each node point can contain associated units (parts of didactical material) in different formats. Central link, beginning and start do not occur in the node point structure. It gives possibilities for interdisciplinary knowledge presentation. It also gives possibilities for education in the area of creative thinking. Learner can begin to learn from any node point. Structure of node points enable learners to make decisions during learning process. Such structure enables learners selection of learning path ensuring individualization of learning process.

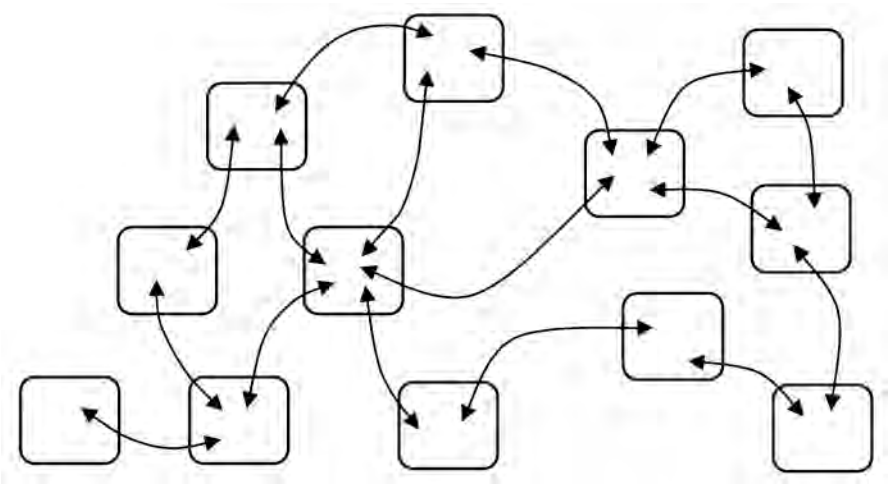

Figure 2. Structure of node points

Evaluation of learner knowledge is realized by three components of educational application: Learner Model, Didactical Method Base, Evaluation. Learner Model creates learner characteristics for each learner (learner model). Didactical Method Base contains, among others: sets of inquiries, answers, examination strategies (to control learner's progress). Evaluation examines on the basis of data received from components: Learner Model and Didactical Method Base. First question depends on learner model, next questions depend on learner responses. Subprogram: self-control enables learners to know current evaluation of their knowledge during learning process. Evaluation component gives learners also hints, explanations of mistakes and advice (what to learn next, what to repeat).

EDU offers as learning method: problem solution method that enables creative learning. Student learns from EDU by solving problems. The system compares its solution with the student solution (using solution graphs and rich search mechanisms) and prepares diagnosis. It gives feedback, updates the student model, specifies the part of material to be taught next and the way of its presentation. Next, it selects the problems to be solved by the student accordingly and the entire cycle is repeated.

Educational application EDU, described above, ensures individualization of e-learning process. Use of learner models enables continuous adaptation to individual learners characteristics. Use of components: Learner Model, Didactical Method Base, Evaluation and subprogram: self-control enables individualization of knowledge evaluation. Use of problem solution method enables creative e-learning. Use of node point structure enables learners selection of self (individual) path of learning, creative and cognitive e-learning for individual learners, learning in own pace.

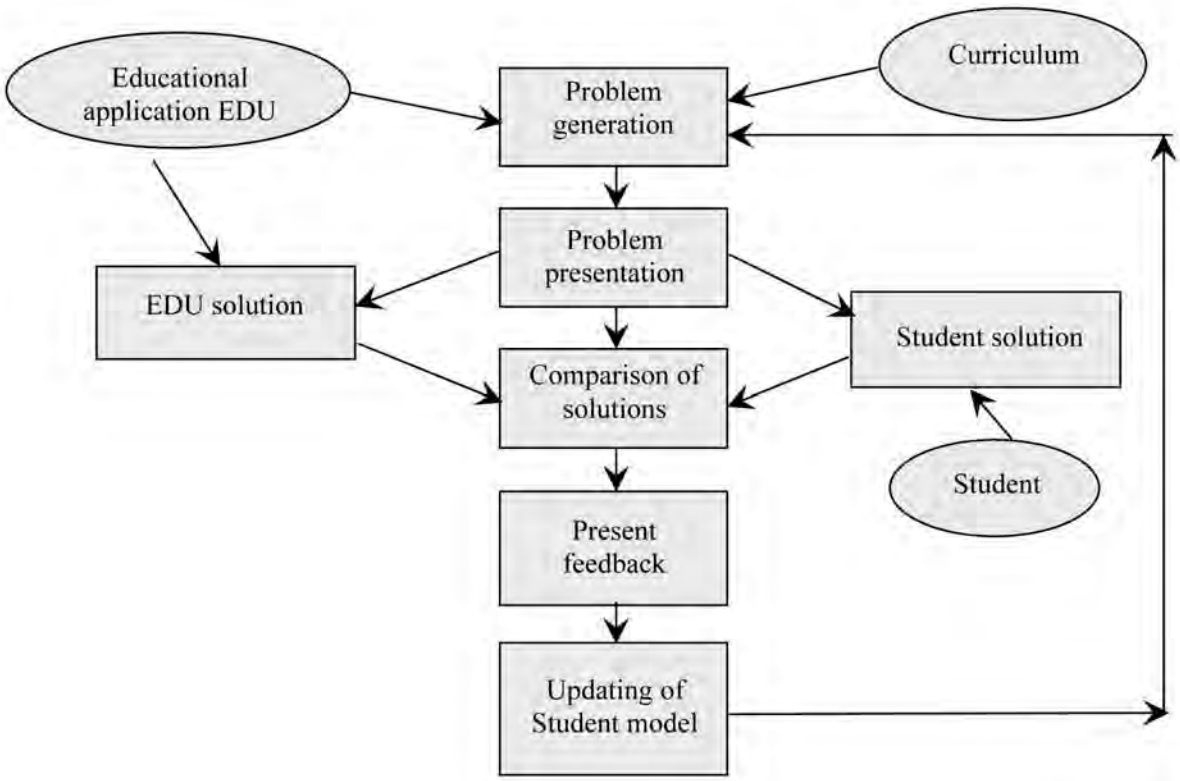

Figure 3. Problem solution method used by educational application EDU

4.2 EDU functions

EDU performs the following main functions:

- creation of an appropriate learning environment according to Kolb's pedagogical theory (p. 2). It enables realization of primary and secondary environment elements depending on knowledge type to which didactical material belongs;
- individualization of learning process:
  - self individualization through selection of own learning path by learner (creative learning). It is realized by node points structure (p. 4.2). It enables choice of an appropriate material (including supporting material) and form of its presentation (theory, demonstration, examples);
  - individual learning process (personalization of e-content) realized by automated tutor using learner models (currently updated during learning);
  - self-control of learner knowledge helpful to select material to be learned next or repeat;
  - e-evaluation of learner's knowledge.

The way of the use of EDU functions forces learners to learn actively. The above functions ensure creative and cognitive nature of learning process. In future application functions will be extended by administrative module and automation of repetitive tasks performed by human facilitators by the use of intelligent agents techniques.

4.3 Effectiveness of EDU use

EDU was practically used for learning by an experimental group of students (25 learners). The didactical subject was: Elements of informatics. Parallel other group (25 learners) learned also subject: Elements of informatics using passive e-learning. Figure 4 shows the effectiveness of EDU use. It is a comparison of evaluation between students using passive e-learning and students using EDU (active learning). The evaluation concerns knowledge of theory and problem solving. During test, learners could get from 0 points to 60 points. In the Figure the percentage of students that got points of the following intervals: 10-19, 20-29, 30-39, 40-49, 50-60, is shown (a comparison between both groups of students).

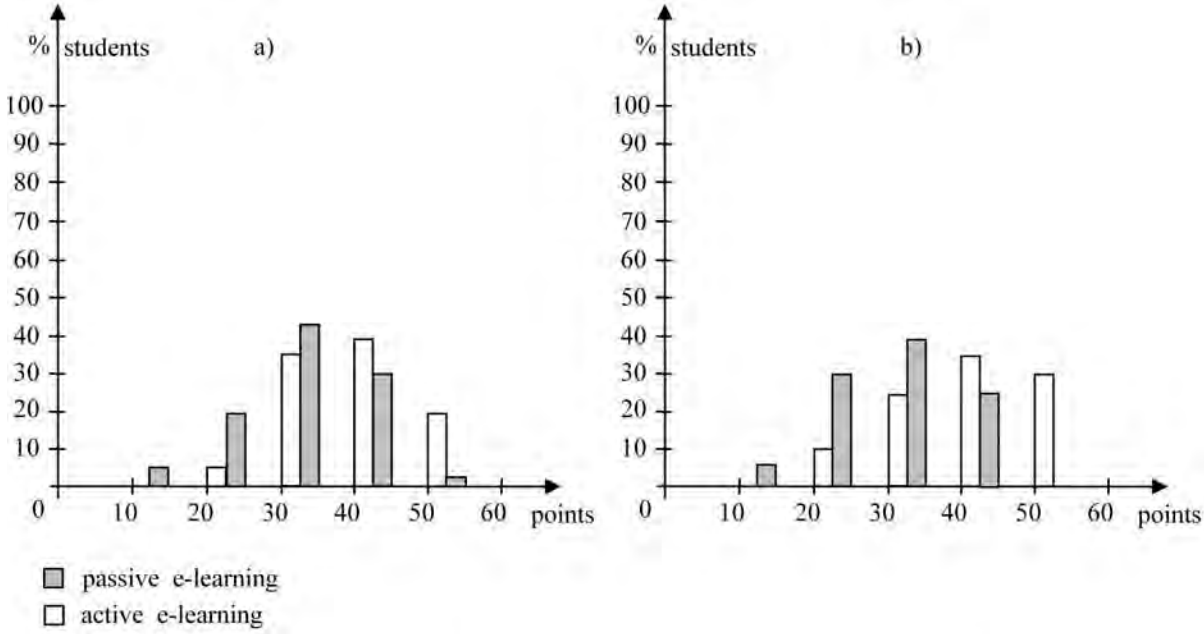

Figure 4. Evaluation of student knowledge: a) theory, b) problem solving

We can see that learners using EDU (active learning) got better results than learners using passive e-learning (especially in problem soving).

Questionnaire surveys were also made among learners (25 students) using EDU for learning subject: Elements of informatics. The enquiry comprised questions concerning mainly use of creative and cognitive features of EDU with comparison of traditional learning (face-to-face).

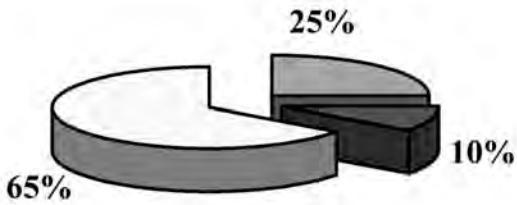

Figure 5. Distribution of the responses of the active students in relation to their satisfaction

The summarized results are shown on Figure 5: 65% of students preferred learning by the use of EDU (creative and cognitive e-learning), 25% of students preferred traditional learning (face-to-face) and 10% are neutral.

5. Conclusion

High quality learning process should be a creative and cognitive process (not only passive receipt and assimilation of knowledge) ensuring individualization of learning. E-learning systems should stimulate learners for creative activity and support creative thinking. Use of ICT tools as creative and cognitive tools in e-learning systems ensures support of intellectual processes in human brain (facilitating knowledge creation).

Intelligent educational systems with adaptive hypermedia ensure cognitive and creative e-learning process, continuously adapting to individual learners, by full use of modern ICT tools features (as an extension of human brain). Adaptive hypermedia are very useful for rich cognitive presentation of didactical material. Rich simulations (by the use of hypermedia) enable research work difficult to realize in real environment (creative learning process). Learner can settle parameters for simulations by himself.

Kolb's pedagogical theory (according to which: learning is a process whereby knowledge is created through transformation of experiences) is very useful for e-learning, ensuring creation of high quality learning environments (considering type of knowledge to which a learning object belongs and learner characteristics) that facilitate e-learning process.

Creative and cognitive e-learning application (called EDU) enabling individualization of learning process has been elaborated at National Institute of Telecommunications (NIT) in Poland for use in postgraduate studies and courses (in the area of information and communication technology) that are offered by NIT.

Creative and cognitive possibilities offered by individualized e-learning process, similar to human learning process, ensure effective teaching by the computer automated teacher. It guarantees high quality preparation (e-competence) for successful jobs.

High quality e-learning process ensures achievement and updating of knowledge, very important for the development of *Knowledge Society* in evolving Europe.

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TOWARDS A CONCEPTUALISATION OF eCOMPETENCE IN HIGHER EDUCATION

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1. Current State of Research

This paper aims to outline current research on eCompetence in higher education. The main research focus will be on eCompetence development models for academic staff. The topic of eCompetence is closely linked to recent discussions that have evolved in eLearning on the strategic challenge to implement new technologies in a sustainable way into universities. Desideratum is the eStrategy which guides the efforts universities undertake to integrate ICT into their work processes (Duderstadt, J. *et al.* 2003, Bremer und Kohl 2004). This strategic challenge reflects the situation many universities currently face in the area of eLearning (Euler and Seufert 2004).

eCompetence research represents one aspect within the discussion of integrating new technologies into universities. Its main interest is on the role of the human factor in this technological innovation process. eCompetence is, at its core, dealing with the development of personal competences in the creative use of ICT. You cannot innovate an organisation without developing the competences of the members of the organisation. In current human resource management models the individual competences of the employees are defined as the most limited resource of the organisation (Albrecht 2005, Erpenbeck 2004).

Academic staff is playing a key role in education innovation. They are the "process owners" or "gatekeepers" of the research and teaching activities within the university (Kerres 2005). Higher education teachers define and plan the (subject) curricula. Digital tools offer a wide range of options to enhance teaching and learning in universities, if they are embedded into innovative pedagogical concepts. But the design of innovative teaching scenarios that include and make adequate use of ICT is demanding new competences from the academia. Staff members need to be aware of and understand the innovative potential of the technology that is available for their research and teaching (Salmon, 2004) – they need to develop competences to cope with the technological challenges in their workplace.

2. What is Competence in the Higher Education Context?

The concept of competence is widely used across scientific disciplines and with a great variety of meanings. This uncertainity what the term 'competence' really stands for, may be faced by trying to narrow the scope on the basis of the research context in which the object of investigation is situated. We try to clarify and construct a concept for competence in the area of higher education. A first reference may be inferred from the work of Franz Weinert, who is based in the psychological field of competence research. Nonetheless Weinert tries to bridge the gap between at least psychological and pedagogical concepts on one side and sociological concepts on the other side. Weinert defines competence in human and social sciences as "... a roughly specialised system of abilities, proficiencies, or skills that are necessary to reach a specific goal. This can be applied to individual dispositions or to the distribution of such dispositions within a social group or an institution" (Weinert 2001). A substantial element of the competence definition is the relation of competence to performance, which links competence to action in social situations (Chomsky 1980).

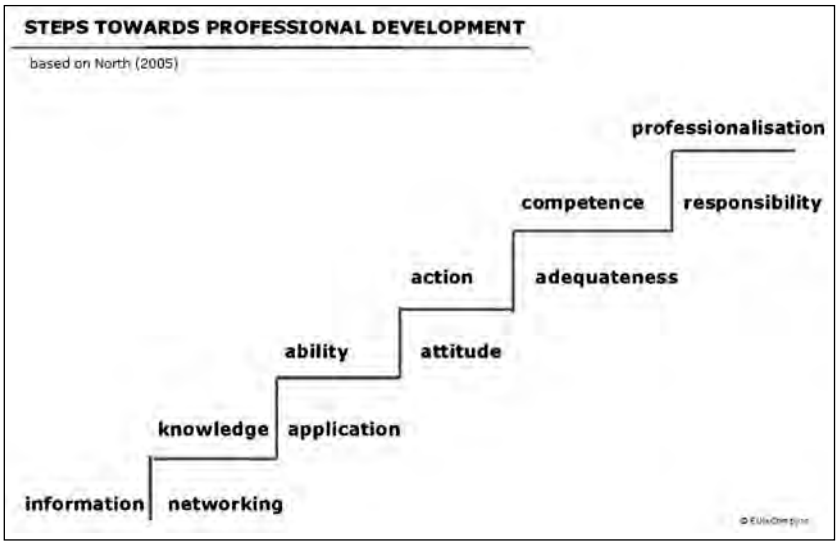
Competence is not limited to the acquisition of skills. Competence is dealing with the ability to handle challenges that occur in a specific situation in an adequate way. Competences are expressed and demonstrated in an act of performance and they are always related to a specific social context. Van der Blij defines competence with a focus on performance as "... the ability to act within a given context in a responsible and adequate way, while integrating complex knowledge, skills and attitudes" (Van der Blij 2002). The definition of Van der Blij seems to integrate consistently the key components that a theoretical concept needs to include for discussing the challenge of competence development and management in the context of higher education.

COMPETENCE DEFINITION		
COMPONENTS	**CHARACTERISTICA**	**LEVELS OF OBSERVATION**
individual dispositions	abilities, aptitudes, motivations attitudes , values	psychological theory
⇩ to act in		
⇩ context-bound situations	complex, undefined, not routinised dynamic	action theory
⇩ according to		
⇩ consensual standards	adequateness, responsibility	sociological theory

We have tried to model the various components in a visual chart that subdivides the key components of the competence term, assigns a range of characteristics to these components, and allocates them to three levels of observation.

By detailing the key components of the competence concept this way, the model visually differentiates the level of competence that represents the dispositions of the acting individual, the context level of performance and the situational context level of standards for adequate behaviour, which is defined by social consensus. The characteristics represent a set of relevant influence factors in the competence – performance process. The levels of observation finally demonstrate the predominance of psychological theory approaches to competence on the individual disposition level, of sociological theory approaches on the contextual level of relevant standards and of the merging of both science domains in the middle level.

The key influence factor of the competence concept can also be represented in a stairway model that illustrates the iterative process, in which these factors interrelate with and successively build upon each other in the construction of competence. The iterative process starts with the acquisition of information. Information, that is connected in a network of meaning, leads, in the second step, to knowledge. If this knowledge is applied to a specific context, it can lead to ability. The ability needs to be combined, in the third step, with a specific attitude (which includes values and motivation) in order to result in an act of performance. If, in the fourth step, the action is consistent with given standards of adequateness, this adequate action leads to competence. In the final step, the competence, that is combined with a certain responsibility, will result in a professionalisation.



These two models are an approach to the competence concept, that we propose for the particular area of our research, which is the educational processes in higher education contexts. Subsequently we will try to build on this theoretical implications on the competence term and relate them to the eCompetence construct that we discuss.

3. Draft Model for eCompetence of Academic Staff

The main challenge for a theoretical discussion of eCompetence is to relate the general term of competence to the specific "eContext" – the electronic context that is gradually evolving and changing the work culture in higher education. The electronic work environments in universities make new, innovative formats for teaching and learning activities possible, to which eCompetence needs to be applied. If academic staff members gain an understanding of the impact of technologies on their key work processes, they can use technology to extend, rework and innovate their research and teaching contexts (Graves 2001).

Then again, the organisation as a whole has to enable and encourage the competence development of its individual members, if it wants to act strategically in the field of ICT-driven innovation. There is a strong interrelation and interdependence between the individual and organisational level of competence development (Weinert, see above). You have to analyse the organisational context in which specific needs and challenges on the use of ICT are defined and in which individual competence is developed. This is the reason why we differentiate in this paper between individual and organisational eCompetence.

Although eCompetence is using a technological focus, in fact the required competences for academic staff are not limited to the "e", the electronic component of the term eCompetence. It is is not primarily dealing with the expertise level of the individual teacher to handle specific software applications. The eCompetence concept has to be interpreted in a wider mode. It includes not only technical aspects, it asks for the educational competences necessary to judge and effectively integrate ICT in education (Stalmeier 2005).

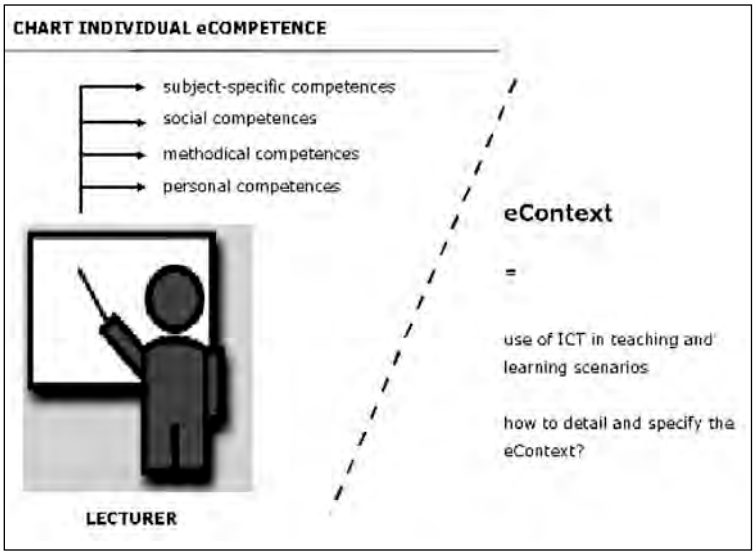
In this perspective we have inferred a general work definition as basis for a conceptualisation of eCompetence in higher education. In this general mode eCompetence is understood as the ability to use ICT in teaching and learning in a meaningful way. With respect to the considerations on the subjective dimension of competence as individual performance and the objective dimension of competence as contextual environment, the definition of eCompetence subsequently differs between personal and institutional eCompetence. Both levels of eCompetence, however, describe the ability to successfully use e-Learning technologies in routine educational practise.

For example, the personal eCompetence of an individual academic teacher describes his or her ability in using ICT in their teaching and course delivery. Institutional eCompetence describes the structures, processes and policies in place, by which a university aims to embed the ICT use into its core tasks research and education. Based on this argumentation, we will in the next step focus on the individual eCompetence concept as theoretical reference framework for the analysis and interpretation of change processes in higher education that are sparked by the innovative potential of technology.

Considering closer the structure of the individual eCompetence concept, one can identify the following key components: the university teacher, which bears the competence as his or her general cognitive disposition to act, and the teaching and learning scenarios which embed or rely on the use of ICT as the particular context in which the performance of the university teacher is situated. Let us observe more in detail the key components and what implications they bear for the construction of a theoretical concept for individual eCompetence.

The first key component is the competence of the individual university teacher. We have deduced in the above given observation a specific approach to define competence that sets the focus on the performance dimension. So the approach here discussed is tying the cognitive dimension – as individual prerequisites of a teacher to act in an adequate way, and the performance dimension – as the combination of key components of the competence of the teacher, together. Erpenbeck and Heyse have constructed a model that defines and integrates the key competences personal, social and communicative, methodical and subject-specific competences into an overarching action competence (Erpenbeck and Heyse 2004). We apply in our eCompetence concept this action competence model and its inherent implications to the individual teacher.

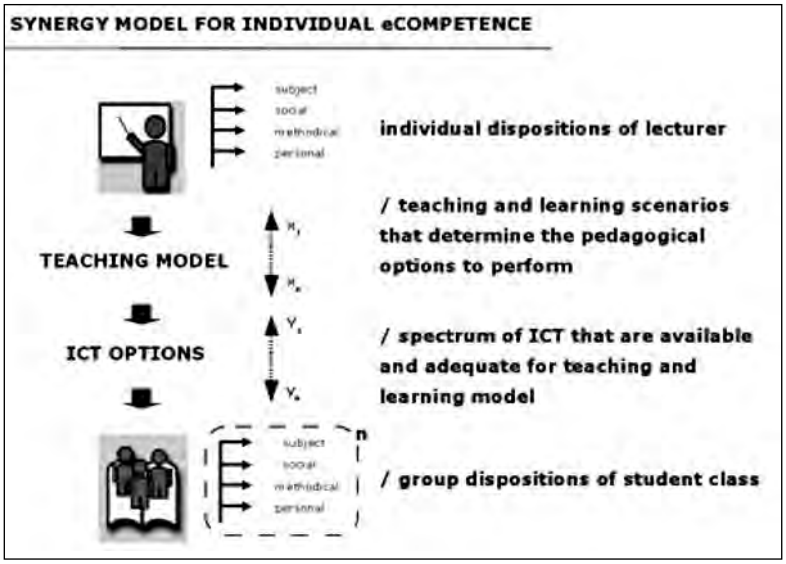
The second key component are the teaching and learning scenarios which embed or rely on the use of ICT as the particular context in which the performance of the university teacher is situated. We like to apply the term eContext to this use of ICT in the teaching and learning scenarios of the university teacher. This eContext is not yet specified. Nonetheless we assume that the eCompetence construct can only be inferred in a meaningful way from the specification of the situative context as the dimension in which the performance occurs. The eContext determines as contextual environment the options of the lecturer to perform in this given situation. So we have to ask ourselves which variables are included in this eContext.



The approach that we have chosen to specify the eContext term is derived from pedagogical models that have emerged in educational sciences for the design of lectures and courses in universities. We assume that the university teacher will, in a first step, think in terms of a pedagogical model for the specific course that he or she needs to organise. So the teacher needs to select from a range of pedagogical models for teaching and learning the model that seems appropriate for the specific course or teaching scenario, in which he or she will interact with the student group (Schneckenberg and Wildt 2006).

Only when the teacher has chosen the appropriate teaching model, a selection of the ICT tools that are adequate for use in the pedagogical scenario can take place. The ICT options, that are available for the teacher, are combined in a spectrum of electronic variables that range in their complexity from simple electronic documents as, i.e., pdf files to highly complex electronic learning environments as, i.e., virtual classroom applications. The main point in this argumentation is the assumption that the university teacher selects the ICT options only after the pedagogical model for the specific teaching performance has been chosen. The economic science teacher that needs to cope with a mass lecture in front of a thousand students, will have very different pedagogical concepts and ICT options in mind compared to the philosophy teacher that plans a course with a small work group. To sum up this argumentation string we assume that the eContext is a subordinate spectrum of variables in the concept of the university teacher's individual eCompetence that is determined by the preliminary spectrum of pedagogical choices the teacher has to take first.

When we combine these two spectra in a synergy model for individual eCompetence, there is nonetheless one additional key component to be added, otherwise the model will not be consistent in itself: this is the eCompetence of the students that interact with the teacher in the specific teaching and learning scenario. Each student possesses a specific eCompetence on his or her own, which can be conceptualised in a similar way as we have inferred the eCompetence of the academic teacher. The main difference between the teacher and the students is not contained in the cognitive dimension, but in the performance dimension of the competence concept that is determined by the context. The primarily goal of the teacher is to teach, the primarily goal of the student is to learn. It has to be pointed out, though, that the efficiency of a specific course setting is largely dependent on the degree, in which the competences of the teacher and the competences of the learner intertwine in the teaching and learning processes.



So the roles in the interaction between teacher and student are situated at opposite sites of the teaching and learning process, but nonetheless (need to) complement each other. The personal eCompetence of the individual student thus describes his or her ability in using ICT in their learning activities. And the combined individual eCompetences of the students in a particular course sum up to the group dispositions of the student class to adequately use ICT in their learning.

4. Conclusions

We have argued in this paper that the general concept of competence is used in many different and inconsistent ways in the research literature. A meaningful definition of the competence term can only be reached, when it is applied to and embedded into a specific context. In the case of our eCompetence research this context is set by the conditions, in which educational processes in higher education take place. Subsequently, a concept of competence that is appropriate for our research context, has been introduced and its main components and influence factors have been detailed. The resulting competence concept has been applied to the specific eContext, which we introduced as the electronic context that is gradually evolving and changing the work culture in higher education.

The construction of the eCompetence concept has differentiated between the individual and the organisational level, the individual level representing personal competence development of the academic teacher and institutional competence as the structures, processes and policies in place, by which a university aims to embed its ICT use. We have assumed that there is a strong interrelation and interdependence between these two competence development levels.

In a last section we have discussed more in detail the structure of the individual eCompetence concept, considering its inherent key components individual teacher, pedagogical model, ICT options and student group. Finally, we have merged these components into a synergetic model for individual eCompetence. The paper can only present a summarised perspective on the eCompetence research. We aim to deepen the research in this field and to work out a more complex model for eCompetence, which will include the organisational level of competence development and apply this theoretical framework to empirical data that stems from ongoing research which is taking place in the European eCompetence Initiative (www.ecompetence.info).

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AN EMPIRICALLY-BUILT FRAMEWORK OF E-COMPETENCES FOR THEACHERS USING ICTS IN DIDACTICS

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A glance on the context: ICT, vocational training and research needs

How to monitor an educational innovative programme which integrates the use of ICTs in order to build a new professional profile (*référentiel de compéténces*) of the teacher who operates in a context able to exploit the didactical potential of technological tools?

Starting from such a question, during a three-years long national project closed last year, called ICT.SIBP-ISPFP[1], we faced the need to collect, analyse and ri-elaborate data concerning teachers' and tutors' practices, competences, opinions and beliefs about their educational path, their professional profile and role.

ISPFP (Swiss Pedagogical Institute for Vocational Training) is a national institute dealing with training of trainers operating in vocational education. It matters to us to underline that in Switzerland two teenagers every three attend a vocational school, so that the role of vocational training in the whole Swiss educational system is quantitatively important. During the last years, ISPFP tried to deepen some issues related to didactics with ICTs, both on the side of apprentices, and on the one of teachers. In particular, by promoting programmes such as the one mentioned above, ISPFP wanted to develop knowledge and competences about using ICTs effectively – from a didactical, pedagogical, but also economical and learning-related point of view – at his inside (on the model of learning organizations) and, at the same time, inside vocational schools.

In performing such a task of enforcing teachers' competences about the use of ICTs and CmC (Computer mediated Communication) in vocational training, we also collected a great amount of data[2] on their practices, and then we had the possibility – at the end of the project – to satisfy the need to reflect on the construction of a set of competences able to define the professional profile of an ICT-updated teacher, and to let these emerge starting from real experiences.

Some words about the methodological framework

Such a need forced us to develop a suitable, original, and integrated methodological approach, in which – at the level of data analysis – we wanted quantitative and qualitative approaches to integrate and to merge each other, taking the best aspects of each.

Collecting a satisfying corpus of data

The starting point was the collection of a significant *corpus* of data: we chose the form of the semi-structured interview to preserve and safeguard the pragmatic nature [4] and, at the same time, the psychosocial dimensions of communication. In particular, we fitted the technique of *entretien d'explicitation* [5, 6] as methodology able to capture the above-mentioned elements and as a privileged instrument for analysing practices.

[1] We are speaking of a Swiss project about the integration of ICTs in vocational training and didactics. For some details see [1].

[2] For further details about the project monitored, see also [2] [3].

The final *corpus* was then composed by more than 40 one-hour-long interviews, longitudinally collected with 12 subjects, holding the roles of 1. teacher or 2. "Practical Assistant in Computer-mediated Communication" (called AP, a sort of tutor-coaching profile, both at teachers' and apprentices' disposal) in the same experience of blended-learning[3].

Analysis tools for an integrated approach: Atlas.TI and Alceste

Such a material was then analysed by two different approaches (but both part of the content analysis area), in the perspective of CAQDAS – Computer Assisted Qualitative Data Analysis Softwares [7] – which allowed us to manage the complexity and the largeness of such a wide amount of data. This means that we used Atlas.TI for a more qualitative-oriented analysis, and Alceste for the statistical-based one.

In small words, Atlas.TI [8] is a software for content analysis, based on a deductive algorithm derived from the main idea of the Grounded Theory [9]. On the other side, Alceste [10] – complementary structured on a inductive algorithm [11] – operates on the basis of a statistical treatment of textual data, founding on the psycho-social assumption that the recurring of the words inside a discourse is not just a casual fact. In our intention, the combination of these two approaches should have "balanced" the researcher's ingrained and subjective intervention to which risk the first method could have exposed. This kind of internal balancing strategy was also pursued by starting the analysis using simultaneously both these approaches, and then trying to have – through a comparison – a direct feed-back action of the first on the second, and vice-versa.

The outputs so obtained were compared through a semantic heuristic, showing – despite of the theoretic "divergence" between the two approaches – a remarkable content overlapping.

The whole process led us to a "portfolio" of eleven main competences. To validate them, we submitted again this framework to a sample of more or less 100 teachers who had already experiences in ICTs' use in their didactics, through a survey.

A new profile raises and grows up: the path towards the 11-item portfolio

Let's have a look on the research process and on its different steps. Keep in your mind that we're referring here just to competences related to the use of ICTs, and not generally to the competences a teacher has to manage in order to interpret his role at his best!

Atlas.TI analysis

The first step with Atlas.TI was to map the excerpts in the interviews dealing with acted competences, being the speech referred to specific situations, to real practices, or to explicit components of competences (described as specific knowledge, skills, capacities, attitudes,…) .

[3] It is important to say that ICT.SIBP-ISPFP project developed more than 60 sub-projects in as many schools. These data were all collected inside one of these sub-projects. In particular, it concerned a blended learning experience with two classes of bricklayers (first year of the curriculum). The experience was more or less six months long, and three phases at distance were foreseen (each of them three-weeks long), during which the apprentices "attended" the school being at home, by means of an online learning environment (OLE) developed on purpose. For other details on both the experience and the OLE, see again [2] and [3].

From this first coding we obtained 1147 quotations, 291 of which were about roles. Being this theme so important, but at the same time not so closely related to competence, we decided not to consider these quotations; the amount of quotations we went on analysing – after a semplification of double quotations – was then of 929. Each quotation was then analysed, trying to make a specific competence explicit, intended as in Le Boterf's tripartite model (a competence is a situated combined mixture of resources we can identify as *savoir, savoir faire, savoir être*)[4]. We obtained the framework reproduced in the following Table 1.[5]

Table 1: Absolute and relative distribution of the occurrences for "General competences" and their "principal declinations".

General competences	(and %)	Principal declinations	(and %)	Nr. occurrences
Didactical aspects	(53.93%)	Accompainment	(13.13%)	122
		e-L: didactics	(36.06%)	335
		Motivation	(2.15%)	20
		Problem-solving	(2.58%)	24
Personal characteristics	(17.33%)	Flexibility	(6.03%)	56
		Meta-reflection	(6.89%)	64
		Person	(4.41%)	41
Psychology	(10.98%)	Psychology	(10.98%)	102
Collaboration	(10.55%)	Collaboration	(10.55%)	98
e-L: technique	(7.21%)	e-L: technique	(7.21%)	67
Total			*(100%)*	*929*

Some general remarks about this distribution:

- The first category on the basis of a representative criterion is surely the one concerning the didactical aspects, which alone groups more than the half of all the quotations. As this category is not homogeneous inside, it is divided into two main dimensions: accompaniment on one hand and all the other declinations on the other hand. That is to say that "motivation" and "problem solving" can be easily assimilated with "e-L: didactics", which, on its turn, picks up other didactical strategies.
- The second category, which concerns some "personal characteristics" of the teacher, shows the same unhomogeneity, since "flexibility" is just one of the characteristics – evidently with a lot of occurrences, as, for example the declination about "persona" and "meta-reflection".

[4] Several and various are nowadays the interpretations of the concept of competence. From a literature review on this theme, trying to make a systematisation of this complex panorama and to lead comparative linguistic study about the use of the term "competence" in some of the most important European languages [12] we agreed in this study to consider competence as an integration and combination – made up in situations – of different resources. This idea meets clearly Le Boterf's theory about the fact that «la compétence professionnelle ne réside pas dans les ressources (connaissances, capacités, etc.) à mobiliser, mais *dans la mobilisation même de ces ressources.* Elle est de l'ordre du "savoir mobiliser". Pour qu'il y ait compétence, il faut qu'il y ait mise en jeu d'un répertoire de ressources (connaissances, capacités, capacités relationnelles)» [13, pp. 57-58].

[5] This table reports just the final results of the codification, since every so called "principal declination" is – on its turn – a cluster of some further specifications.

- Then there are three other categories which, although less represented than the first two, have the pregnancy to be separately considered. The third one, with the label "psychology", has almost a disciplinary character, with which we point out some aspects related specifically to adolescence – in case of apprentices – and their dynamics, and related to the management of the relation with the other, and, finally, related to the specific object "learning".
- "Collaboration" has a more organizational value, as it concerns the attitude to team-working, to the division of tasks, to the organization of resources in a same project.
- As last, there is a category that some years ago would have appeared with a different weight: that about specific technical aspects set by ICTs.

Alceste analysis

Through Alceste analysis, just 80 occurrences of the whole 338330 have not been processed (in percentage it is around the 0.02%), bringing down to 7304 the u.c.e[6] number of the *corpus* suitable to be analysed. The stability between the two descendent hierarchical classifications[7] has regarded 5645 u.c.e. (around the 77.3% of the total).

The analysis has brought to defining a dendrogram composed by 5 classes, which have been represented in the underlying Figure 1.

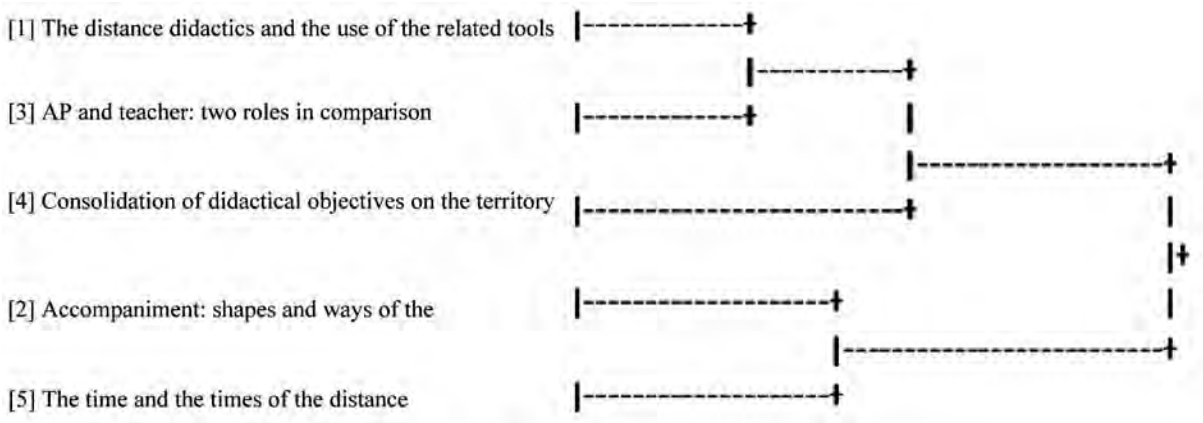

Figure 1. The five classes emerging from Alceste analysis represented in the dendrogram

- *The distance didactics and the use of the related tools (with specific reference to the OLEs).* In this category we find the main thematic of the distance didactics such as the necessity of a specific planning of activities and didactical materials, the considerations about the management and use of an OLE, the reflections about the necessary conditions in order to plan and develop cooperative activities and team-work in network. "Presence" and "distance" are, therefore, two emerging concepts in a category that we could describe as an analysis about the suitable and useful didactical use of OLEs and of multimedial tools.

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[6] U.c.e. stays for Unités de contexte élémentaires. «Il s'agit, non pas de comparer les distributions statistiques des "mots" dans différents corpus, mais d'étudier la structure formelle de leurs cooccurrences dans les "énoncés" d'un corpus donné» [11, p. 9]. In order to be able to analyse the textual productions, Alceste automatically defines, using a statistical heuristic (ivi, p.17) some enunciates, or, better said some "Units of Context", on the basis of two criteria: one related with punctuation, and the other to the number of words, defined as *simple forms*. Differently said: «L'u.c.e. répond à l'idée de phrase mais calibrée en fonction de la longueur (évaluée en nombre de mots analysés) et de la ponctuation» [10, p.9].

[7] The procedure called Descendent Hierarchical Classification (Classification Descendente Hiérarchique, CDH) is similar to the cluster analysis: it consists in the separation of the u.c.e. in classes, so that these result the most homogeneous as possible at their inside and, at the same time, the most dissimilar between them. In order to check the stability of the results of the CDH, Alceste operates a double CDH in parallel, using for each of them u.c.e of different length, comparing then the obtained classes and preserving just those, which demonstrated to be stable.

- *AP and teacher: two roles in comparison.* Undoubtedly this category refers to the comparison between the "traditional" teacher's profile, and that one of the Practical Assistant in Computer mediated Communication, before mentioned. Although this thematic was inducted by the researchers' interest – and therefore by their questions – this not completely justifies the salience of this class (which even if quantitatively situated at the last position, groups however the 13.52% of the analysed u.c.e.), which imposes to reflect about the role and the teacher's profile evolution as a central focus on didactics with ICTs.
- *Consolidation of objectives on the territory.* Fundamental in this class is the *balance* emerging from the protagonists' point of view about the activities foreseen by the *project*: in this sense the interviewed subjects operate a comparison with the didactical activities supported by the ICTs experienced before, directly related to the reached *objectives* and the impacts on the *territory*, in an *experimental* perspective, grounded in the *experience.*
- *Accompaniment: shapes and ways of the communication.* The class nr. 2 is a long list of actions operated by teachers and APs in order to realize that accompaniment and that *tutoring*, which is frequently defined fundamental for the learning characterized by distance interactions. In this category *communicative strategies* emerge, set with the different tools at disposal (*e-mail, telephone, sms*) for solving *problems* (technological or not) faced by the apprentices. In addition to this, there are themes related to the communication management and, therefore, the definition of a netiquette, and of some other rules requested by the on-field-practice.
- *The time and the times of the distance.* Central is here the thematic of the assignment, but in particular connected with that of the revolution in time (and consequently in behaviours) which are imposed by distance didactics. By saying "time" we are referring to a micro-dimension – in the rank of "minutes" spent to see a streaming video, or in the OLE, and to a macro-dimension which involved the organisations of one's activities all over a week.

The comparison between the two analysis

The comparison between the two analysis, not including – as already made with the underlined quotations with Atlas.TI – the class about role, shows some peculiar points:

- *The preponderant interest for didactical aspects.* It seems to us that it is not by chance that the preoccupation for technical aspects, so predominant in the last years, occupies here only a relatively important place. This is not to say that the technological aspects are not important, neither the training path for teachers in this field concluded. It is however evident that ICT diffusion is nowadays a more and more common fact. This entails a *shift in paradigm* which invests – thinking about teachers' practices – more the contents than the tools. Tools are in this perspective interesting as vehicles, mediators of contents. The interest is therefore focused on knowing the *specificity of the tools*, in order to be able to choose with *ratio didactica* which is the most suitable instrument, in order to *plan* a didactical path conforming to the different potentialities made available by ICTs; that means *managing the distance*, operating by acting communicative and pedagogical strategies, able to maximise the efficiency and efficacy of the didactical action.
- *The necessity of a complete framework about teacher's identity*. Also without considering the discussion about the role, there are some elements which go to reinforce the traditional teacher's profile: that is to say the *necessity to develop a posture de recherche* as an *adaptability* answer to the *changing contexts*, which impose to adopt, in a proactive way, an *experimental perspective* and, on the other side, to have an *habitus for the meta-reflection*, the innate attitude to build a *praxis-reflection circularity* on one's action.
- *The necessity to deepen the role and the accompaniment dynamics*. The teacher is seen as a transmitter of knowledge, but rather the one who orchestrates, leads, acts as a companion in the discovering of knowledge. It's worth to deepen this *scaffolding* function in its different facets such as *coaching, mentoring, monitoring, tutoring*, etc. A second dimension refers to the necessity of *mastering the communication* in its shapes and modalities: the teacher should have experience and cognition not only (and "simply") of *tools*, but also, and above all, of the *psycho-social dynamics* involved in communication.

- *The necessity to make experience of even more new contexts.* The didactics which widely uses ICTs constitutes a context characterised by some newness. The entry of a new scenario based on time-rareness and space-evanescence causes a sense of disorientation, which entails to be elaborated and solved in a new kind of familiarity to be constructed.
- *The opportunity to perceive yourselves as a team-at-work.* The team-work is not a very common practice in the teachers' world, intended as team which face jointly the same challenges and the same problems related to one or more classes. The monitored experience has frequently shown that a didactical project could have benefits by a foreseen, shared, and effective division of roles, to be thought in the perspective of the team working. The concept of "*équipe*" seems to be a winning and suitable, strategic answer to the new learning contexts.

The final competence profile

Through a following step, we have finally come to underline the following 11 competence areas.
It is possible for each competence to have, in the protocol at our disposal, a very accurate and precise description of the knowledges, the know-hows and attitudes entailed in it, as they emerged in the interviews. Here, to be more synthetic, we report just the "labels", comprehensible if considered the previous explanation.

We simply add that the validation made through the survey which foresaw an attribution to each of the 11 competences of a score on a 5 point ranking (from "superfluous" to "fundamental"), reported a total average of 3.8, where "4" corresponded to the item "very important", confirming the pregnancy of the underlined dimensions.

The 11 families of competences concern: 1. mastery of tools; 2. didactical values of the tools; 3. didactical planning; 4. didactical strategies; 5. familiarity with the new normative and symbolic context; 6. accompaniment; 7. posture de recherche; 8. relational dynamics; 9. ethical approach; 10. flexibility; 11. team-work.

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E-COMPETENCES AND E-LEARNING: AN EMPIRICAL STUDY OF THE RELATION BETWEEN E-LEARNING EXPERIENCE AND ADULTS DIGITAL-LITERACY

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Abstract

In this article we present some of the results of an empirical research relating learner e-competence to the actual e-learning experience in a post-graduate program. We outline a model based on which the actual e-learning experience, as expressed in students' evaluation and assessment of the e-learning program, is not simply determined by the content and organization of the program itself, but is also influenced by the learners' e-competences, as acquired by formal training and especially by experience with computing and internet use. Moreover, learner demographic characteristics seem to have direct and indirect effects on the assessment of the e-learning experience, as they affect both the needs and expectations different groups of learners have from an e-learning program and thus their criteria for evaluation, as well as the e-competences they acquire formally and informally. The policy implications of these findings are that e-learning programs should take seriously into consideration the social, educational and training characteristics of their prospective students, and that assessment of such programs should take into consideration learner social and educational and e-literacy attributes.

Introduction

Two years ago, the University of the Aegean, Greece launched a new and innovative post-graduate program on gender studies in the information age. One of the program's novelties is its design and implementation, as it is the first – and so far the only – such program in Greece to be delivered in an e-learning mode. The courses are taught by means of an e-learning setting (e-distribution, e-interaction, e-collaboration), combined with on-campus seminars and workshops [1]. This strategy was selected, among other reasons, for attracting, to a university located on an island in the south Mediterranean, high-calibre professionals from throughout the country, which are for the most part employed full-time and for which flexibility is a critical issue in pursuing post-graduate studies [2] [3] [4] [5]. In terms of its *structure and pedagogy*, the program emphasizes modern educational processes, supporting:

1. collaborative learning and group work,
2. independent study, with the tutor acting as a facilitator to the learning process and
3. learning through self-directed inquiry, supported by the appropriate methodology and access to resources [6] [7] [8] [9].

On the one hand, the subject matter of the program, which focuses on the new educational and work environments in the information age and the role of gender in these environments, and on the other hand, its e-learning mode of delivery, has attracted great interest from a diverse group of adult professionals such as teachers, economists, social scientists and IT specialists, with each group being attracted to a different aspect of the program, or combinations thereof [10] [11].

The present analysis is part of an ongoing multi-faceted evaluation research agenda which has been incorporated into the program's implementation and design from its inception, for two purposes: (i) the program's continuous improvement and (ii) the systematic study of the socio-economic, educational and technological factors related to and being influenced by novel e-learning processes [12]. One aspect of this broader research, which is here presented, is the examination of how student e-learning experience and assessment thereof is related to (i) *learner individual and social characteristics*, such as age, gender, place of residence, etc. and (ii) *learner e-competences* as expressed in both objective and subjective measures of student ICT skills, experience and attitudes toward computers. Computer competence and literacy have been related to individuals' attitudes and perceptions regarding computers [13].

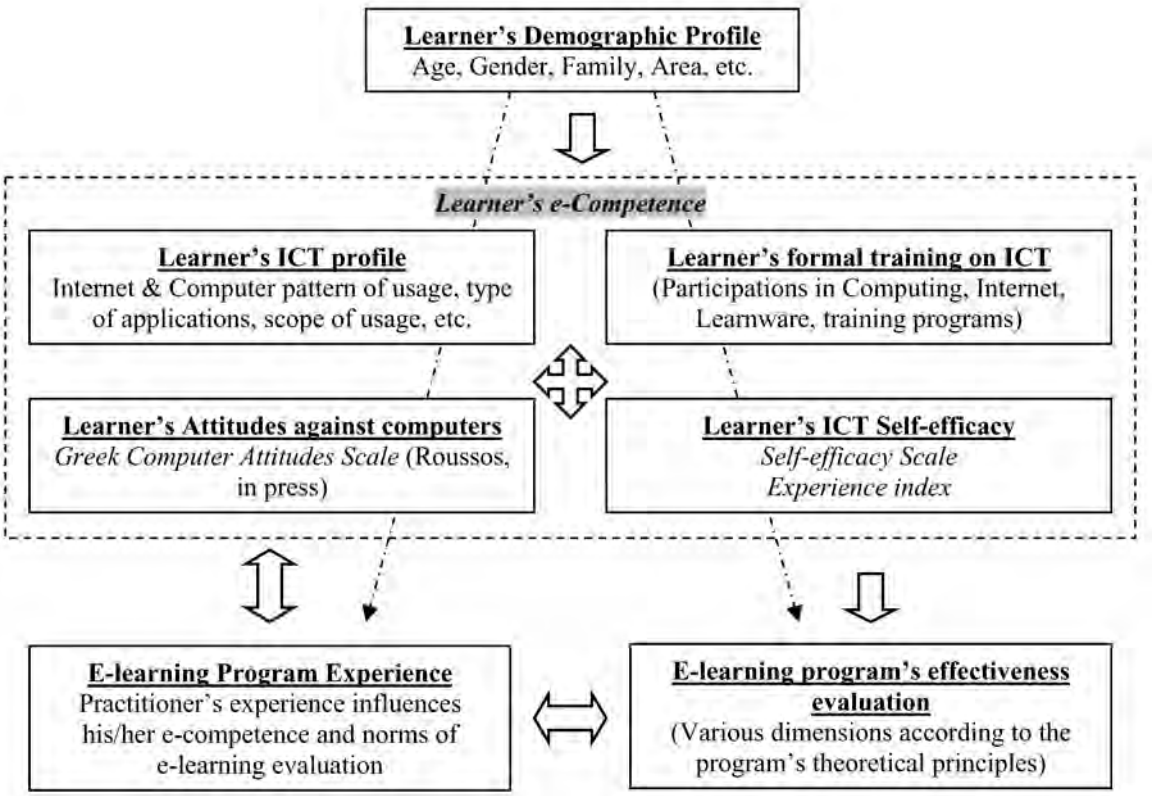
Moreover, *e-competence* is assumed to exert significant influence on e-learning effectiveness, as it refers to a set of:

1. e-skills acquired by doing or by studying,
2. personal characteristics formatted throughout one's life,
3. knowledge acquired by education and/or experience, and
4. attitudes toward ICT and specifically education technology.

However, little attention has been given both in evaluation models of e-learning and in the actual practice of various programs to *the attributes of the learners themselves* which in effect determine in large part the attitudes, experiences and capacities with which they approach the e-learning experience, and thus determine the perceived and/or actual results of e-learning. For the purpose of contributing toward filling this void in the relevant theory and practice, we outline a proposed model and present empirical data which examine some of its proposed relations.

The Model

We here schematically present the model proposed for analyzing how adult learners' e-competence interrelates with the e-learning environment and how this competence and other individual characteristics influence participants' e-learning experience and program's effectiveness:



The Research Design

For the purpose of examining the relations outlined above, we constructed and/or adopted a number of research instruments befitting each concept and/or variable studied. They were all combined in a closed-ended questionnaire, which was delivered and completed online by all the students participating in the post-graduate program (n=70), both during the beginning and after the completion of the courses offered by e-learning. The instrument was comprised of the following sections:

1. *Student demographic characteristics,* served as key independent variables for examining possible causal relations;
2. A set of questions concerning the *actual students' experience on using computers and the Internet;*

3. An ICT efficacy *self-assessment* section, consisting of 21 questions on perceived capacities for every-day computer and Internet operations;
4. The *Greek Computer Attitudes Scale* (GCAS) used for a psychometric measurement of students' attitudes towards computers (Roussos, in press), consisting of three subscales measuring confidence, affection, and cognitive aspects;
5. The *e-learning environment evaluation* section which called for the assessment of the post-graduate program effectiveness judged according to the pedagogical theoretical principles on the basis of which the e-learning program was constructed[1] [10].

More specifically, participants were asked to answer questions regarding the main structural and functional features of the e-learning program, like independence in choosing *time, place,* and *type* of study; support of personal learning-style (customization); support in meeting course requirements; inciting active participation/involvement; securing cognitive benefits within a constructivist framework; facilitation of access to information and learning material, etc. Another set of issues was related to the technical support offered by the programs' technical department and its role in securing e-learning effectiveness.

Based on the theoretical model above and on the data collected by the instruments described, we focus in this paper on the *e-learning environment evaluation* as the major dependent variable and as major explanatory factors we examine *student demographic characteristics* and *learner e-competences*. The specific group of hypotheses here examined are the following: (i) social, educational and other demographic learner attributes affect e-learning experience both directly and indirectly by affecting e-competences; (ii) learner e-competences profile influences the e-learning experience and assessment of program effectiveness. We turn to a brief presentation of the most significant relevant data analyses.

The Results

Participants demographic profile

Our target group was 70 post-graduate students, registered in the last two academic years, which varried in terms of their social, economic and professional characteristics. The majority were women (75%), married (54.4%), with an average age of 34.6 years[2] (SD=8.14). They have grown up in major cities (42.9%), towns (20.0%), small towns (10.0%), villages (10.0%), n/a (17.1%). These descriptive statistics confirm that one of the post-graduate program's original stated aims, which was ameliorating existing social inequalities, was indeed fulfilled [11] [14].

Participants' e-competence profile

The program's selection process, which has e-literacy skills as a requirement, functions as a "filtering device", so it was expected that students would be more *advanced* (on average) than the generic Greek population, as far as their digital-literacy is concerned[3]. Almost all participants have available a personal computer and an Internet connection (at least) at their home. But there is great variability in more quantitative variables describing their *objective* experience on ICTs (see the standard deviation values). More specificly, 1 person owns a PC since 1978, while on the other hand 4 persons have bought one in 2004; participants have been using computers on average for 10 years now (Mean=9.80, SD=5.2), by working 28 hours weekly (Mean=28.8, SD=14.4). They have had an Internet connection for 6 years (Mean=6.47, SD=2.79), they work on-line 16 hours weekly (Mean=15.84, SD=8.15) and exchange 24 e-mail messages (Mean=24.1, SD=37.91). Learners have participated on average[4] in 2.62 computing training programs, in 1.25 Internet training programs, and in 0.94 office automation

[1] For these principles see the Introduction section.

[2] Frequency distribution: age 23-28: 17, age 29-35: 12, age 36-45: 19, age 46-50: 8

[3] See for a recent survey in Greece: VPRC/GRNET, (2005) *National Research about New Technologies in the Information Society* 2005. http://www.v-prc.gr/2/1232/index_gr.html (in Greek)

[4] Some outliers concerning experts have been ignored.

training programs[5]. It seems that although students evaluate themselves as equally experienced on computers and Internet, they have in fact more formal education on computers[6], while it appears that their Internet use skills are more experience-based.

Participants' self-efficacy estimation

In order to measure learners' ICT self-efficacy we constructed a "self-efficacy index" by summing up each respondent's answers to a set of questions (simple additive value model) and we tested this scale's reliability (internal consistency)[7]. The scale has a value range from 21 (very low self-efficacy) to 105 (very high self-efficacy), with a Mean=91.2, (SD=9.88), suggesting a rather high rating on this scale. Furthermore, learners evaluated themselves as persons with "great experience" on using computer (Mean=4.16, SD=1.07) and Internet (Mean=4.19, SD=1.00) and as persons with "moderate experience" on using learnware and educational technology (Mean=3.11, SD=1.48). In order to test the external consistency of these measurements, we investigated the relation between the *self-efficacy index* and the perceived "overall experience" as follows: experience on computing, $r(58)=0.74$, $p<0.000$; experience on Internet, $r(58)=0.61$, $p<0.000$; experience on educational technology, $r(58)=0.75$, $p<0.000$. In turn, we tested the hypothesis that the actual experience coincides with the learner's perceived "overall experience"[8]: years of experience on computing, $r(60)=0.60$, $p<0.000$; hours of computer use (weekly), $r(60)=0.26$, $p=0.05$; years of experience on Internet, $r(57)=0.45$, $p<0.000$; hours of Internet use (weekly), $r(58)=0.37$, $p<0.000$; e-mail messages per week, $r(58)=0.37$, $p<0.000$.

We found no significant differences between *men* and *women* as far as the total self-efficacy index is concerned, although men on average give greater values for this e-competence factor (Mean 95.50 with 89.98, $p=0.08$). However, we have found significant differences on: (i) specific expert-level questions, (ii) educational technology experience, and (iii) formal training. As far as the age factor is concerned, older persons have more participation in ICT training programs, indicating that there is no trend for increased participation by younger groups. We found some significant differences on the self-efficacy index and experience on computing between groups according to *area of residence*: learners coming from major cities exhibit greater self-efficacy [Mean=95.6 with Mean=86.5, $t(56)=3.905$, $p<0.000$] and have greater experience [Mean=4.53 with M=3.86, $t(54)=2.491$, $p=0.016$]. We also examined the relation between actual experience (that is also correlated with the self-efficacy index) and the training experience of the participants and found significant positive correlations for most of the variables: (e.g. Years of experience on computing – Training on computing, $r(55)= 0.437$, $p=0.001$; weekly e-mail messages – training on Internet, $r(53)= 0.560$, $p<0.000$; years of experience on computing – training on Internet, $r(55)= 0.513$, $p<0.000$, etc.) We also studied the relation between the total self-efficacy index and the training experience of the participants and found: participations in computer training programs, $r(58)=0.42$, $p=0.002$; participations in Internet training programs, $r(58)=0.43$, $p=0.001$, participations in office automation programs, $r(51)=0.39$, $p=0.006$.

Evaluation of the e-learning environment

Participants have assessed their e-learning experience rather positive while their answers differ significantly from the *neutral* point 3 (t-Test, value=3, $p<0.05$). The more positive answers have been given to questions concerning *time, place, and type of study independence* (Mean=4.47, SD=0.62), and *facilitating access to information and learning material* (Mean=4.36, SD=0.55). Generally the analysis unveiled a positive relation between experience on computing and the group of effectiveness evaluation axes (see above). For example, relating the experience on computing (in years) we had the following results on the said axes: keeping students' attention $r(27)=0.62$, $p<0.000$; improving active participation/involvement, $r(27)=0.53$, $p=0.005$; support for fulfil program's requirements, $r(27)=0.39$, $p=0.047$; communication and interaction goals achievement, $r(27)=0.60$, $p<0.000$; cognitive benefits from a constructivist point of view, $r(27)=0.42$, $p=0.030$. In addition, a positive relation was observed between Internet experience and the above axes of e-learning effectiveness, but not as

[5]There is a very high positive correlation between participations in these training themes, $r(56)=0.763/0.840/0.933$, ($p<0.000$).

[6] The statistical significance has been tested by a Paired Samples t-Test, ($t(52)=4.592$, $p<0.000$)

[7] Cronbach's Alpha=0.914 with no increasing value if item deleted

[8] We present here only the rates for the *experience on computing*

strong as the first one[9]. Another important relation emerged between selected expert-level questions of the self-efficacy scale and the e-learning evaluation scale: the more skilled (or almost expert) the learner, the higher is his/her evaluation of the specific e-learning setting. Additionally, we found a positive relation between the anticipated level of technical support and the learners' ICT self-efficacy rate, $r(25)=0.50$, $p=0.011$. As far as the age factor is concerned, we found significant differences for many evaluation axes with the older participants giving a more positive evaluation, (e.g. keeping students' attention, $t(21)=-2{,}696$, $p=0{,}014$; improving active participation/involvement; $t(21)=-2{,}216$, $p=0{,}038$; cognitive benefits from a constructivist point of view, $t(21)=-3{,}162$, $p=0{,}005$. Sufficient technical support offered by the institute seems to be an issue for the e-learning environment effectiveness. As far as differences due to gender, the women more than the men expressed the view that they had not the technical support they needed, Mean=1.78 with 1.14 for men, $t(23) = -2{,}524$, $p=0.019$).

Discussion

Given the above mentioned demographic characteristics of our student population, it becomes evident that the learner profile in our post-graduate program is that of an adult life-long learner: our students come from varied economic and regional backgrounds, they are in large part female, married and employed. As such they comprise an appropriate case study for examining hypotheses relating e-competence and e-learning in the field of adult education. With respect to their e-competences, our participants were above average, both as objectively and subjectively assessed and self-reported, something expected both from the self-selection process of applying for an e-learning program and from the actual selection procedures followed by the program, in which minimum e-literacy requirements were set. An interesting finding of our analysis was that the "objective" measures of computer and ICT use in general seemed to coincide quite well with the "subjective" self-assessment of ICT-efficacy measurements, indicating that these two aspects may consistently measure different aspects of the same attributes and may thus be considered as complementary modes of measuring e-competence.

Taking into account the rather limited participation in formal ICT training programs, we suggest that learners' ICT-literacy is based mainly on self-experience (especially as far as learnware and Internet use are concerned). This indicates a need for more effective policies aiming to adults' *qualified* digital-literacy, by means of both formal and informal education and training programs. Furthermore, the positive relation between respondents' actual experience and the formal training they have received, implies that learners limited in both might face difficulties in participating in e-learning programs. The positive relation between the learners' self-efficacy and formal training acquired verify once again the importance of formal and informal education on the person's self-confidence and self-evaluation (both ingredients of the e-competence concept).

The participants overall assessed the program's mode of delivery positively, emphasizing particularly the aspects of independence in place and time of learning and the ease of access to information and educational materials. These results confirm the success of the pivotal pedagogical and organizational features of the program's design and implementation. Relating *students' e-competences to the evaluation of their e-learning experience* we examined the hypothesis that the higher these competences, the more positive would be the students' assessment of their e-learning experience, as in effect the learner's e-competence almost by definition effects the way he/she experiences the e-learning processes and thus the way in which he/she eventually evaluates it. The data confirmed the hypothesis that persons with greater ICT *experience* evaluated the e-learning processes more positively, as in practice they encounter fewer difficulties, need much less support, obtain more benefits and at the end of the day come away more satisfied with the mode of delivery. More specifically the evaluation was more positive by persons with higher *objective* and *perceived* experience with computers, and not so much with experience with the Internet. This is evidence that the main qualification for participating in an e-learning program is computer-competence and not so much the Internet experience, as in effect, the vast majority of the actual work is carried out off-line[10].

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[9] Data are omitted because of space limits.

[10] This hypothesis was validated by investigating the data from the e-learning platform's log files.

Relating the students' *demographic characteristics* to the evaluation of their *e-learning experience* we found firstly that there were no significant *gender* effects. We did not find statistically significant gender differences in e-competence, but men did show a tendency to express greater confidence in and to actually have more expertise. Such differences seem to account for an overall more positive experience for men, as for example they needed less support and were able to manage technical issues. But the data offer an indication that both the process of selection, as well as of self-selection of applicants for participation into the post-graduate program lead to a convergence in e-competence of men and women, thus suggesting that similar e-learning post-graduate programs can further serve as mechanisms for overcoming aspects of the much-documented "digital divide". With respect to *age* we also did not find the hypothesised increased ICT expertise in the younger people, either formally – through education and training – or informally, through experience. However, our data indicated that the older the learner, the more positive he/she experienced the e-learning setting, indicating that age is an important factor expressing a social, professional and family profile with specific obligations, needs and thus expectations from an e-learning program. Overall our data confirm that the e-learning environment is more consistent with socially mature adults with above average e-competences. Lastly, students from *urban backgrounds* exhibited higher e-competence, both on objective and subjective measures, than students from rural regions, a fact which seemed to influence their learning experience. This is an important finding to take into consideration when e-learning programs such as the one under examination aim – among other things – at ameliorating social inequalities in opportunity, arising from living conditions.

The above findings lend support to our theoretical model which perceives program effectiveness as a function of not only program features but also of learner attributes, such as demographic and e-competence characteristics, which influence both needs and expectations and capacities of the students involved in the e-learning process. These findings may be taken to have interesting policy implications. They suggest that e-learning programs should seriously take into consideration the social, educational and training characteristics of their prospective students and try to reach a difficult trade-off between securing equality of access to all groups, but at the same time accepting into the programs persons with social characteristics and e-competences who are more likely to function positively within the e-learning framework and thus contribute to the program's overall effectiveness.

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TEACHERS NEED FOR A NEW KIND OF INTERPRETERS: TRANSLATING LEARNING MATERIALS INTO DIGITAL LEARNING OBJECTS

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Introduction

For several years K.U.Leuven has been an important player in the field of ICT- and media-supported higher education, through projects implemented at the university as well as in an international context. In the last few years the innovation of the teaching practices has accelerated, due to the implementation of novel information and communication technologies and systems. Teacher training faces the challenge of adapting to these new trends and transforming the traditional face-to-face education towards a more interactive and blended learning practice. Teachers need more support and guidance through the expanding new educational landscape both situated in the virtual as in the real world.

AVNet acts as a central department for educational support which is provided more specifically through the use of audio-visual media and interactive multimedia in education, in networked e-learning and distance education. The department specializes in an integrated multidisciplinary approach taking into account media science, organizational, didactical and technological aspects. AVNet constantly aims at improving and optimizing its service through research and development, participation in relevant international networks and collaboration with other K.U.Leuven services and departments. AVNet acts as a support service. The main objective is to help, guide and support all university staff (and its partners) by offering them tailor-made and high-quality answers to their questions and problems within our areas of expertise.

This paper examines how a central university support unit as AVNet at K.U.Leuven can assist teachers in the implementation of new learning technologies, especially by contributing to their professional competence development. To this end, AVNet organizes a series of informative seminars and practical hands-on workshops to inform the teachers about new technologies and how these new technologies can be implemented in their teaching. The focus is not on the use of ICT in itself but on the translation of (existing) learning materials into digital learning objects.

The University has a well-developed ICT infrastructure, and many staff and students use telematics, word processing etc. as naturally as a book. The next-generation technologies, however, require new, more complex infrastructure and skills, which are not yet available to the whole University. These skills are bound to become a measure for the University of its ability to anticipate changes in the way we exchange information, its understanding of techniques and its desire to play an active and critical role in the shaping of the information society.

In this paper, we will describe the process of staff support from research, the creation of templates based on digital pedagogy, to the dissemination and delivery methods of Academic knowledge. We will present the current practice of training seminars and workshops at AVNet, and analyze their results and impact in terms of competence development for our university teachers.

1. e-Competence development: the end and the beginning of a symbiotic chain

The academic community has always been challenged to incorporate new technologies into its methods. However, the future role of the University will be defined not only in terms of its ability to access new channels of information exchange but also – and more challengingly – to give the teachers the freedom and time to create content that is easy to incorporate in the new digital learning environment. In order for this to happen, staff have to have access to infrastructure, instructions on how to use it and a clear understanding about which objectives can be attained.

Due to the technological revolution in the learning environment, the new e-teacher have to cope with all the technological changes and will have to develop new skills to adapt the learning materials to the digital learning environment. When teachers want to transfer the learning materials from one medium to another they have to

1. Know which technology they can use;
2. Have access to the infrastructure of this technology;
3. Transfer their learning materials to the new delivery model (design).

In order for this to happen, the combined know-how of different professionals with different backgrounds is needed. All the people involved need to interpret all the aspects of the new technologies into a pedagogical view. First of all, technological researchers have to search the market for technologies which can enhance learning. ICT assistants need to implement the new technologies in relation to the digital learning environment. Instructional designer are needed in order to create templates to make the translation from learning material to digital learning object easier for the teacher. From the beginning of the process the student and the teacher are the main points of focus. E-competence development needs to move from a technology centered view to a learner centered view.

1.1 Radar for new technologies: a learner centred approach

The technological revolution is proceeding at increasing speed. Every month a new hot technology appears on the market. Videoconferencing, weblog, wiki, e-portfolio, streaming media, podcasting, vodcasting, gaming… Teachers have hardly adapted to the digital learning environment and are already being confronted with all these new trends and possibilities.

AVNet helps the teachers to forest these technologies that are useful to implement in the learning environment. AVNet investigates these new technologies looking for the educational potential of the technology. We argue that it is important that a central department for educational support acknowledges and analyses the need of the teachers and then looks for the right technology to complement this need. It is important that we move away from a technology-centered view to a learner-centered view. When a new technology appears on the market, it is not the role of AVNet to only give access to this technology. We see it part of our mission to interpret the pedagogical potential of the new technologies. Which technological tools can decrease the cognitive load of the students and at the same time provide the teachers with an added value to its digital course?

The teacher is the beginning of the symbiotic chain.

1.2 Give access to the infrastructure

Of course when the use of a new technology is proposed to teachers, they need to have access to the right hardware and software. Technological staff have to implement the technology and make it work. AVNet often tries to choose a technology that is user-friendly and easy to use. To make a technology available across the university, it has to be implemented within or at least compatible with the existing digital learning environment. It is important to inform the teacher about the relation between the new technology and the digital learning environment.

1.3 Translating content into digital learning objects

Instructional design plays an important role in the creation of online education. Instructional design can be defined as “the systematic use of principles of instruction to ensure that learners acquire the skills and knowledge essential for successful completion of specified performance goals”. Efficient and well-thought-out design can limit the cognitive efforts of the learner and can enhance learning. But it has to be admitted that is hard to create a rich and synoptic online course due to the fixed structure of the learning environments and without knowing html code or other computer languages. Which is why we argue that e-teacher needs a new kind of guide and interpreter. AVNet tries to play the role of both guide and interpreter.

For instance, AVNet creates templates based on instructional and usability design. On the one hand we focus on how people learn and on the other hand on making a userfriendly interface so teachers can work very easily with the templates. We also try to limit the workload of the teacher by finding standard solutions. For example we have developed a tool that generates xml-code automatically. We also made a tool to automatically compress digital video into streaming video. We try to identify the obstructions and barriers in the production process of digital learning objects and try to find a reusable solution for the teacher. So the teacher is both the beginning and the end of the symbiotic chain.

2. Description of the training programs

Secondly we want to briefly discuss AVNet's training program which consists of three contact seminars and a workshop. The seminars are organized to give an introduction to new technologies. We explain and demonstrate how these technologies can be used in education. The workshop is an intensive two day training to learn how to actively use the templates shown in the seminars. The workshop is specifically organized for those teachers who want to use audiovisual or multimedia materials in their digital course. To support the workshop we have provided an online course about the use of moving images and sound in a digital learning environment. The participants can use this online course both as a guide and as a good example of an online course.

2.1 Seminars

The contact seminars are 2 hours sessions. The seminars are organized to promote new technologies and create a discussion and interaction between the participants and the speakers. Each seminar is structured in a way to emphasis the learner-centered approach of the technology applications. The seminars are structured in accordance with the procedure a teacher has to go through when they want to translate their learning materials into digital learning objects.

The seminars are divided into four parts. In the first part we present a didactical view on the selected new technologies. We emphasise how teachers can use this technology in education and why this technology can enhance learning. What is the added value, the downsides and the implications when you use this technology in the digital learning environment?

In the second part we invite a teacher who uses the new technology in his/her learning environment. We select a best practice and invite the speakers to show their colleagues how such a technology can be used in education. The aim is to provide the teachers with a well-developed example which can give them inspiration and ideas to implement the technology in their own education.

In the third part we demonstrate how the university supports the technology and how the teachers can implement this technology in their digital learning environment. In this part we again move beyond the technology and introduce "best ways to use" based on instructional and usability design. To decrease the difficulty of the implementation of the technology we created reusable templates. These templates are created and designed typical for educational use. Templates are created in a very user-friendly manner based on instructional design. The main goal is to limit the need for technological knowledge. We limit the need for coding and writing in the used computer language. The teachers do not need to know html or xml code to develop their digital learning materials.

2.2 Workshop: Audiovisual and multimedia learning materials

The workshop is an intensive two day practical workshop. They learn how to produce audiovisual materials. The workshop is divided into four modules which can be followed separately or as a whole.

In the first module the teachers learn how to use a camera and how to set up a camera. This module is developed for those teachers who want to make their own audiovisual learning materials. In the second module they learn about editing. They learn how to use professional editing software. We also introduce the teachers and give them a notion of easy to use and/or free editing software.

In the third part we concentrate on compression. This phase is necessary when the teachers want to use the audiovisual materials online. We give them information about the importance of compression. In the last part we concentrate on the implementation in the learning environment. We learn how the teachers can translate their audiovisual materials into digital learning objects. We teach how audiovisual learning materials can increase the cognitive effort of their students. We show them the advantages of a learning environment and how they can go beyond the traditional use of audiovisual materials in the classroom. AVNet acts as a guide and interpreter.

3. Evaluation

After each seminar and the workshop the participants were asked to fill in an evaluation form. All the teachers reacted very positively on the training programs. More than fifty percent of the participants began to use the technology and templates offered by AVNet within a week after the seminars and workshop. They were very enthusiastic and motivated to use the digital learning environment in a more efficient way of distribution. They emphasised on the importance of the templates and the easy-to-use solutions that AVNet supplies.

The main strength of the training program lies in the student-teacher-centered approach. We concentrate on how the student learns, foster a technology that can enhance learning, implement it in the digital learning environment and create easy-to-use templates, or support devices so the teacher can use these technologies very quick and easy. The importance of offering this training within a central university department is to train the teachers how they can translate their learning materials into efficient digital learning objects. AVNet acts as both a guide and as an interpreter. We base our training programs on the needs of the teachers and develop guides to help the teachers to implement the new technologies in their digital course, based on both instructional and usability design.

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EFFECTIVENESS OF INDIVIDUAL COMPETENCE DEVELOPMENT BY USING NETWORKS OF GRANULATED CONTENTS

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Introduction

The potential of specialists as well as skilled employees is essential for the competitiveness of the economic areas. Therefore the regional economical development depends on the growth of intellectual capital, human resources and assets. The capital of a company consists of financial and intellectual capital. Intellectual capital may be thought of simply as knowledge, skill and competence that can be converted into profit. The main components are human and organisational capital. Human Capital represents the knowledge, skills, competences, and expertise of the company's employees. The organisational capital includes the structural and process capital. Structural capital represents the assets that complement the company's human and process capital and that enable the creation of value. Process Capital deals with the methods by which the company creates value. (Figure 1) [8]

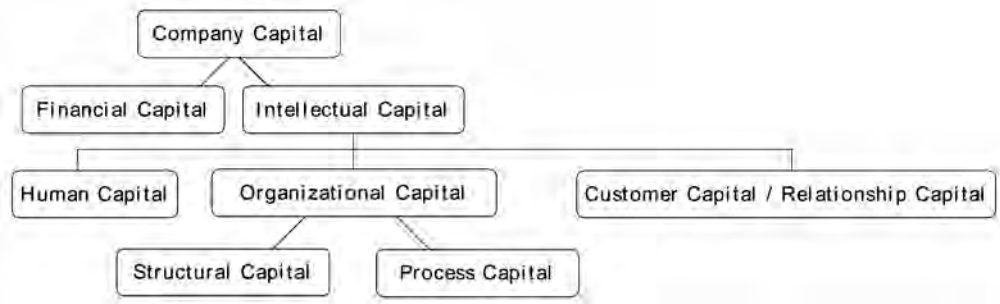

Figure 1. Structure of Intellectual Capital

Precondition for that is the increase of the quantity, quality and effectiveness of the knowledge development and transfer in the economic area. The key issue is the dialectical relation of efficiency and individualisation of knowledge transfer procedures. Therefore the optimisation of learning processes based on special methods and tools are necessary. That is especially important for the distance education as a special field of application.

Importance of Content for Competence Development in Distance Education

The knowledge transfer in the framework of distance education as well as in other related kinds of education such as blended learning is focused on the development of human and organisational potentials. It is an iterative procedure of special phases in a cycle of generating organisational and human capital as part of the intellectual capital used in the work flows of the organisations reality of practical applications. (Figure 2)

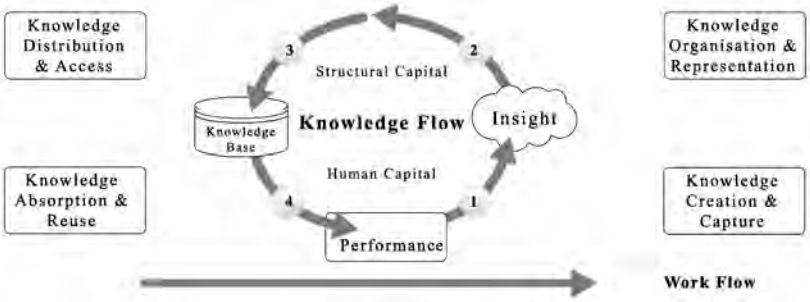

Figure 2. Life cycle of knowledge development

The terms of knowledge, skill, competence, and expertise are of central importance for the knowledge transfer. Knowledge is generated from information. It is the psychological result of perception, learning, and reasoning. Skill is the ability that has been acquired by training or learning in order to produce solutions in problem domains. It is the familiar knowledge of any art or science, united with readiness and dexterity in execution or performance, the application of the art or science to practical purposes, the power to discern and execute, the ability to perceive and perform as well as expertness, adroitness and aptitude. Competence is the quality of being adequately or well qualified physically and intellectually. The humans are able to answer adequate, sufficient, suitable, capable and qualified. The expertise perfects the perception of complex situations apprehending the different situations as familiar cases. The capability for the perception or conception of family likeness between different appearances is increased. Experts are able to generate from amorphous, tangled situations those cases including its appropriated solution already. [3] Acquiring of competences and skills in the framework of learning and training programs is accompanied by the incremental improvement of the human knowledge. It is possible to acquire theoretical and practical as well as general and special knowledge. (Figure 3)

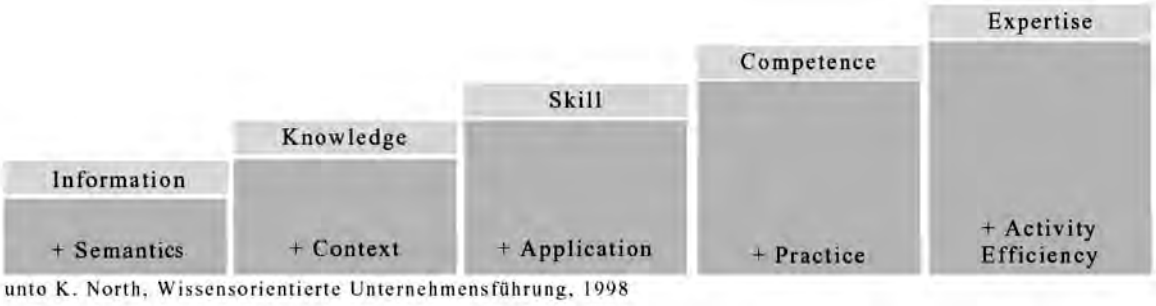

Figure 3. Model of generating competence and expertise [7]

The development of competences is influenced by several key aspects including the following views:

- composition view as structure of different kinds of competences,
- organisational view as architecture of organisations supporting the development of competences,
- procedural view as time-dependent procedures of acquisition of competences,
- methodological view as procedural modality and manner of the development of competences,
- content view as digital representation of the information and knowledge,
- technical view as technology driven, infrastructural development of competences.

Therefore the development of competence is a multidimensional problem including the dimensions of method, structure, time, content, and organisation. The majority of the dimensions is directed to the focus, how is to practice the development of competence. The content dimension in relation to the composition view is the only focus, what is to learn for the development of competence. Content is all in a collection, the sum or range of what has been perceived, discovered, or learned. Knowledge presentation tools and systems are appointed in order to discover process, store, administrate and present contents to the users as learners, teachers, or trainers. This is done by aggregation, collection, accumulation, assemblage. The content influences directly the opportunities of learning as the key procedures for the development of competences. (Figure 4)

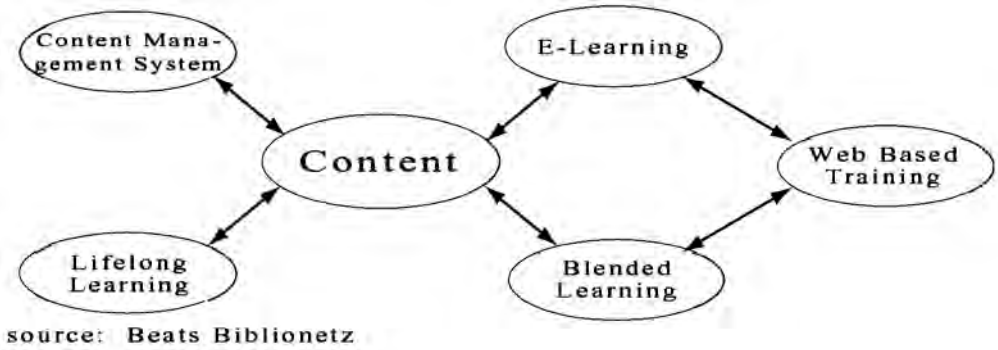

Figure 4. Content and the related aspects of learning [4]

How the competences are developed is very important, but without contents as knowledge representation no knowledge transfer realizable and implementable. Content is in this context a quantity of digital solidified knowledge. The quality of the content will be influenced by the degree of objectiveness achieved by evaluation. Content is the main source for the knowledge transfer as a base for the competence development. In the past the software development was the bottleneck for the progressive expansion of the information processing. The problem was solved by applying the methods of software engineering in the framework of information management. Recently the content development seems to be one of the bottlenecks for the progressive expansion of the competence and knowledge transfer. This problem should be solved by new methods of content engineering in the framework of knowledge and content management.

Classic Monolithic versus Granulated Content Architecture for Individualisation

The term "Architecture" in the science field of informatics is used for describing the general relation of the elements of a complex system. There are related definitions of software architecture [5]:

- The software architecture of a program or computing system is the structure or structures of the system, which comprise software elements, the externally visible properties of those elements, and the relationships among them. [2]
- Architecture is defined by the recommended practice as the fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution. [1]

Applying the first definition to the problem of content architecture an analogical definition can be derived. That means the content architecture of a document or a system of content is the structure or structures of the system, which comprise content objects, the externally visible properties of those objects, and the relationships among them. The consequences are [2]:

- The architecture defines content objects.
- The systems can and do comprise more than one structure.
- Every content system has architecture.
- The behaviour of each element is part of the architecture.
- The architecture for a system is a good one or a bad one.

The behaviour as well the properties of the content objects will be described by the means of the object modelling such as UML (Unified Modelling Language) in general or will be defined by using standards such as SCORM (Sharable Content Object Reference Model) in particular. One of the key issues is the decision of the content structuring as kernel of the architecture concept. In the past the content development was dominated by the simple transfer of classic content systems from the lectures or seminars to the digital description of similar computerized events especially in the framework of computer based and later on of web based training. Relative large-scale and complex content modules were generated. They are characterized by a monolithic structure.

The disadvantages of monolithic structures are:

- the inflexibility concerning changes of the system requirement,
- the enormous complexity,
- the abandonment of modular design concepts and reusability of submodules,
- the partial redundancy of functions and contents,
- the inflexibility concerning of evaluation and control requirements,
- the difficult maintainability, extensibility, and adaptability.

Therefore the recent and future development of content development is oriented towards the intensified modularising. That means, that the content is structured into relative small-sized, as far as possible independent and logical partitions as submodules. (Figure 5)

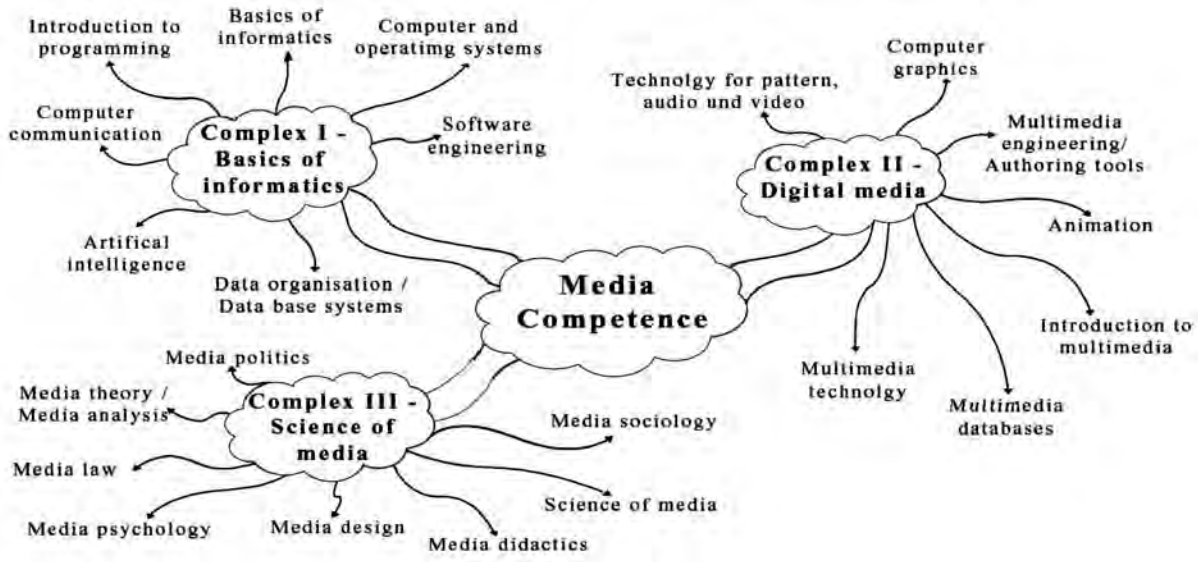

Figure 5. Modularised content for media competence development

The advantages of the object-oriented module design development are:

- the increase of the flexibility,
- the improvement of the quality,
- the reduction of costs and developmental periods,
- the increase of efficiency in implementation and application, etc.

But in the majority of the application cases, the complexity and for that reason the inflexibility for the more and more individualised learning is still too high. That is why the next generation of content will be characterised by granulation. That implies the decomposition of the contents into the smallest logical units, which are achievable. By this means the highest flexibility and efficiency for learning, knowledge and competence transfer are attainable.

Organisation of Granulated Content by Semantic Webs in (Distance) Education

The main problem of granulation of the content is to find out the smallest logical content unites as objects linked by a network of logical relations. Recently the manual structuring and granulating is the usual way to realise the most flexible architecture for the individual learning. (Figure 6)

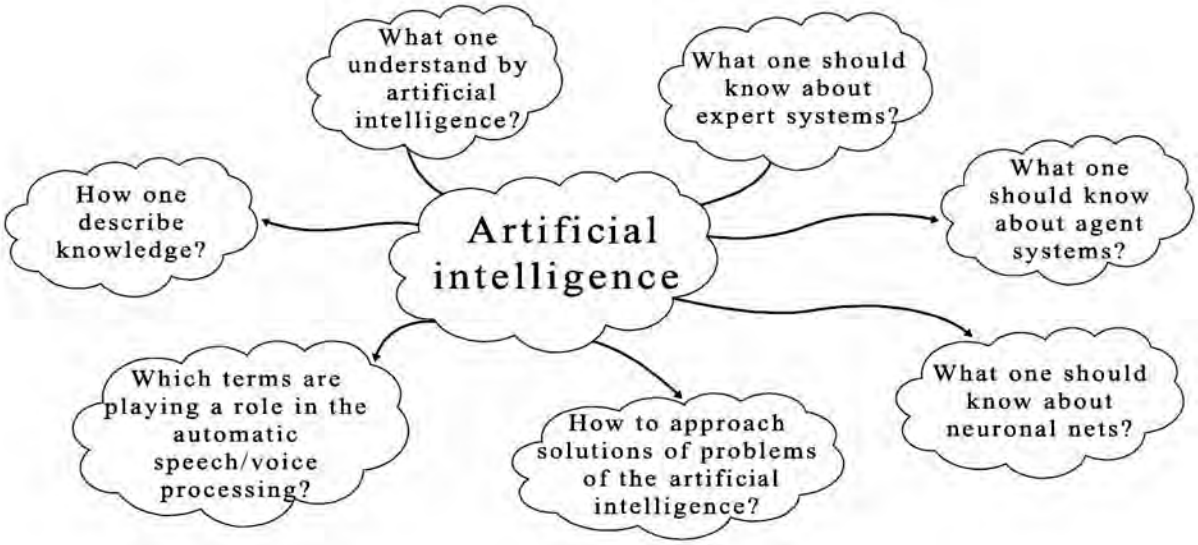

Figure 6. Decomposition of one module for media competence content into granulated content units

After decomposition of the content modular-design system into the granulated-design system the description of the relations of the granulated content is very important. Therefore the ontology approach is used. An ontology is typically a (hierarchical) structure containing all the relevant entities and their relationships and rules within a domain. Ontology is related to semantic networks. The semantic network is defined as formal model of terms und its relations. It is used for presenting of knowledge within so called knowledge networks. A semantic network is characterised by a generalised graph. The nodes of the graph are the terms; the edges of the graph represent the relations. Which kinds of relation are allowed is to be defined within the different network models. [9] As a consequence the decomposition diagrams can be transformed into semantic network models. (Figure 7)

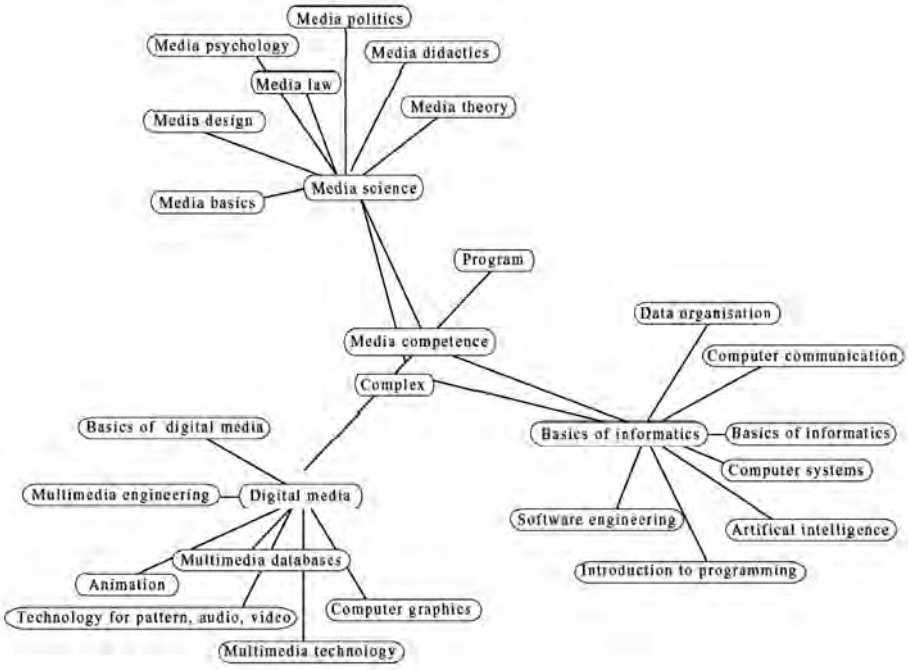

Figure 7. Modularised content for media competence development as a semantic network

The modularised as well as granulated content is produced by means of Content Management Systems (CMS) using the opportunities of Authoring Systems frequently. CMS consists of an application software system enabling and organising the corporate development and editing of content such as text or multimedia documents. Authoring Systems are developing software systems for the production of digital contents. Integrated Authoring Systems enable the developers to include different media in a learning course, to design the content architecture and the navigation for controlling of the interactions

according to a story board. Often they are orientated towards visual systems for visual programming with hidden source code. Normally Authoring Systems are connected with CMS or Document Management Systems (DMS). The finished and available content will be provided for the user by Learning Management System (LMS) or Web Content Management System (WCMS). LMS, also termed as Portal System, consists of a software system including a related data base system. The contents are administrated and provided for the learner by the LMS. Furthermore the LMS has functions such as presentation, communication, training, and evaluation. WCMS has the same principles for providing the user like LMS but they are especially focused to the web application.

The content will be used in a very efficient manner in an iterative cycle:

- The user will be able to begin with a very concrete question focussed to easily understandable and manageable answer providing a fast and tangible benefit.
- After getting the answer the user is able to detect related terms in the context of the available content by getting information from the semantic network.
- Afterwards the user is able to decide either to continue with a related term in the network, to place a new question, or to break off the system interaction.

Because of the extreme decomposition of the content into smallest logical units, the user will be able to avoid working through these parts of the content that is not directly related to his question. (Figure 8)

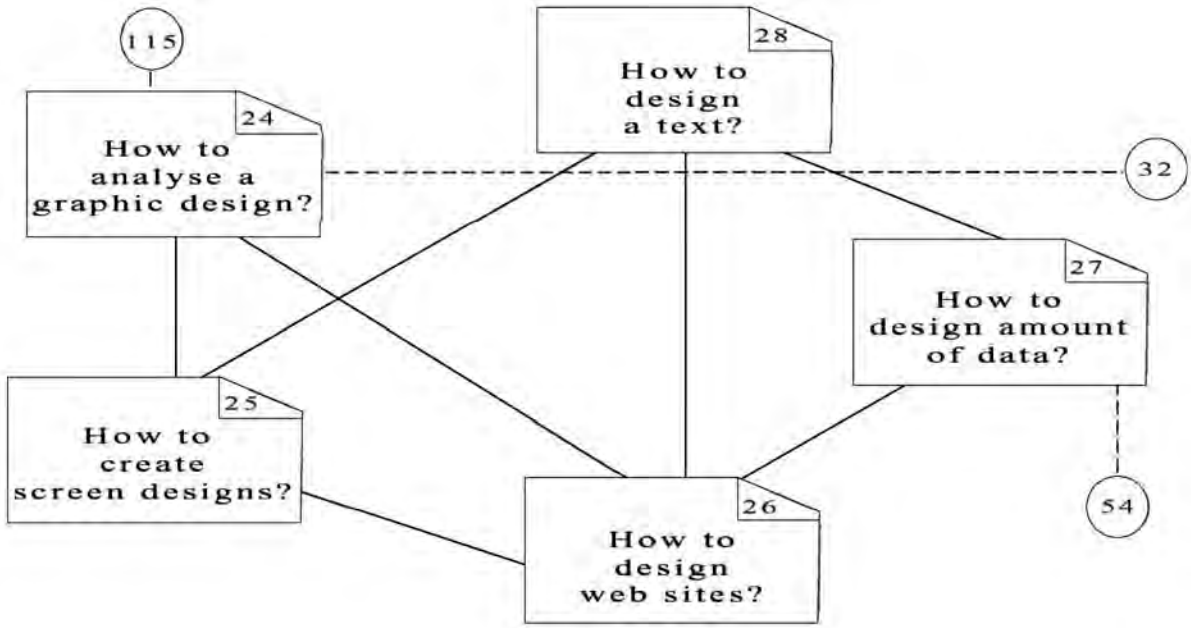

Figure 8. Granulated content units in the context of semantic relations

The knowledge and competence transfer becomes much more individual. The user will be able to learn more purposeful and efficient. Simply said, he will save time and resources or will achieve more applicable knowledge and competences with reduced efforts. The important side effect of the granulation of content is that it will be easier to use available content units in different kinds of education. Normally, a module produced for academic education is without redesign not applicable for vocational training. But parts of the content could be used in another form of education and training such as Distance Education directly. Therefore the decomposition facilitates the access to the available content units and its reuse. Especially, in the case of transfer in the corporate relations and affairs, the enterprise will be able to improve and extent the intellectual capital faster and cheaper by using granulated content in the framework of semantic networks.

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THE PATH FOR ADULT EDUCATOR TO KNOWLEDGE SOCIETY: SEARCH EXPERIENCE WITHIN ADU-EDU PROJECT

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Life Long Learning in the Knowledge Society

The ideas of the Knowledge Society and Life Long Learning let us see our life as ongoing process of producing knowledge, as well as sharing and applying it. Information Technology (IT) is the main issue of discussion on Information Society. A shift of focus from Information to Knowledge Society let us stress Knowledge Technologies (KT) and discuss the adult educator as a developer and as an important actor within these technologies.

An adult educator becomes not only the teacher or trainer of adult people, but he/she acts more as a tutor, mentor, counsellor, consultant or developer of KT. Such activities as supervision, entrepreneurship, management of learning organizations or human resource development make adult education an integral part of business life. ODL results in new activities such as designing of materials and tools for open and flexible learning, development of virtual learning environments and learning support systems. A shift from traditional schooling to Life Long Learning refocus activity of adult educators from teaching children and/or adults in the educational settings to development of learning possibilities in social and professional life.

The path we track in the AduEdu project

Expansion of the practice of adult education requires redefining the profession of an Adult Educator. The AduEdu project is designed to meet the need for defining the profession of an adult educator in the framework of Knowledge Society (see Figure 1).

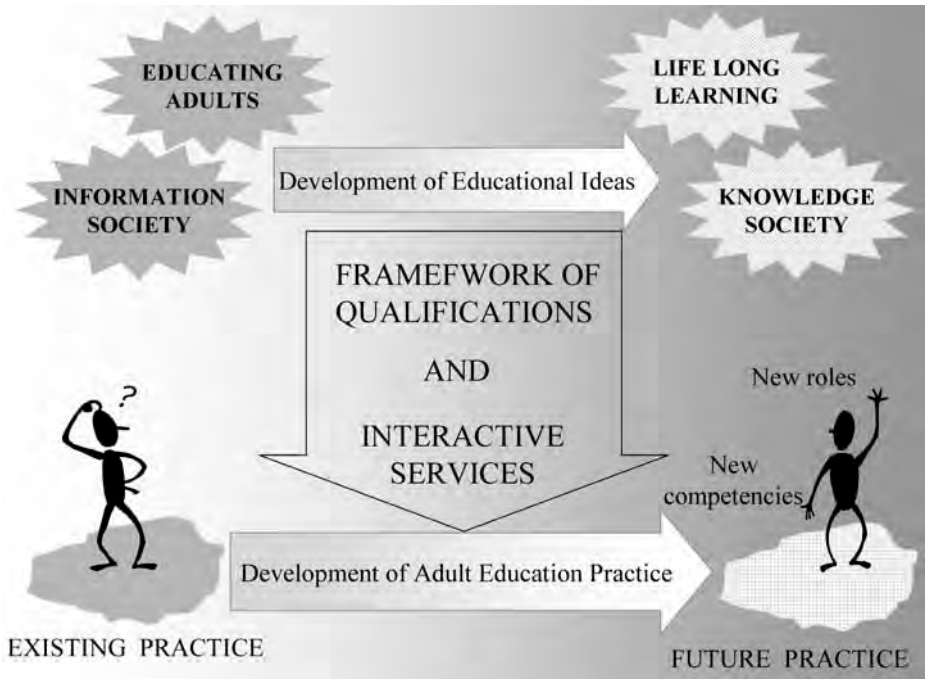

Figure 1. The idea of the AduEdu project

The goal of the project is to develop and coordinate among participating countries Framework of Qualifications of the adult educators (FQ) and implement it in four areas:

- in supporting assessment and further development of professional competency of Adult Educators;
- in guiding development of programmes & courses for training of Adult Educators;
- in linking Adult Education (AE) policy and strategy to requirements of Knowledge Society and idea of Life Long Learning, and
- in setting criteria and designing means for evaluation of AE training practice.
  (more information about project see on website http://aduedu.EUproject.org)

Eight organizations from eight countries (Lithuania, Denmark, France, Latvia, Malta, Norway, Romania and Sweden) searched for the way towards Knowledge Society. More questions than answers have been generated during the first year. Partnership is ready to share their findings on the path towards Knowledge Society and widen discussion with interested parties.

The methodology for development Framework of Qualifications

The development of a Framework of Qualifications (FQ) for adult educators is a core activity within the AduEdu project. The earlier activities of the AduEdu are directed towards production of a solid conceptual and evidence-based platform for the framework while the later ones are directed towards securing widest possible implementation and usage of the FQ. The main attention was paid to methodology development during the first year of the project. Management and evaluation methodology implementation process will go in parallel with all other activities.

The eight phases are described in the methodology:

1. description of AE contexts and their 'Practice Spheres';
2. defining AE roles, positions and functions;
3. defining AE competency domains, areas and levels;
4. specification of AE competency indicators and measures;
5. development of FQ-based tools, guides and online services;
6. development of recommendations for FQ implementation and utilisation;
7. generation of European-wide awareness; and
8. development of the support services for FQ utilisation by organizations and by individual users.

Each phase of the FQ development is supported with a set of online services defined and made available within the AduEdu project platform.

Modelling Adult Educator's practice sphere

The practice sphere of adult education and lifelong learning is conceptualized as the three-dimensional cube-model:

- The first dimension represents *Space* where learning takes place. Virtual space learning is contrasted to real space learning.
- The second dimension represents *Regulation* of learning. Self-regulated learning or self-regulated access to education, is contrasted to education that is regulated by others;
- The third dimension represents *Context* of learning. Situational learning is contrasted to institutionalized learning.

We use the model as a tool for trying to define different learning scenarios that are supported by adult education organizations. 95 different learning scenarios have been identified by partners of the AduEdu project.

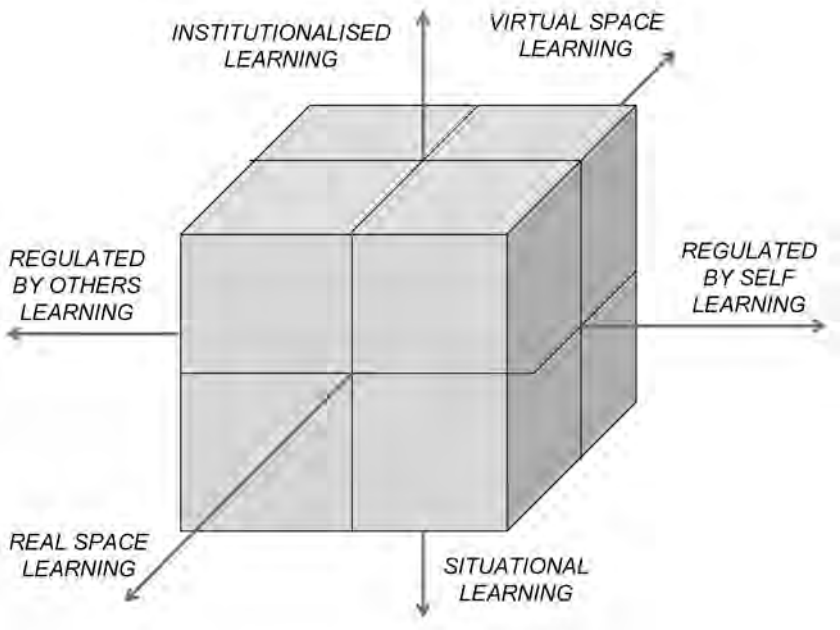

Figure 2. The model of Adult Education/LLL 'Practice Sphere'

Definition of developmental trends

Two sources for definition of developmental trends where considered in the AduEdu project: futuristic literature on Knowledge Society and the documents of educational policy at both levels: national and European. Analyses of Knowledge Society from the perspective of postmodernism (Edwards & Usher, 2001; Usher, Bryant and Johnston, 1997) reviled common changes in knowledge, learning and education:

- Knowledge change – knowledge is mirroring a world of rapid change; it is losing its canonised status and become more decentred – value of different sources and forms of knowledge increases and value of specialise discipline-based knowledge decreases; knowledge is valued by its 'performativity'.
- Learning change – learners make choices based on desire rather than search of enlightenment; learning stance towards life becomes a means of self-expression and autonomy.
- Educational change – educational institutions increasingly find it difficult to claim a monopoly in the generation and dissemination of knowledge. Educational activities have become consumer goods in themselves, purchased as the result of choice by free agents (adults) within a marketplace, where educational products compete with leisure and entertainment products.

On the basis of European Commission communications and reports, we have identified three main objectives which have to be reached in order to develop the European Knowledge Society:

- The recognition of non-formal and informal competencies,
- The central place of the trainee in the training system and
- The use of ICT in Adult training.

Analyses of developmental trends let us define the demands of Knowledge Society on an individual learner, an adult educator and AE organization. Definition of trends helps to predict changes in roles of Adult Educator and set priorities in competency development.

Functional description of Adult Educator

Five areas of Adult Educator's activity have been defined at different levels AE practice and key purposes of these activities have been defined (see Table 1).

Table 1: Activity levels of Adult Educator

Level of AE practice	Area of activity	Key purpose of activity area
V level National/EU	Adult education	Develop, maintain, promote and gain agreement to the vision, culture and strategic direction of Adult Education and LLL service
IV level Regional	Promotion of learning region	Establish partnership with community members in order to establish sustainable infrastructure for Adult Education and LLL services within region
III level Organizational	Learning service provision	Contribute to the development, delivery and evaluation of efficient AE/LLL services, which meets the needs of learners, stakeholders and the community
II Level Interpersonal	Teaching/learning facilitation	Create effective environments for learning in order to enable all learners to achieve to the best of their abilities
I level – Personal	Professional development	Reflect critically on professional experiences in order to enhance professional effectiveness

Four key functions (production, functioning, reproduction and development) have been defined for each activity area. Three managerial functions: planning, organizing and leadership have been described. The map of general functions was coordinated to specific demands of different AE/LLL scenarios within practice sphere (Figure 2) and different national contexts.

Defining roles of Adult Educator and development of Framework of Qualifications

Wide variety of adult educator's roles within different spheres of practice have been discussed in the project. Roles have been related to different activity levels (see Table 1) and with different functional blocks. Roles, related to teaching/learning facilitation have been linked to different learning scenarios that are distinguished on the three-dimensional cube-model.

Six steps from Competencies and Framework of Competencies to Qualifications and the Framework of Qualifications have been performed in the AduEdu project:

- Defining competencies of Adult Educator;
- Distinguishing Domains/Areas of Competencies of Adult Educator;
- Designing the Framework of Competencies;
- Distinction of Specializations in Profession of Adult Educator;
- Distinction of Qualifications Levels of Adult Educator;
- Designing the Framework of Qualifications.

The Framework of Qualifications forms the base for developing interactive services for target groups.

Development of tools for supporting transition towards Knowledge Society

One of the main objectives within the project is to develop tools and guidelines for use of FQ in adult education practice and integrate them into an interactive on-line service addressing the four target groups:

1. for adult educators we are developing an interactive online tools for assessment of professional competency and planning professional development;
2. for developers of programmes, courses & modules for vocational training and continuing education of adult educators we are going to suggest an interactive online guide and reference materials for curricular development;

3. for managers and decision makers in the field of AE we will provide the recommendations and reference materials regarding human resource development policy and strategy in the field of adult education;
4. for evaluators we suggest the criteria and interactive online means for evaluation of programmes and courses for training of adult educators.

The open discussion with target groups is very important for us at the stage of service development. National reference groups have been established by the partners. The reference groups will be testers of the prototype tools.

The questions raised after the first year of project implementation

The AduEdu partners raise four questions for discussion:

- Are we ready to change AE services that we provide for adult learners or we are happy about status quo?
- How should roles and competencies of Adult Educators adapt to undergoing processes of changes?
- What kind of service is needed for supporting those actors in the field of Adult education, who are dealing with changes in their practice?

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DEVELOPMENT OF METOIM WEB TOOL FOR COMPETENCES SELF-EVALUATION

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Introduction

The paper presents the methodology of the METOIM "MEasure TO IMprove: how European Labour Union associations and firms can better improve through self-evaluation" Web Tool for improving the employment chances of EU citizens, as part of the lifelong learning policy of equal opportunities.

The activities were carried out during a Leonardo da Vinci pilot project which is an innovative ICT educational product aimed to highly contribute to fill the gap of information and communication within the vocational training and employment fields. The project created a different and unique partnership by bringing together labour Unions from Italy, SMEs from Italy, France, Hungary, Greece, a large technical university from Romania and vocational institutes from Italy, Austria. The main point is that vocational training at formal and especially non-formal levels seems to be very difficult to handle within social organization and trade unions as the mainstreaming as well as knowledge management processes are bumping into the inadequacies of instruments, communication and information. METOIM stakeholders are principally a wide partnership within different countries both at vertical (politics) and horizontal level (geographically) based on social actors who best resemble the trade-union between employment and corporate world; the implementation of an instrument capable to measure competences (transversal and social), quality of learning (motivation and perception), quality of services (case studies, best practices) and quality of communication/information tools; the recognition of equal opportunities, especially women role, as a major standpoint to favour mainstreaming and pluralism within the vocational training "market". The project is directed to workers, trade unionists and employers with a particular attention to the field of transport and to the coordination of women and undirected addressees as young people, unemployed, atypical employees.

Definition of Competencies

There is no single concept, definition, structure or anything else dealing with "key competences", to which the scientific community generally agrees on. It is much more the other way round, which means that there are hundreds of definitions and approaches, which provided a different description of what a key competence might be, what it might be used for and how it could be made evident and measurable. We tried to synthesise here some of these approaches in the light of our project (Steiermark, 2005).

Key Competence

A Key Competence is the ability to mobilize and correctly apply one's own resources (Mertens, 1974) (abilities, knowledge, experiences, etc.) as well as environmental resources (instruments, tools, other persons, etc.) to bring a performance to a positively defined result within the setting of a particular working environment (Rychen and Salganik, 2001).

Transversal Key Competence

A Transversal Key Competence is a key competence, which is not exclusively linked to one specific performance and/or to one specific working environment. A transversal key competence can get evident in different performances and/or different environments. Nevertheless, a transversal key competence is always – alone or together with other key competences – very relevant to bring a job performance to a positively defined result (Down, 1998).

Online Questionnaires/Testing Tools Design

In the 21st Century Web era, the social surveys' styles have changed. The online questionnaires are often used nowadays as they have several advantages over traditional survey methods in terms of cost, speed, appearance, flexibility, functionality, and usability (Dillman, 2000, Lumsden and Morgan, 2005). The most important features which online questionnaires bring are that they can include pop-up windows for instructions and error messages, can incorporate links and a high level of interactivity which can provide different sequencing of navigation, providing definitions or clarification and also detecting possible errors done by the users in the moment of completion (Lazar and Preece, 1999). Beside many advantages, online questionnaires have several disadvantages. The most important comes from the theory of social research and shows that online questionnaires' weaknesses are based on the four standard survey error types: coverage, non-response, sampling, and measurement errors (Dillman, 2000). As a result of the digital divide (Boitos, 2004), the different level of access to Internet in each country limits the spreading of results.

The "Politehnica" University of Timisoara multimedia team (UPT) together with the partners of the METOIM project have developed a practical, comprehensive tool for the design of online questionnaires. The tool is part of the METOIM Web Tool which delivers surveys as initial phases of the finding, evaluating and gaining information about the level of key competencies of employees. The Web tool can set up different types of questions: multiple choices with one choice or with several choices, selection questions, rating questions and open questions.

METOIM Questionnaires Design

The METOIM partners, social actors all over Europe will be sharing, though in different contexts, the implementation of an instrument capable to measure competences (transversal and social), quality of learning (motivation and perception), quality of services (case studies, best practices) and quality of communication/information tools. The self-evaluation competences online application is based on the tool for designing online questionnaires of UPT (Andone *et al.,* 2005). To establish the competences the partners applied, an online survey was realized for two professional categories: front-desk officer and professional driver. The METOIM Web Tool can be found at www.metoim.org (www.cisltoscana.it/progettoleonardo).

This application is a tool used to run statistics using data inserted with an online automated questionnaire. The techonlogy which backup the development is php-mySQL technology and is based on 3 components: a mySQL database (Figure 1), the online questionnaire (form) used to insert data and the real time statistics (reports). The questionnaire targets two professional categories: front-desk officer and professional driver, and for each category there is a list of 9 competences. When the user selects a competence, a description of this competence is displayed, followed by option-lists to check the age and gender. For easy completion these information are filled in automaticaly if questions from an another competence were answered for that user. To develop such a mechanism it is imperative to keep all the data about a person in the database when it is inserted a first competence for that person, even before a full save of the questionnaire of each user. A person's data is inserted if he has competences filled in the database. The application will query the database and assume all the data about that person from database. This was one of the main application initial requirements due to the low access and speed to Internet of the target groups.

The form includes fields to describe the competence; when the form is completed the inserted data is validated and inserted in the database with a query. (Figure 1) If the inserted data are not valid, the user will receive an error message, but all the valid data will be preserved in the form. The questionnaire has a list with the code of competences. This list is used to inform the user about the competences which are already completed for current person. The codes and information for the completed competences appears in a different color (red).

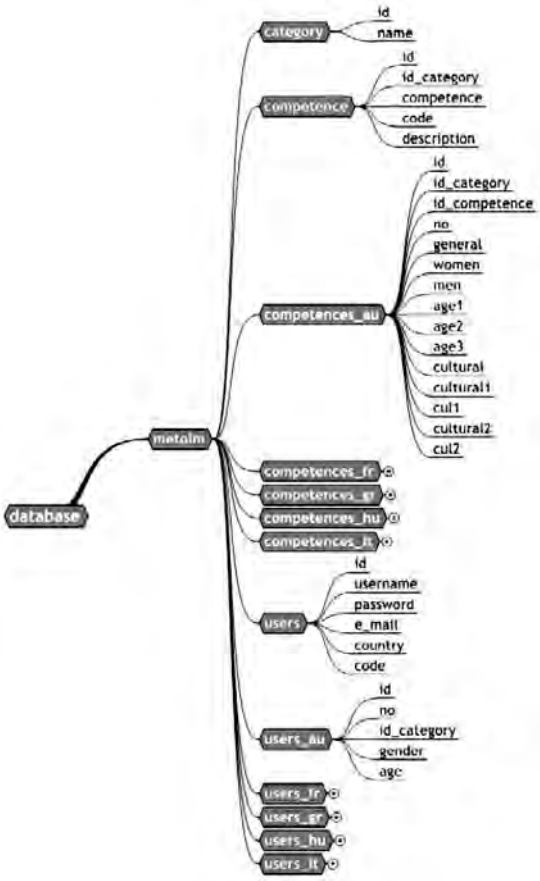

Figure 1. Database structure

From all the data inserted within the online questionnaire, real time reports are continously realized, which are produced for both country and general format and can be viewed all the time. The statistics are realized querying the database and are subdivided by gender, age, competences and provide information about the number of users in general and per country.

METOIM Web Tool Application

The main scope of the METOIM Web Tool Application is to develop an online tool for the self-evaluation of key competences at international level for several employment areas. This tool is used as an assessment method for companies interested in vocational training and responds to the workers needs of assessing their competences at an international level. The Metoim Web Tool will be translated in German, French, Hungarian, Greek, the Italian and English versions are already tested. The tool development and design concern a management structure of all the data concerning users involved in a way or another in this project, even if they are partners, firms or employees. The application represents a collection of instruments: tools, questionnaires and statistics, which can be access in accordance with user's rights.

The main components of the METOIM Web Tool follow the structure:

- A database structured in seven tables which retain data about the users, skill profiles or statistics;
- Registration tool divided in two sections (firms and workers); also, here was developed a user-password generator;
- Login section where user's data are checked; after that the user is guided to the right area;
- Skill Profile tools for front-desk officers or professional drivers, developed like questionnaires (input) and graphs (output);
- Statistical sections are available for firms and project partners.

Registration Form for Firms

As a multi language application, for the content management of this core part a language engine was designed. An external standalone text document for each language was written which stores all the content of that language. Also, all the web pages run a script to determine the current language in use in the application or to allow the ability to change the language (Figure 2.).

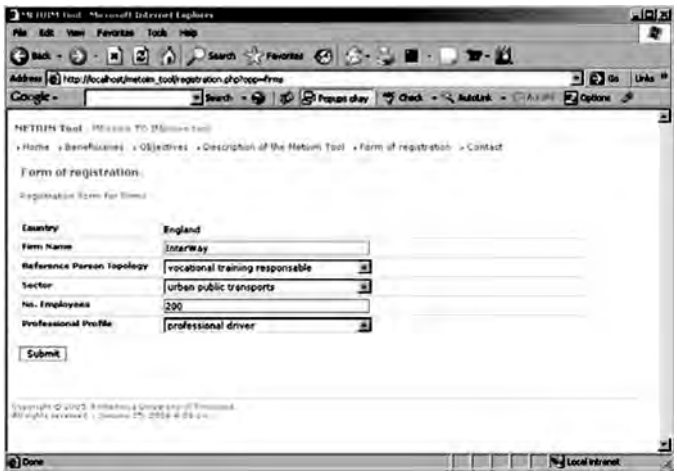

Figure 2. Registration Form – partial

This allows increased international user flexibility for multiple purposes in several EU countries. If in the future another language is added, in the application it is enough to translate all the content of this text document and to be inserted into the right path. As an open online application, we need to provide an open registration form for firms and workers. An automated registration process allows any user to register his information and then to be provided with a generated username and password. Each user (firm, worker or project partner) is able to access the User Section through his username and password. From there the user can navigate inside his account selecting options like user profile, skill profile or statistical section. For example, a worker is able to view his user profile or to complete the sections of the skill profile in accordance with his professional profile preserved during the registration process.

Skill Profile

The main aim of this part is to map the contrast of the various working sectors (public, entrepreneurial class, trade union) and to individualize the sectors and the evaluation indicators about the object under analysis taking into consideration:

- Social and transversal competencies,
- Quality of the services,
- Quality of the trainings,
- Modality of information and communication

The initial project phase involved multinational roundtable where the tests were put together to be used by the workers with a view of helping the rethinking about their own working conditions, relevant in particular from the following points of view: affective or emotional, willingness, knowledge, motivational, besides evaluations of competencies. The self-evaluation test permits a multiple answer solution for the user side and also the consequent dynamism of the sequence of the questions. From all of these tests a final profile is generated for the use of the worked and/or the firm and with direct recommendation on possible training. The direct connection with special web links to information, testimonies, trainings and referents to contact from his working but also regional/national area, increases the worker possibilities to strengthen the eventual critical aspect that the test might show.

The skill profile self-evaluating test consists of:

1. a test on **perceived skills** in which the workers find questions related to the 5 selected competencies scattered randomly and will assign a mark from 1 to 7 as a gradient of importance;

2. a test on **possessed skills** in which the workers will find questions related to the 5 selected competencies scattered randomly and will assign a mark from 1 to 7 as a gradient of importance;
3. a graphic illustrating the comparison among the different profile;
4. a final table which reports the scores obtained for each category, added together and a comparison with the average of all the user results and the pre-input expert data gathered in the first phase of the project. The difference between the averages will show then a gap on the transversal skill, which can be positive or negative and thus be a point of force or a weakness for the worker competence.

During the online completion of the skill profile test, the worker needs to answer to the similar online questionnaire as described above. The result can then show the following outputs: possessed competence level and competence perception. In that moment the user (worker) can compare his diagram with the firm diagram, see his results in questionnaires or obtain the report about the skill profile. Several data are pre-input in the METOIM Web Tool: the expert data, the profile data according with each job and the firm profile. Each firm needs to establish the firm profile, the job competencies requirements, and all of these information is also used to realize a country firm profile. The tool innovations consists in the linear, statistical and graphical comparison of each user key competencies and transversal competencies with the firm and country profile.

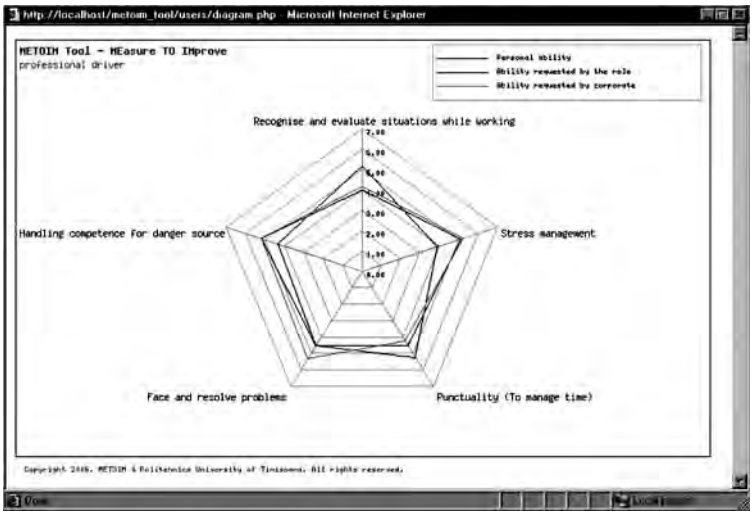

Figure 3. Graphical representation of competencies

One of the major challenges in the METOIM Web Tool was the graphical real-time representation of the results, as the target group special requirement of and within the spirit of easy-to-read and usability of online applications. In order to create and manage dynamic graphics, PHP requires installation of GD Graphics Library, an open source code library for the dynamic creation of images on web sites. As a result a graph is created for a common user (worker) using the data from his Skill Profile. These data are extracted with a query from the database and are used in the PHP script to generate a dynamic image (polygon). In this case a .PNG file was generated, but .JPG or .GIF files can also be generated , with facilities to be saved, emailed and printed.

The main goal of the METOIM Web Tool was to provide workers and firms with an easy-to-use and to access online application and methodology for assesing competencies and with information for possible and suggested training in the geographical and subject area. But the tool was intended also for the use of expert in vocational training as a market analysis and information gathering. The Statistical Section provides data about the profile of workers from each country as generated real-time statistics for each category: age, gender, education, professional profile. Also, for each country an average firm profile is created. Both of these tools' sections are of high value for experts and allow shortcuts in the strategical development of the future vocational training area with a view for a common European standard of transversal competencies.

Challenges and Conclusion

During development the team needed to overcome several challenges:

- the subject novelty in relation with people with low IT skills;
- the use of the graphics as an easy-to-understand tool;
- the general user interface for fulfilling several usability requirements;
- the unavailable customised solutions and software for the target group;
- different technical solutions (real-time simulation with direct user interaction, graphic-based assessment);
- the different connection between all 3 tool parts, the situations and the competences;
- temporary table in which we store all the competences that have been evaluated for a particular user.

As a result an application which respects the universal design rules was created. The METOIM Web Tool is a friendly application for people with low IT skills, which allows different levels of interaction (worker, firm, expert) and innovate the methodology of assessing competencies. The application is tested and evaluation by firms and workers in 3 countries. For more and actual information please visit the project website at www.metoim.org.

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DISTANT TRAINING OF E-COMPETENCES FOR DIGITALISATION AND CREATIVE USE OF CULTURAL HERITAGE

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Introduction

The importance of culture, in all its diversity manifested in different types of knowledge, traditions, lifestyles, languages and cultural expressions, is a key immaterial factor in the development of European knowledge society. This type of society requires access to the cultural and historical heritage on-line to largest number of people. Nowadays the professionals in cultural memory institutions work actively to acquire, organise, store, manage and use large amounts of human knowledge in digital form. The modern information technologies offer them continuously growing set of powerful means to digitise cultural content and to present it in the global information networks. In the same time the fast growth and enrichment of approaches, technological standards, tools and methodological facilities in the multimedia and web technologies require continuous update and acquisition of new knowledge and skills.

Vocational e-training is based on the e-learning paradigm which means sound pedagogical methods, wide availability, user-centred learning and an evident removal of the classroom element from the learning process. On-the-job training (OJT) is a form of individualized training that allows an employee in need of training to receive the necessary knowledge, develop the required skills and improve performance all while on the job. These aspects are very important both for the employee and the employer, since they provide the opportunity for quality training while limiting the effect on work plan.

The present paper discusses the aims and some results of the LdV project JASON "On the Job e-Training Skills to Deal with Digital Cultural Heritage Content", developed by partners from Portugal, France, Hungary and Bulgaria. The partners work on JASON learning platform, aimed to develop facilities and learning content for OJT e-training aimed at building and enhancing e-competences for specific group of knowledge workers – librarians, archivists, museum curators, conservators, historians, archaeologists, art historians, artists, e-publishers, etc. to deal with digital objects of the cultural heritage.

In the first part of the paper results of the target groups' educational background, ICT attitudes and learning needs analysis are summarised. The second part reviews directions and topics selected by the partners to develop appropriate e-competences for professionals from memory institutions. The third part presents briefly requirements and decisions for implementation of the JASON e-Learning environment.

E-competences and learning needs of memory institutions' professionals

Analysis of the project target group's typical educational backgrounds and job descriptions in the partner countries, using especially the experience of the Portuguese Network of Museums, outlined the following professional groups, directly concerned by the project:

- Curators, archaeologists and other graduate technicians – graduate professionals, commonly also having a MA, Msc. or PhD (more rarely). Their ICT aptitude varies enormously, depending on the individual professional curriculum, from the very familiar with ICT at various levels of use, to the computer inept person. Curators coordinate and perform tasks in researching, inventing, analysing, exhibiting, disseminating or otherwise organizing cultural heritage and coordinate conservation projects, especially preventive ones. Archaeologists and conservation architects will have a similar job description, but with a stronger emphasis on

concrete intervention projects on sites, monuments, collections, etc. Graduate technicians in libraries and archives will have their job description directed more clearly to day-to-day management of collections.

- Technical personnel – persons with a BSc. in a specific area (Conservation, Photography, Radiology, Archival techniques, Library inventorying, Archaeological excavation). Having more recent and more technical-oriented education ICT aptitude will be more widely spread. Job descriptions tend to be very case-specific, directed to the actual performance of a technically defined task (which is normally a part of a larger project designed and coordinated by a professional of a more empowered professional group) and they normally imply the personal responsibility of the technician in the performed job, from the choice of method to the documentation of the task for future reference.
- Professional technicians – they develop the various tasks needed to accomplish projects, but lack any actual responsibility for the final quality of the work. They are not supposed to work without direct supervision. Recruitment for these professional groups dispenses with university education, but generally requires professional training (or practice in an institution at an auxiliary level for a number of years, with adequate in-house training, leading to a promotion to this level). ICT aptitude will vary according to the specific field.

The current e-Competences of memory institutions professionals in the partner countries and their picture of the topics they need to learn in the field were additionally investigated by means of common questionnaire containing 9 groups of questions.

Content and structure of JASON e-training courses

The analysis of the target groups job descriptions and current e-competences and needs allows to determine their specific learning needs for ICT knowledge and skills. On the base of this analysis JASON developers determined the scope of necessary e-competences in four sub-areas, considered central for acquiring competences to deal with digital objects of the cultural heritage and selected a set of topics to be covered by the project eLearning courses.

Technologies, standards and methods for digitising cultural heritage master pieces

These courses have to introduce the trainees from memory institutions to the modern computer multimedia technologies. The brief structure of the two basic courses is described below.

Introduction to Media Representation

The course contains 39 HTML pages (plus glossary and bibliography) and 54 pictures/multimedia objects, and consists of the following lessons:

- Digitalization – why use it and digital images
- Introduction of Image File Formats (GIF, JPEG, TIF, PNG)
- Animation
- Sound (attributes, types, perception of sounds, file formats)
- Video, video streams
- Devices for digitalization (scanner, digital camera, microphone, synthesizer, recorder, video camera, video editing card)
- Types of media manipulation software
- Navigational systems

The Digital Image

The course contains 99 HTML pages (plus glossary, bibliography, online documents, links) and 242 pictures/multimedia objects, and consists of the following lessons:

- Introduction to Graphics (proportion and intensity, contrast and dominance, shade and tints, screen resolution etc.)
- Colours (basics, features, combinations, contrast etc.)
- Digital Gallery
- Graphic file formats (raster vs. vector files, GIF, GIF compression, interlaced GIF, JPEG, PNG)
- Graphic file formats for the Web
- Imaging strategies (interface elements, photographs as GIFs, photographs as JPEGs, diagrams and illustrations as vector graphics)
- Multimedia (introduction, applications, standard formats, web multimedia strategies)
- Digital media processing (audio processing, video processing, delivery, streaming, downloading, drawbacks, design and multimedia)
- Scanning (introduction, scanning for printing or video screens, resolution, screen bit-depth)
- Scanner features (resolution for the video monitor, scan resolution and image size)
- Digital cameras (introduction, vocabulary, optics, viewfinder, storing images)

Processing of digital objects

The new acquired competencies are oriented to work with multimedia digital libraries, archives and galleries containing diverse multimedia types, with support for 2D and 3D objects. These competencies will permit the professionals of memory institutions and cultural industry to store and catalogue easier digital objects and to integrate the multimedia content in new complex digital artefacts, thus increasing the knowledge and reducing the costs to produce and publish educational and common-interest materials. The brief structure of the courses, developed up to now is described below.

Multimedia Authoring Packages

The course contains 95 HTML pages (plus glossary, bibliography, online documents, links) and 103 pictures/multimedia objects, and consists of the following lessons:

- Authoring tools versus programming tools
- Authoring tools (CD-ROM based, cards or page-based, Icon or object-based, time-based tools. examples – HyperCard, Asymetrix Toolbook, Macromedia Authorware, Macromedia Director)
- Web-based authoring tools (Microsoft FrontPage, Macromedia DreamWeaver, Claris HomePage, Adobe PageMill, Macromedia HomeSite)
- Main opportunities of multimedia authoring tools
- Choosing a right authoring tool (vs. users, projects purpose, multimedia elements, budget etc.)
- Introduction to Microsoft PowerPoint
- Introduction to Macromedia Director
- Introduction to Macromedia Flash
- Introduction to Adobe Premiere Pro

Use of digital images for museum activities

The course contains 44 HTML pages (plus glossary and bibliography) and 37 pictures/multimedia objects, and consists of the following lessons:

- Preparation for digitalization (hardware, software, environment)

- Project planning (management policy for digital assets, defining the audience, evaluating assets)
- Storage and management of the digital collections (capture and storage, preservation strategies)
- Metadata creation/capture (scope, standards, types of metadata, collection-level description)
- Process of publication of digital collections (accessibility, security, authenticity)
- Disclosure of resources (searching and retrieval, browsing, visual and content-based retrieval)

Using effectively new forms in remote collaborative working and work flow

This category covers themes such as portal technologies, shared work spaces, collaborative working, approbation strategies and policies for collective publishing, etc. One course is developed up to now.

New forms for remote collaborative working and workflow in memory institutions

The course consists of the following lessons:

- Introduction to the Internet (basics, getting connected, Intranet/Extranet)
- Using the Internet (browsing, bookmarking, download/upload, cache, data compression)
- Finding information on the Internet (where and how to search, search results)
- Web database (models, implementation, digital archives)
- Information workflow (e-mail client, address book, mailing list, sending e-mails)
- Manage time (meetings schedule)
- Collaborative tools (forums, glossaries, chat, videoconference, virtual networking)

Effective use of Web digital content (including search by semantic web approach)

One course is developed up to now in this category and its brief structure is described below.

Semantic Web approach to access information on Internet

A sample view of a screen is shown on Figure 1. The course consists of the following lessons:

- Problems with the current information retrieval in Internet
- Semantic Web scheme and levels
- Resources and identifiers in the Semantic Web
- Ontologies – concepts, structure, examples
- Ontology description languages
- Problems with actuality, reliability, trust-worthiness of the Internet information
- Information preparation and retrieval in the Semantic Web Annotations
- Agent technologies in the Semantic Web
- Perspectives and problems; integration of information sources
- Example of Semantic Web site for cultural heritage

JASON eLearning platform

According to the investigation of JASON e-training forms and learning context, and considering some previous experience of the authors with e-training on the workplace, the following functional requirements for the JASON learning environment were formulated:

- It has to support sufficient level of interactivity for learning-by-doing operation mode.
- It has to supply facilities for skills acquisition.

- It has to permit fast activation of the learning environment and fast restoring of the working environment.
- It has to store the current status of the trainee on exiting the learning environment.
- It has to allow fast restoring and continuation of the e-training process.
- It is desirable to simulate operation in apprentice mode, presenting exemplary solutions of practical problems.
- It has to allow easy and natural communication of the trainees with the instructor and with peers.

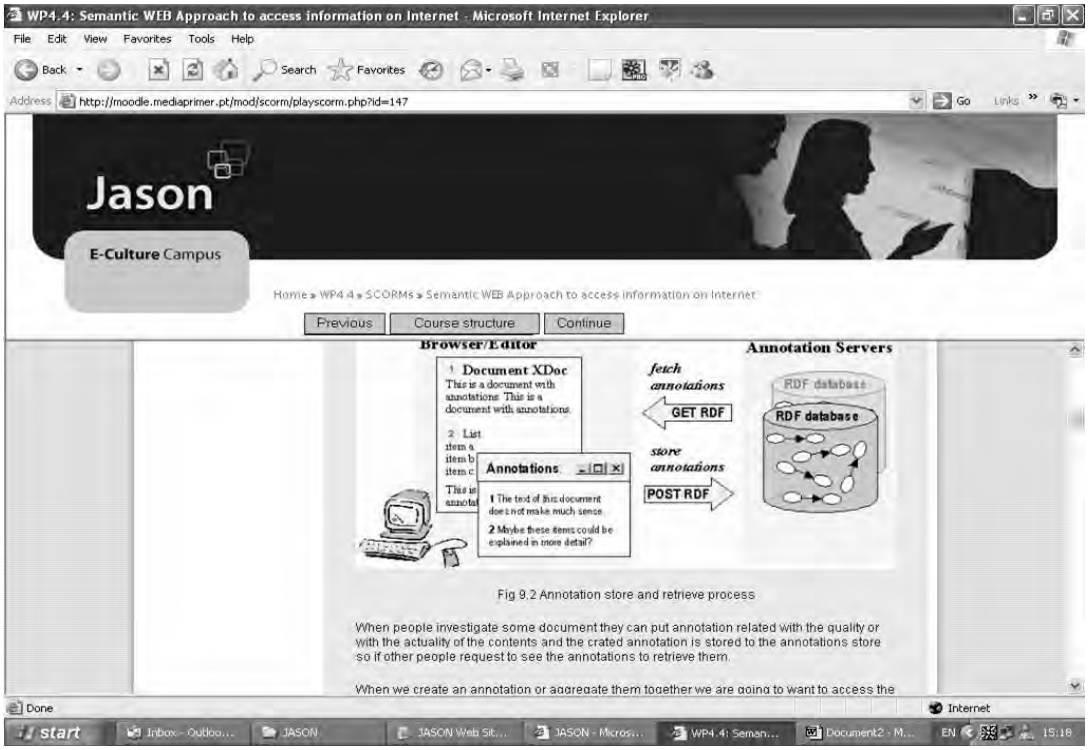

Figure 1. Sample screen of a JASON e-training course

The JASON environment implementation (Figure 2.) contains 4 local distance training centres in the partner countries, each integrating two functional software subsystems: virtual training studio for implementation of OJT process, and authors' studio for creation of multimedia training materials. To use JASON environment (http://moodle.mediaprimer.pt/) the user needs only to have a multimedia computer connected to Internet. It does not require the installation of any specific software, just a standard software platform: operation system, browser, video, sound reading programs, etc. The JASON environment allows different users to use its resources all the time. The role of the instructor is to assist and guide the learners if they experience difficulties. The environment supports the learning process with synchronous and asynchronous communications and includes context-oriented forums, chat rooms, message board. The communication tools are available for interaction both among the learners themselves, and between the learners and the instructors as well. The local training centres are developed through modification and customization of an open source Learning Content Management System (Moodle), as it meets the basic JASON requirements. The e-training courses are organized according to the SCORM standard for re-usable eLearning materials.

Conclusion

The JASON developers determined the scope of e-competences, necessary for memory institutions professionals to handle and access digital objects of the cultural heritage. The created e-training courses have just started their experimental use in theirs partners' languages versions in order to supply feedback for improvement and enhancement of the courses content as well as of the JASON environment fuctionality.

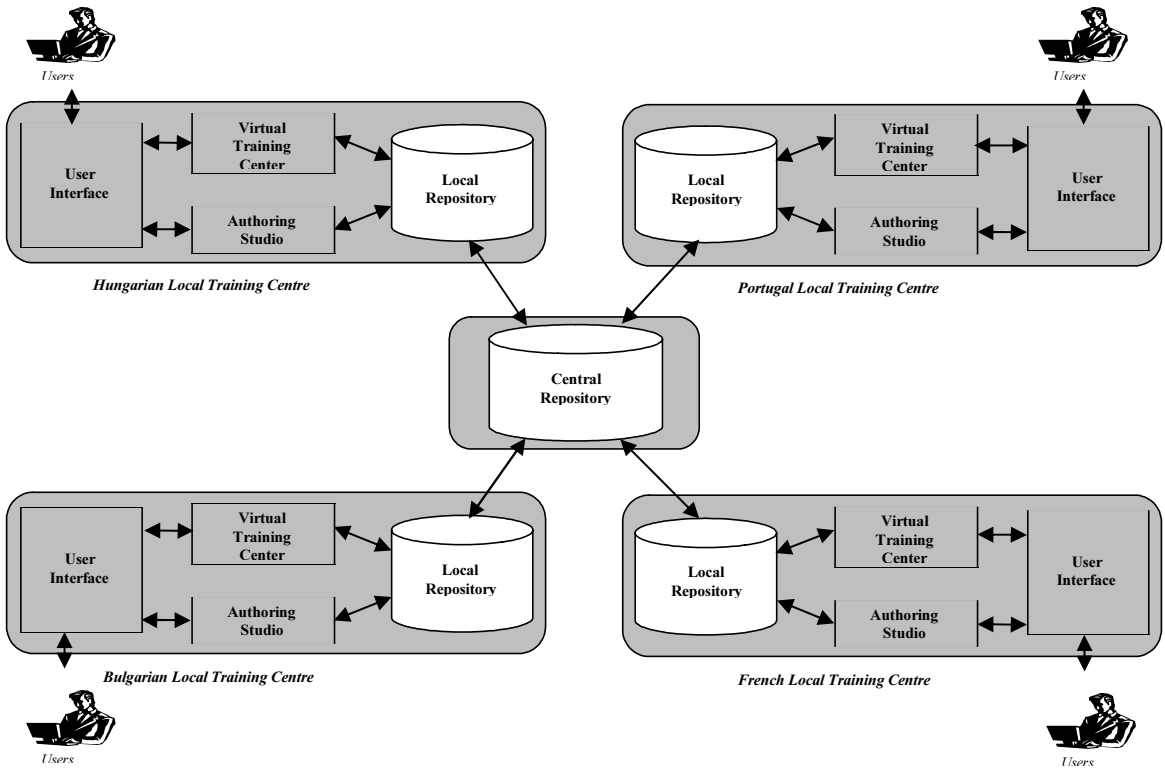

Figure 2. Architectural scheme of the JASON environment

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IS THERE A RETURN OF INVESTMENT FOR E-LEARNING?

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Introduction

One of the boldest claims of e-Learning is that the introduction of e-Learning enables employees to be better trained and at the same time has a massive and rapid Return of Investment (ROI). In reality, this ROI is mainly accounted for by the reduction of the cost of training staff and employees by avoiding sending them away from their desk, reducing travel, administrative and instructors' costs. E-Learning also claims to allow learners to learn what they need when they need it. This is the just-enough, just-in-time and just-for-you concept. All these claims help fuel one of the largest myths: that e-Learning has very fast ROI, and trains staff better.

We now know that e-Learning is not meeting these expectations, and that, in fact, there is currently a risk that e-Learning is not facilitating the up-skilling of employees, but is rather contributing to the 'non-training' of the workforce. There are many reasons why this is happening, some of which are linked to the learning culture within organizations, to peer pressure, or, the fact that employees are at their desks to do productive work and not to learn. Other reasons are linked to the e-Learning offering not being aimed at the learning needs or goals of individuals and organizations. In fact, all the reasons for failure are mainly the consequences of an ill-defined program, where the Business Objectives have not been defined against the needs of the organization and where the definition of ROI and the measures of the program are not defined.

And so it is that, after all the hype of the last years, we now find that e-Learning does not deliver value for the money invested. In addition, there is even no way of assessing whether learners are learning more or better. In fact, we cannot assess the impact of the program against business indicators.

So is there a return of investment for e-Learning? Or is e-Learning just a way for training managers to reduce the cost of training? Is there a positive and measurable impact of e-Learning?

In this article, I will propose some guidelines for starting e-Learning programs in a way that the business indicators impacted are well defined, allowing for the measurement of the efficiency of the initiative, and the value of the program itself.

I will first make an assessment of e-Learning and then outline how ROI is defined today and then I will propose an approach and a set of recommendations for setting up Corporate e-Learning programs.

E-Learning today

As I mentioned earlier, e-Learning has been accompanied by a lot of hype. And many organizations have implemented massive and very ambitious e-Learning programs, thinking that this will help cut the cost of training their employees. Expectations were and still are very high. E-Learning has too often been defined as a way to bring learning content to the employees at the point of use (usually their desk), accessible at any time, anywhere and tailored for the learner.

Why does e-Learning fail?

So why does e-Learning fail? As mentioned earlier, the way e-Learning is currently introduced into organizations is 'top-down'. It is also mainly an economical decision. There is little or no reflection on the business drivers to be impacted, or on the cultural changes and other pre-requisites for the introduction of this type of program.

There are many assumptions made, such as the motivation of the workforce to learn on their own, on the availability – in the case of on-line collaborative learning – of colleagues, peers, coaches or experts, on the culture of the organization. This last point refers to peer-pressure. Even if the organization would like (and sometimes defines an e-Learning charter) to allow time for employees to go on-line and learn, this time is, in practice, rarely available workforce (they can still do this learning after hours!). The need to deliver, to log hours against billed projects or clients is too often a higher priority for the organization. The same applies for the employees who do not understand that colleagues cannot help them. In reality, there is very little time made available to the employees to focus on their own learning.

So, there is no dedicated time set aside to help employees focus on what it is they need to learn, and then learn it. All e-Learning allows (or should I say dictates) is that employees define their own pace, their own learning curriculum. It is quite a big assumption to think that every employee in an organization can do this!

Finally, the e-Learning offering is neither linked to individual nor business goals. Too often, the decision to purchase a Learning Management Solution and the thousands of hours of unfocused e-Learning content supersedes the analysis of the needs. In all this turgid content employees do not find what they need when they need it. And needless to say in some cases, the boredom of sitting in front of a screen being subjected to non-appealing and non-specific content also contributes to non-usage.

There is one exception here, and I would categorize this as management mandatory training. This could be compliance training, or safety training, for which the organization has set a goal of 100% of staff completing the course. This goal is then measured on a regular basis. In this case, managers and team leaders are making sure that employees are accessing the course.

ROI and e-Learning today

Today, the ROI is defined using very simple rules. Usually, it is a combination of Cost savings versus an initial investment. In other words, the following methodology is used;

ROI = Cost Savings – Investment

Where the cost savings are:

- How much will I save by not sending *X* employees that I need to train x cost of travel
- Cost of a trainer to deliver the training
- Cost of the administration for organizing training classes, preparation and booking rooms and venues, etc.
- Cost of the time away of the office

And investment is:

- The cost of a platform (Hardware, Software, LMS or LCMS)
- The cost of content (courseware, SCORM Modules, etc.)
- Some marketing cost

Based on this formula, a lot of e-Learning solutions have, at least on paper, a huge Return within a very short time. But unfortunately, this formula is very restrictive, and does not reflect of the real cost, such as the content creation, the sustaining and maintenance cost and all other attached licensing, server monitoring and upgrade costs, and even the program cost.

Also, by using this formula, the only real benefit of using e-Learning is that learners can access the content anywhere. There is no mention of any other benefit (such as the learning effectiveness, or business impact, or motivation, etc.).

This formula is usually misused on purpose: to demonstrate that there is a big ROI, and to justify the strategic need for the organization to go in this direction. In fact, as this is a top-down decision, and the sole purpose is to reduce training cost, this approach is very useful.

In reality, there are some obvious costs that are forgotten:

- Sustaining costs
  - For the content, and the learning modules
  - For the management of Metadata, and other tagging and classification/navigation data
  - For the platform, such as the upgrade of the Operating System, Antivirus, Backup, new versions, Database, etc.
- Administration costs
- Internal marketing cost: this is the program around the internal advertising, coaching, support, etc.

Conclusion 1

In conclusion, e-Learning, as we know it today, is not meeting all the claims that it is making. E-Learning is contributing more to non-training of the organization. This could impact an organization quite badly, as it can result not only in a down-skilled workforce, but also in poor results and projects for Clients, of even in the de-motivation of the employees. In fact, today, e-Learning is mainly helping e-Learning specialized companies to be prosperous, and to develop their markets.

E-Learning can also be quite expensive: developing customized programs or content can be very efficient, but also very costly. Maintaining the learning management system can also result in high cost.

So should companies run away from e-Learning: this expensive tool that does not help train their employees to help the company maintain a distinct competitive advantage?

In fact, some of the benefits claimed for e-Learning could be leveraged. Combined with the business-driven approach and linked with the business drivers and goals, correct organizational changes and supported by an appropriate program, e-Learning could deliver a lot of benefits for an organization, as well as a ROI. The organization would need to understand that the ROI would be linked to the business objectives, and the shifting of business drivers, that e-Learning needs a substantial focused investment (i.e., not in the technical environment, but in the organization and the content), and that the ROI will not be based solely on the cost savings.

This is the approach I would like to elaborate on the rest of the paper.

E-Learning with a ROI

The definition of a ROI and the measures for success are required for any project. For example, when an IT director wants to implement a new Front End Solution costing several tens of thousands of Euros, he/she will need to justify this investment, make a business case supported by added value for the business and by a strong ROI. Unfortunately, this is not the case in corporate e-Learning projects, and this is the main gap, as it does not allow measuring the success and the efficiency of the program.

The impact of e-Learning on work practices and the organization itself needs to be measurable and there must be verifiable sets of both tangible and softer benefits. So it is important to define the ROI and the way that the efficiency of an e-Learning program is measured at the very start of the definition of the actual program. In other words, it is at the definition and exploration phase that the objectives, outcomes and measures are implemented.

ROI for e-Learning *can* be defined, so that there is a way to ascertain whether that the program is making the expected impact, and also to quantify the benefits for the employees and the organization. I will suggest a method to define the ROI, and give some guidelines to define e-Learning projects, and also to select only the ones that have a definitive ROI, and keep conventional training methods for other development needs.

This way of defining e-learning projects is innovative and the results go far beyond the standard cost savings arguments.

The proposed approach

The proposed approach is based on the KirkPatrick model and the Phillips extension. The KirkPatrick model is widely used by Training and Organizational Development groups in organizations in order to evaluate the efficiency of courses and training programs. This model is very powerful, but it is not used to its full capacity today. In fact, the model is mainly used for levels 1 and 2, which translates into the use of happy sheets as evaluation, attendance to a session, and some basic questions about the usefulness of the training. In practice, most attendees fill in that the course was useful, pertinent and good, as they do not want to be caught in follow-up sessions, or they do not want to be seen as unpleasant. There is no evaluation or assessment of either learning objectives being met, or business impact.

The Phillips extension allows to quantify the business impact on the organization, and therefore measures the benefits that the learning or training program brings to the organization in monetary terms. As this is very dependant on the evaluation of the KirkPatrick levels, this model is very rarely used in organizations.

Here is the model that I will use for the rest of the article. It is not the original KirkPatrick and Phillips models. For more information, the reader should refer to the original model.

Level 2	**Level 3**	**Level 4**	**Level 5**
Learning Objectives	**Application Objectives**	**Business Impact Objectives**	**ROI**
What do participants need to know/be able to do/understand to achieve results?	What must participants actually have done in order to achieve the business impacts?	How will things be different in the business as a result of the learning solution? What business drivers will have shifted?	What is the value of the business Impact – if it can be quantified?

Typically, people try to use this, starting with level 2, where the learning objectives are defined. It is true that if a learning or a training program needs to be defined, it is easier to structure it around the concept of modules or classes, and therefore around the Learning Objectives. The others are derived after this (with more or less success). The Business Objectives are tied to the Learning Objectives, and may therefore not be relevant for the success or the growth of the organization.

The trick here is to use the model differently. In fact, it is to start with what is important for the organization and for the business goals, and therefore to start with the Business Indicator we want to impact.

So here is the approach:

1. *Definition of the Business Objectives to be impacted:* this is the definition of what we want the organization to do differently, and which business drivers need to be shifted. These can be prioritized or weighted against the vision of the company, or used to create a distinct business advantage, or simply to catch up with the competition.
2. From these business objectives, define Level 3: *What do we need employees to be able to do in order to achieve the impact these business objectives?* By doing this, we define the proficiency of employees to perform specific tasks. Some business objectives as defined for level 4 may not be impacted by having employees perform specific tasks, and are therefore discarded for the rest of the analysis.
3. Once we have identified the Application Objectives, we can derive the Learning Objectives: *What do employees need to learn in order to meet the application objectives?* At this stage of the analysis, we can select the application objectives that can be acheived by meeting specific learning objectives. As for the previous step, some application objectives may not be met by Training or by the knowledge. These Application and associated Business Objectives will

then be discarded from the analysis. An analysis will also have to be performed at this stage to assess what is the best way to meet these learning objectives: some will be by e-Learning, other by on-the-job training, classroom based, a blended approach or by seminars. e-Learning is not the answer for all the learning objectives, and only some of the objectives can be, either totally or partially, met by e-Learning.

4. And finally, for the business objectives that are still eligible for the program, *we can quantify the gain* for the organization.

The result of this analysis could derive the following program charter: *"By implementing this Learning program, we want employee to learn X, Y and Z so that they can do the following tasks impacting the following business drivers that will result in an estimated value of €xxxx"*.

This is the mission of the program! This is what will be communicated to the stakeholders of the program! This is what is going to be communicated to the employees … to the community of Learners!

By doing this analysis, we are able to link the learning objectives up to the business impact and therefore to the value that this will generate.

Everyone understands the reason for this program and the benefits to them of learning from the material in the program. Peers, colleagues and management also understand the benefits, and therefore facilitate the learning effort, and respect the time allocated for the learning.

The cost aspect

As for any project, there is an investment to be made. In e-Learning projects, the investment is typically around the infrastructure, both Hardware and Software, and on the acquisition of content. I think that it is important to remind you that e-Learning can be costly, and that the focus should not be on the delivery of the content, but on the content, and the program itself.

Sustaining and maintenance costs can be quite expensive, and it is important not to forget these when defining the ROI plan over several years.

Conclusion 2

e-Learning is fantastic tool for helping organizations to meet new business goals, and create or keep a distinct business advantage. When well-defined, the e-Learning programs can leverage benefits for the learners and for the organization. The e-Learning concepts can be maximized.

But, as with many technological solutions, the key resides in the definition of the program, and the link to the business objectives, goals and results. Therefore, the definition of the program must be carried out around these business aspects, so that the program's missions and goals are obvious and easy to communicate.

It is only in this case, i.e. when the program is linked to a business-driven ROI, and measured against this, that you will be able to implement a program that has a positive impact.

I would like to recap some of my recommendations:

- There is no silver bullet. The ROI must be linked to the business objectives.
- Invest in the definition of the business goals and the program. Communicate at every level of the organization.
- Invest in the content, not in the infrastructure. Maybe start with Open Source Software (for example, Moodle, www.moodle.org).
- Ask for help from experts and consultants, preferably small and flexible consultancy organizations that do not have off-the-shelf solutions.
- Create the program, define the plan and stick to the plan.
- Measure and Communicate.

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E-LEARNING AND EARNING
THE IMPACT OF LIFELONG LEARNING ON ORGANISATIONAL DEVELOPMENT

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Abstract

The focus of this paper is the perspectives of people, both employers and employees, who are engaged in lifelong learning, within the UK economy. It puts forward two models of lifelong learning. One of which reflects employees' approaches to their e-learning and self development, the employee model. The other model reflects the motivations of employers in promoting lifelong e-learning opportunities, by way of engagement in e-learning courses, to their staff in order to improve the organisation's effectiveness, the employer model.

Introduction

This paper will examine the contribution of lifelong learning to organisational development, specifically in relation to e-learning courses. It presents two new models of lifelong learning. Firstly, that lifelong learning is used by employees to improve their current, or future, employment prospects. Secondly that lifelong learning is used by employers as a way of improving their organisational performance. Longworth and Davies (1996, p. 64) took an instrumental view of organisational learning holding that 'for the individual, learning is employability and employability is learning. For the organisation, learning is survival and survival is learning. For both lifelong learning is lifelong earning.'

As Osborne and Oberski (2004, p. 414) held "a prevailing discourse within lifelong learning is that of flexibility of provision on meeting students' needs at time and places of their own (or their employers') choosing and the availability of open and distance learning opportunities based on the use of communication and information technologies (C&IT) seems to be especially important in achieving this flexibility." This flexible provision includes e-learning which is "a rapidly expanding category of E Business. Defined as using the Internet for instruction in post-secondary education and training, the prospects for e-learning appear to be tremendous" Katz and Oblinger (2002, p. 4).

Phillips (1991) put forward a number of areas where organisations might expect to find positive results from employees being involved in learning, and or developmental experiences. All of these areas are capable of being measured, using quantitative information. They include cost savings, time savings, new work habits, and improved working climate, which would be evidenced by low, or reduced, turnover, staff commitment and satisfaction. Finally initiative that could be measured by the generation of new ideas and accomplishments by employees. This clearly reflects the employer model of promoting lifelong learning to improve organisational competitiveness.

In contrast Edwards (1997, p. 16) held employees, as a result of significant changes in work patterns now have "to make their own way without fixed referents and tradition anchoring points in a world characterised by rapid and unpredictable change, uncertainty and ambivalence, where knowledge is not only constantly changing but is becoming more rapidly and overwhelmingly available." This reflects the employee model of lifelong learning, as a method of remaining in employment.

What is lifelong learning?

Smith and Spurling (1999) provided a simple definition of lifelong learning, that it relates to people learning consistently throughout their lifespan, covering all life from the cradle to the grave, and which may start at any age. Clearly lifelong learning takes place within an economic context be that organisational, national or global.

Indeed Longworth and Davies (1996) put forward four value systems in relation to lifelong learning, viewing it as a form of economic investment. These are firstly that organisational learning as an investment in survival, here the model is one of employer improving organisational effectiveness by creating and sustaining learning in order that employees are empowered to cope with a changing external environment. The writer argues that this can be regarded as reflecting the employer model of lifelong learning as it provides them with skilled workers whose skills and knowledge are used to promote organisational competitiveness. The second is national; here learning is viewed as a national investment. This agenda centres on the creation of national programmes for enabling and stimulating lifelong learning. The predominant discourse being that of governments, which will be discussed later. Their third value system is societal, learning as an investment in wisdom and social harmony. The agenda here is one of creating and sustaining learning societies, both in communities and globally. It is the writer's view that these reflect the employer model of lifelong learning, using learning to create sustainable competitive advantage.

Their final categorisation is that of the individual, or consumer, here learning is regarded as a personal investment in the future encouraging personal growth and developing potential, possibly to ensure continued employment. The writer argues that this can be regarded as the model of the employee where the employee takes responsibility for their own learning either in relation to their own employability.

Lifelong learning can therefore be viewed as being promoted by employers to improve their organisational competitiveness or being engaged in by employees to ensure their continued, or improved, employment prospects. The next section will consider the environmental factors which influence these views.

The environment within which lifelong learning takes place

In the decades since the end of the Second World War the strength of the UK economy has fluctuated, as global economic and social structures have changed. European Commission and national governments' policy statement, in relation to lifelong learning, are "couched almost universally in terms of ensuring greater economic competitiveness", (Osborne and Oberski 2004, p. 415). In 2002 the UK government established the Sector Skills Development Agency which Duff (2003, p. 54) regarded as a 'real commitment from government departments to resolving skills issues'. As Herrington and Herrington (2006, p. 2) suggested "what employers, governments and nations require are graduates […] who can create, innovate, and communicate in their chosen profession". This provides clear evidence of a model of employers promoting lifelong learning to improve their organisational competitiveness.

The causes of these changes have included moves in the economy, increased global competition, technological change and demographic trends all of which demand flexible and multi-skilled workers. In turn this flexibility, on the part of workers, is viewed by employers as promoting competitiveness, economic growth and guaranteeing employment. Contemporaneously there has been a delayering of management structures in UK industry together with the end of jobs for life. Workers can no longer rely on stable employment in one organisation, or area of work, for their lifetime. All of these changes have led to the emergence of high performance organisations with flatter hierarchies, which emphasise teamwork, require high levels of skills and creativity in the workforce. This in turn has generated a demand for continuous updating by employees to respond to the higher skills, which the workforce is now required to have, which are easily provided by way of e-learning opportunities. As Smith and Spurling (2001, p.104) held in the "current economy short-term shareholder value dominates corporate strategy, reclassifying any sentimental attachment to the specific labour force [...] as a luxury." In some organisations, employees are now viewed as little more than current assets to be used, or disposed of, as economic circumstances dictate to ensure organisational competitiveness.

In order to ensure the quality of training and development in organisations the UK government introduced the Investors in People in 1990 as a national standard, or benchmark. Reynolds and Ablett (1998, p. 24) held that government initiatives, including Investors in People, have "proved attractive to organisations and in many instances are perceived as a route to becoming a learning organisation, or indeed to becoming (in some instances) synonymous with the learning organisation". It may therefore be argued that Investors in People supports a model of lifelong learning being promoted by employers as the outcomes will provide them with skilled workers whose skills and knowledge will enhance the economic competitiveness of the organisation. The perspective of the employers will now be considered.

Employer perspectives

Longworth and Davies (1996, p. 64) took an instrumental view of organisationally promoted learning when they suggested that "for the individual, learning is employability and employability is learning. For the organisation, learning is survival and survival is learning. For both lifelong learning is lifelong earning." This was supported by Smith and Spurling (2001, p. 1) who held that the "motivation to learn is an urgent issue politically, economically and socially". Indeed it has been suggested by Training Strategies for Tomorrow (2002, p. 19) that organisations like e-learning "because it promises to save them money on training". Here the model of lifelong learning is predominantly one of employers providing themselves with skilled workers whose skills and knowledge will improve the performance of the organisation. This can be reinforced by the use of e-learning technologies and Internet based courses.

Waterman *et al.* (1994) summarised this approach to employee education and training in the following way "employers give individuals the opportunity to develop greatly enhanced employability in exchange for better productivity and some degree of commitment to company purpose […] for as long as the employee works there". They also discussed the concept of a career resilient workforce which they defined as employees who are not only are dedicated to the idea of continuous learning but who are also ready to reinvent themselves to keep pace with change. This is a model of employee learning, as employees are prepared to take responsibility for their own career development and are committed to the company's success as long as they are employed by it. The perspectives of employees will be considered further in the next section.

Employee perspectives

Maund (2001) held that employees have a number of motivations for learning. These encompass both the models of lifelong learning, and include intrinsic pressure, external pressure, the quality of provision available to them, specific drives and personality factors. Employees' intrinsic motivation, engagement with lifelong learning opportunities, is relevant to the course to their future career and their own personal interests. Whilst extrinsically they are motivated to study they may also be concerned with the value of the underlying qualification, and that it will be recognised by their current, or future, employers.

The provision of e-learning opportunities are important as the "achievement of competence […] is an ongoing process [...] given the constant change that takes place in the workplace" (Ladyshewsky and Ryan 2006, p. 62). It has been suggested by Training Strategies for Tomorrow (2002, p. 19) that employees like e-learning "because it they have greater control over when they do the training". The actual paper qualification itself has a priority for a number of employees, indeed Fallows and Ahmet (1999, p. 4) held that, in relation to undergraduate study, "the certificated qualification has been seen by many employees as the easy passport to well-paid employment". Macfarlane and Ottewill (2001, p. 16) took the view that the one thing which employees have in common is that "whatever their level or background, is that their prime motivation in studying is very probably economic". Their underlying motivation is to improve their career advancement or to improve their performance in their current role. This is a clear example of the employer model of lifelong learning a where the employee, takes responsibility for their own learning either in relation to their own employability. Whilst Smith and Spurling (2001, p. 1) held that "the levels of motivation displayed by individuals reflect their social and economic experience in general, and their family experiences in particular".

Illeris (1997) identified a number of qualification requirements, or competencies, which are essential for learning to occur. These include motivational factors such as drive, dynamism, keenness to learn, the person's capacity to keep up with and contribute to their own development. It may therefore be argued that employees' intrinsic motivation is relevant to the course to their future career. Their underlying motivation being to improve their career advancement or their performance in their current role. So learning is relevant to the course to their future career, and to other factors, which are personal to each individual learner. E-learning can foster a learning community which enhances the learning experience and increases individual motivation. Whilst students are intrinsically motivated to study they are also concerned with the value of the underlying qualification, and that it will be recognised by their current, or future, employers. This is a model of lifelong learning by employees with them engaging in learning, or development activities, to ensure their continued employability.

Conclusions

These models are reflected in the following figures. Figure 1 illustrates the model of employee lifelong learning where people engage in learning opportunities to maintain, or improve, their employability.

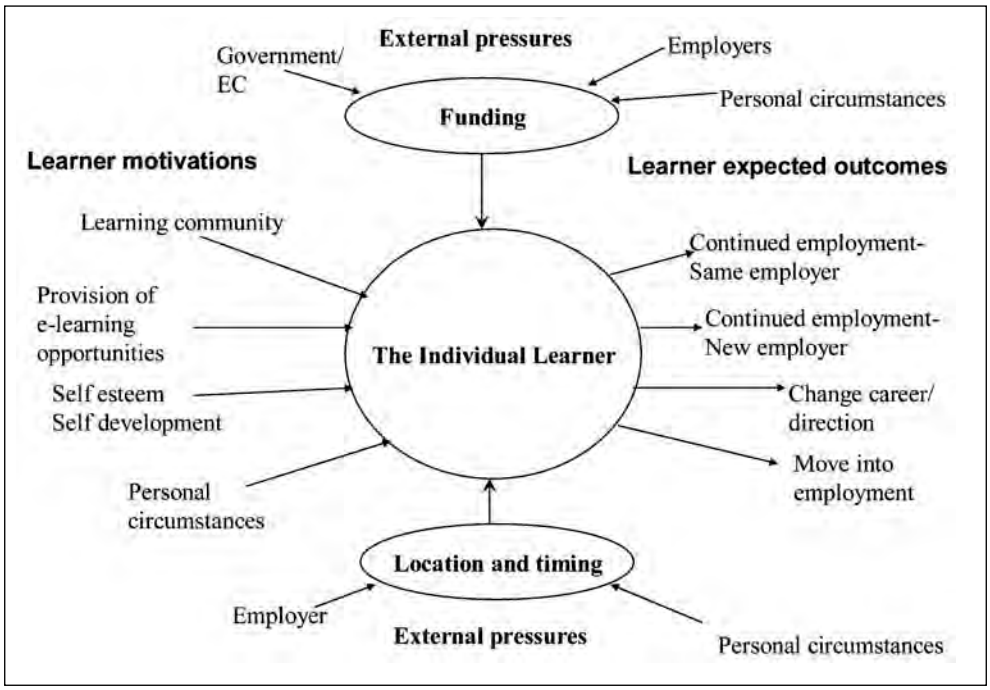

Figure 1. New Model of Lifelong Learning

Whilst Figure 2 illustrates those forces which lead to the provision of lifelong learning opportunities to employees, within a work context. These are accessed by people in the workplace and are ultimately consumed by the organisation by way of their improved performance, and/or improved productivity. This is the employer model of lifelong learning.

Figure 2. New Model of e-Lifelong Learning

Senge (1990, p. 139) held that "organisations learn only through individuals who learn". Longworth and Davies (1996, p. 64) took an instrumental view of organisational learning holding that "for the individual, learning is employability and employability is learning. For the organisation, learning is survival and survival is learning. For both lifelong learning is lifelong earning." Therefore, it may be argued that the only source of competitive advantage is an organisation's ability to learn, to promote learning in its employees, and to react more quickly than its competitors. Individual learning does not guarantee organisational learning but without the former, the latter cannot occur. This view is reflected in Figure 2.

Clearly the discourse of the learner, the employee, is also significant. As Hicks (2002, p. 350) held "learning means a change, but a change of relatively permanent kind".In her view, learning implies a different internal state, which results in new behaviours or actions or new understanding and knowledge on the part of the individual, enabling them to survive in a turbulent environment.

This is model of employee lifelong learning, Figure 1, and was supported by Longworth and Davies (1996, p. 22) who held that "lifelong learning is the development of human potential through a continuously supportive process which stimulates and empowers individuals to acquire all the knowledge […] and understanding they will require throughout their lifetimes and to supply them with confidence […] in all roles, circumstances and environments" ...which clearly include virtual ones such as those offered by learning.

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MEASURING AND MANAGING KNOWLEDGE AS KEY PERFORMANCE INDICATOR WITHIN THE FRAMEWORK OF THE BALANCED SCORECARD

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Aim of the paper

This paper aims to outline the theoretical and structural requirements of integrating e-learning within the key performance indicator "learning and growth" in the balanced scorecard approach, developed by Kaplan and Norton, and gives indications of the use of e-learning as economical success factor, now that its usage has transcended the early experimental phase. The advantages of e-learning have been discussed in great length; this paper intends to take a peek at underlying strategies of effectively transferring and managing knowledge within bigger organizational frameworks.

1. Balanced scorecard: working with quantifiable figures

It is becoming increasingly important to companies to manage and measure performance. Hard facts and verified numbers have a greater acceptance; which seems quite logical, as they can be used for planning and lead to a graspable figure.

A popular mean to analyze financial and non-financial variables is the balanced scorecard, created by Robert Kaplan and David Norton. The balanced scorecard (BSC) focuses on four areas, that is, it has four key performance indicators (KPI) on which the performance is measured: customers, internal processes, financial performance and learning and growth (Figure 1). It gives numbers to categories that are likely to be overlooked as they cannot compete with truly 'hard' evidence. The BSC has also more depth in analyzing results, since it includes their performance drivers, which allows for better and sooner awareness of problems to subsequently take actions to improve the results.

Here, we put more emphasis on the importance of measurable knowledge and the impact this can have on overall firm performance. Therefore, the BSC is an ideal tool to transform such a 'soft' factor as knowledge into 'hard' and numerical terms. Today's challenge lies in exploiting knowledge and finding new ways to develop a competitive advantage and leading edge against the competition.

2. Valuable resource: knowledge

In today's fast changing business environment it is essential that companies are able to react in short time to the demands of the external environment. Developed economies face a special challenge, as they cannot compete anymore with a cheap labor force on the global scale. Nowadays, the most valuable assets a firm can possess is *knowledge*, in the form of innovative organizational members, educated workforce and the use of new technologies.

In line with lifelong learning it is essential that the workforce, front- or back-office, is constantly re-educated about products and processes. Therefore, the term 'knowledge management' becomes an important part of company strategy and deserves as much nurturing as other processing parts.

The importance and usefulness of e-learning gets ever more attention, as technology plays a growing part in developing knowledge and turning it into the success factor of the company. How else can a modern, complex company provide the same knowledge to all its employees cluttered all over the world? How else can it be possible to get a high enough return on your investment in knowledge transfer in the company?

In order to provide knowledge for every part of the company and in order to do so in a cost effective, rational way, firms as Philips, Comet UK and TUI Netherlands, have realized the benefits of electronic learning and hence added value they receive from sophisticated knowledge development and management in their companies. So have done – within the last years – many more companies. E-learning is hot. There is hardly a company left that has not yet experimented with electronic courses, learning CD-roms, shared documents, web-based learning pages and PowerPoint presentations to be distributed and taken in by individual employees.

Three concerns have been often been voiced during this experimental phase: one, on the student side, is the cry for a less passive, less intake-based approach to e-learning. The second, on the teacher's side, is the need for better monitoring of knowledge transfer. The third is the overall demand for an "end-to-end" solution. All three concerns are to be taken seriously while developing and implementing e-learning as part of a company's strategy in order to get the highest return out of the new technology.

The first wish is directed at both technical and content developers and is concerned with the way *knowledge transfer* is likely to be most effective.

The second wish concerns the urgent need of teachers, trainers and managers to be able to track and trace the knowledge transfer, to be able to point out "well doing students" and to be able to use these figures on the knowledge growth of the company as a whole as a factor in the company strategy. Here, we are looking a requirement when it comes to effective *knowledge management*.

The third wish urges business strategists and technicians to come to one overall system of knowledge transfer *and* knowledge management to make the most effective use of both and be able to integrate the one e-learning framework into bigger organizational frameworks and relate it to other internal and external factors.

3. Measuring and managing knowledge

Thus, it is not only necessary to provide a platform to increase and distribute knowledge to the workforce as many companies do nowadays, but this knowledge has to be manageable as well. This means that it is turned into quantifiable and comparable figures. Just with this transformed information the management and decision making authority is able to evaluate it and take proper action.

In order to use the balanced scorecard as a means to strategy implementation, the information has to be quantified in objectives, measures and targets. What proved to be rather challenging for a soft factor as knowledge is possible with a balanced scorecard approach to knowledge and learning.

The four KPI's (customers, internal processes, financial performance and learning & growth) are all measured and transformed into manageable factors. Each key factor has its own objectives, measures, targets and initiatives. Not only does this lead to comparable figures, it also provides a real goal for results. Finally, this allows strategy to transform into action.

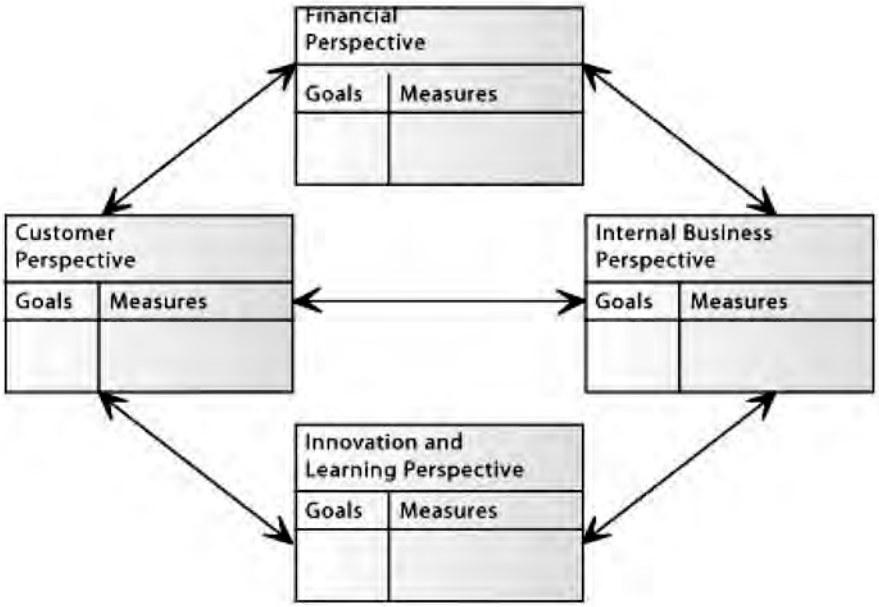


Figure 1. Kaplan and Norton, 'The Balanced Scorecard', Harvard Business Review, January-February, 1992

3.1 New means to transfer knowledge

Effective *knowledge transfer* that can be used for the BSC requires e-learning that has to transcend the experimental phase. E-learning has proven itself to be able to realize the aim for quantifiable knowledge, if combined with the right technologies. Traditional ways to train employees are not as effective and do not give the desired results when it is necessary to analyze the knowledge. How do you know who is listening in the classroom, who is paying attention and who actually grasps what he or she is hearing? Only testing the knowledge can give that insight. With e-learning it's possible to test along the line of the course and can give both the teacher and the student complete insights into the individual performance. The results of the participants can be analyzed quite precisely, like disclosure of answers down to page level.[1]

Education in a classroom environment can also lead to a very one-sided activity, namely the speaker being the only one talking and participants only listening. E-learning only works with an active participant, as he/she has to follow the course individually. With the addition of questions, individual links and highly interactive multimedia material instead of passive presentation materials, it is possible to respond to the students' wish for less passive (e-)learning.

The interaction has the added effect that the material is better learned and recallable. Once only possible with advanced authoring systems that require the use of programming languages, it is now quite common to see easy-to-use authoring systems on the market that allow the creation of interactive, attractive content.

[1] Where has the participant clicked on the page, which link has he/she followed, how much time has he/she spent on a given page?

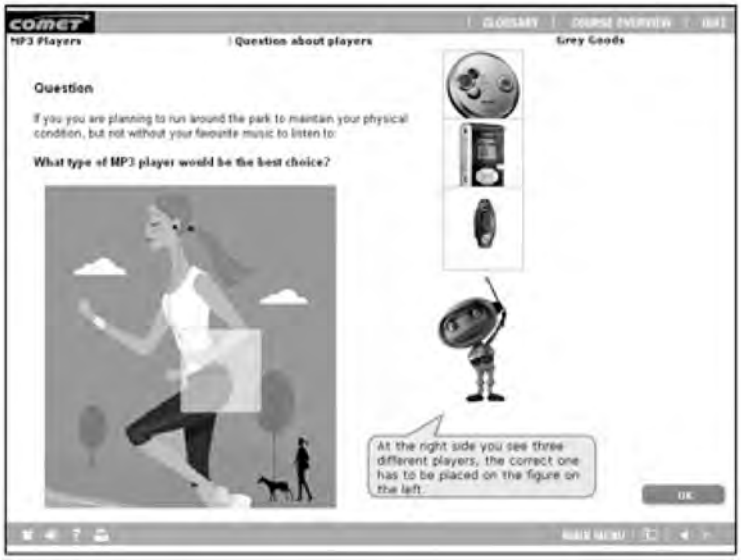


Figure 2. Example of interactive e-learning content

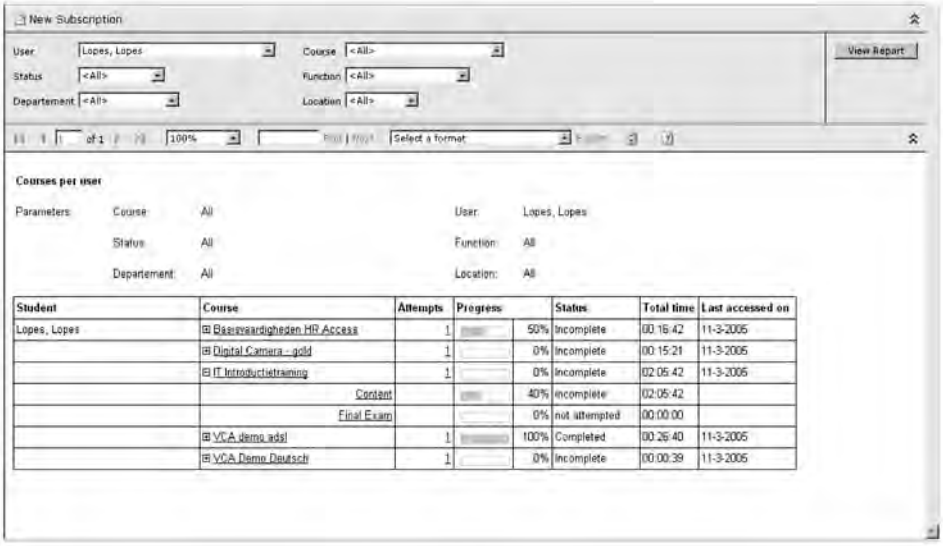
Moreover, e-learning modules are not only a way to teach with the aim to control the workforce. It is also possible to use it as a stimulating tool, when the company does not wish to be seen as the controlling sort of authority. Competitions to win prizes induce people to participate and learn at the same time in a less obvious student-instructor environment. It depends on your criteria in what way you plan to implement e-learning and educate your workforce. The progress of every user is monitored, so the international company can address each participant individually.

The costs of motivating and rewarding the personnel with credits and prizes are negligible compared to the increase in margin and sales volume. On the learning portal, successful managers can be quoted, a list of the most knowledgeable (and successful) employees can be updated each week, etc. This all enables active workforce management, even for independent third-party recruitments or external dealers.

3.2 New means to manage knowledge

To make use of the BSC it is necessary to have reliable figures for the KPIs on which later action builds up. E-learning can be helpful in this matter, as the advocate of e-learning is the comparability and quantifiable output. Consequently, we are faced with certain requirement for an e-learning framework that enables complete and effective knowledge management. The e-learning system must allow for detailed reporting and must transport these reports into intelligible statistics on WHO has done WHAT and HOW. Furthermore, it is necessary to be able to compare the figures and reorganize them in groups that can be interesting for the company's management at that point.[2] Thus, with an e-learning system that provides detailed statistical data on knowledge transfer the second wish for better recording can be provided for.

[2] These do not necessarily need to be logical and thus should not be fixed in advance. It can be important to compare learning performances according to age, length of employment, etc.



New Subscription

User: Lopes, Lopes | Course: <All> | View Report
Status: <All> | Function: <All>
Departement: <All> | Location: <All>

of 1 | 100% | Select a format

Courses per user

Parameters: Course: All | User: Lopes, Lopes
Status: All | Function: All
Departement: All | Location: All

Student	Course	Attempts	Progress		Status	Total time	Last accessed on
Lopes, Lopes	⊞ Basisvaardigheden HR Access	1		50%	Incomplete	00:16:42	11-3-2005
	⊞ Digital Camera - gold	1		0%	Incomplete	00:15:21	11-3-2005
	⊟ IT Introductietraining	1		0%	Incomplete	02:05:42	11-3-2005
	Content			40%	Incomplete	02:05:42	
	Final Exam			0%	not attempted	00:00:00	
	⊞ VCA demo adsl	1		100%	Completed	00:26:40	11-3-2005
	⊞ VCA Demo Deutsch	1		0%	Incomplete	00:00:39	11-3-2005

Figure 3. Example of statistical output of learning records

Taking it further than only monitoring, these outputs must be easily transformable to be used for the objectives, targets and measures of the balanced scorecard. Figures on the knowledge transfer must provide objective measurements that can be used as direct input for the Balanced Scorecard. With a web-based training, user information can e.g. be stored in an SQL database and can be linked to any other database in order to produce specific reports and management information that takes into account several factors, i.e. learning performance and given statistical data on users.

3.3 All in one knowledge management

With a learning content management system (LCMS) that provides easy to use content and easy to export facts and figures, effective *knowledge transfer* and *knowledge management* in the organization can be a fact. The figures that are produced by monitoring the knowledge transfer can be included in overall statistics on the performance of the company within the key performance indicator knowledge and growth.

A complete LCMS must meet certain requirements to fit within an overall company strategy based on performance factors[3]: Knowledge transfer must be available and attractive to all co-workers. For complete tracking and tracing it must provide detailed statistical data. It must allow for statistical summaries and grouping (e.g. according to areas, business units etc). To facilitate integration in larger frameworks it must provide various export functions and the possibility to link databases.

Statistical summaries of the knowledge transfer can be related to later operational results: e.g. does the group of people of one store who performed well in the training really turn out to reach better results in the reality of the market place? Do we need to stimulate manager X to take a course on safety measures in order to reduce the number of incidents in his business unit? This makes it possible to manage knowledge: first, the company's workforce can be steered according to knowledge performance and knowledge gaps within business units, regions etc. Therefore, knowledge can effectively be enhanced for the company as a whole, which leads to a better performance on each field. Secondly, the results and output of the statistical reporting can be linked to other factors as part of the balanced scorecard to measure the performance of the entire company. In these terms, knowledge management is so much more than transferring and managing knowledge; it enables the management of the company's knowledge and performance as a whole and thus channels organizational change and – in the end – improvement.

[3] For a brief overview, we exclude other necessary requirements such as ease of use, quick content management, compatibility with international standards, etc.

4. Conclusion

In order to integrate e-learning as a quantifiable measure and knowledge growth as performance driver within the balanced scorecard framework, we have pointed out the significance of effective knowledge transfer, effective knowledge management with the combination of an LCMS as “end-to-end” solution.

With the detailed information provided by an LCMS it is not a big step to the use of the balanced scorecard. The numerical output of the results is easily used within the BSC framework. Knowledge transferred via e-learning and continuously measured for individuals and groups thus becomes a reliable performance indicator. Likewise, if one decides to use the BSC as additional management technique it is wise to also use e-learning for clear, objective statistical ‘input’ of the BSC. Not only does the incorporation of knowledge management in the BSC lead to comparable figures, it also provides a real goal for results.

Hence, the complementarily of the two gives the necessary competitive edge, which is needed in today’s knowledge society and competitive environment. By using knowledge transfer and knowledge management via e-learning, a business strategy that aims at the overall performance of the company can be transformed into action.

ADDING eVALUE TO PRACTICE

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Introduction

The traditional route into professional practice has changed. Whereas previously practitioners followed a single pathway through school and a full time further or higher education course as preparation for a lifetime career, this is no longer the case. Careers develop in different ways requiring providers of vocational courses to offer greater sensitivity and flexibility to meet the needs of a wide diversity of student background, experience, skills and competence. This diversity results from school leavers who find that there are limited places on the course of their choice forcing them to take an inappropriate substitute. As a result, they drop out when the reality does not meet their expectations or abilities but later return to study once in work. Similarly new graduates may discover that the career for which they were prepared does not interest or suit them and switch to a different discipline. Even experienced practitioners may reach a point in their career where a change in direction or significant updating is desired. In consequence, such individuals commencing vocational study may be starting their second or third academic course, however, the common thread that links them is the industry sector and workplace environment that they share. In this regard they are reversing the norm in that they are being educated *from* practice rather than being educated *for* practice. If a single prescribed pathway is no longer feasible, the onus is on the providers of vocational courses to offer multiple pathways and engaging study to meet student and employment needs.

This paper considers the issues surrounding competence and how this can be developed in the workplace. It describes how virtual solutions can be used to deliver competent practice and uses a postgraduate conversion course as an example of the design decisions that can yield desired results.

Developing Competence

The concept of lifelong learning is not new. Dewey (1916) stated almost a century ago that it 'is common to say that education should not cease when one leaves school'. In this respect such post-initial education has always been within the remit of the professions. In the UK there are approximately 400 chartered professional bodies and the Privy Council[1] expects that 'admission to full membership must be on the basis of a qualification in the specific discipline' (cited on CMI website, 2003). For much of the last century courses leading to membership of the professions followed a syllabus set by the profession based upon the needs of practitioners. This worked effectively whilst practice and the professional marketplace remained constant, however, in the last decade it has become apparent that:

- Employers cannot fully control their environment. They are dependent on, and must be responsive to, technological and market changes.
- Employers need knowledge workers capable of adjusting to flexible environments. They must change from an essentially training culture to one that encourages lifelong learning at work.
- Employees are expected to take greater responsibility for their own actions. They must make their own informed decisions rather than simply follow instructions.
- It is not possible to prescribe in advance all the knowledge that an employee needs for a lifetime career. He or she must develop the competency and skills to engage in information search, evaluation and application.

(adapted from Jarvis *et al.,* 1998)

[1] The Privy Council advises HM The Queen on matters of state.

Given this fluid environment, a competent person must be able to demonstrate both 'the ability to do something well' (CUP, 2006) and, as a modern knowledge worker, they must also be able to utilise 'relevant knowledge to create useful new knowledge' (Romiszowski, 1997). This goes beyond soaking up information that is presented for use and demands a degree of activity and creativity that has pertinence for education and training.

The Education vs Training Conundrum

In professional practice, although only a few skills are vital from day one, much knowledge and ability across the spectrum of work is expected to be acquired very quickly. If this is to be delivered through workplace training then it may be anticipated that just as much time is devoted to this as to working, which diminishes the value of the new employee to their employer. Allied to this is the issue that intensive training will develop a trainee's work-based competence, in the sense of Pavlov's dog, but does not fully prepare them to deal with the unexpected. Although an argument exists that says every individual has a support network surrounding them to fill gaps in knowledge and understanding, this is not necessarily the same as being in a position to arrive at appropriate solutions from first principles. If the workplace is as characterised by Jarvis *et al.* then the consequence of such an argument is for education rather than training. The difficulty is that where this can only be delivered in blocks of real time, and at a specific location, the employer may find their business even worse off than when the employee's time was lost to training days.

Competence at Distance

The alternative to full time or part time/block release education is distance learning. It has the advantage over these conventional forms that it can be continued alongside employment and allows the employer to reap full and continuing benefit as the employee develops. However, as a vehicle for employee development, it has been ignored by many employers who do not understand it; cannot see how it can develop workplace skills and frequently regard it as a second class of education. This is understandable as, until the advent of the open universities, distance education was termed correspondence and generally only involved reading for knowledge. The extension of this is a concern that if a worker is only reading how can they develop real workplace skills to the level of competence of their colleagues. Further, that if a person completes study that does not equate to that of colleagues educated full time, the conclusion is that distance is of an inferior standard. Twenty years ago such arguments might be substantiated as distance learners have traditionally been disadvantaged due to their isolation, lack of access to physical facilities and the remoteness of academic support. This is compounded when study is directed at professional practice, which differs between localities and regions. These issues are used to argue that certain subjects and courses can only be delivered at distance if the underpinning knowledge can be written down and access to specialist facilities are not required. This perception that distance learners may only read for a qualification is rightly challenged by the spread of information and communications technology. The internet, the web, interactive multimedia, discussion boards, chat rooms and more, now virtually guarantee that, when used appropriately, a distance taught student can enjoy all the educational experiences of a full-time student without leaving work or home. Thus starting a distance learning course not only adds immediate value to the student as an employee but can also be economically beneficial in terms of tuition fees and other costs.

Building a Value Added Course

In 2002 the College of Estate Management commissioned a new masters course for graduates to convert their existing degree into a qualification recognised by the professional bodies. The College is the UK's leading international provider of distance learning courses for the real estate and construction professions. Annually it has more than 3,000 students studying for postgraduate and undergraduate degrees and diplomas, of whom thirty percent reside outside the United Kingdom in over 80 countries. The Graduate Development Programme thus needed to reflect and accommodate a wide range of career paths and personal and practice needs.

Conventional Study

College students are traditionally supplied with comprehensive paper-based study materials specially written by experts, submit tutor-marked assignments at regular intervals on which they receive written feedback and sit an examination in a range of modules directed at their professional discipline. Support for study is by phone, fax and email and face-to-face meetings are arranged for tutors to discuss and expand on study topics. The College's academic team of internal tutors is supported by a large number of academics and practitioners who anonymously mark student's assignments. This model reflects the traditional dissemination approach for delivering distance education, as it is defined, packaged and focused on the measurable outcomes of learning. The limitation of this instructivist approach is it is directed at modifying student behaviour. The student is expected to absorb the study texts and with this knowledge to complete the required assessment. The function of the tutor is to act as the source of knowledge and their role is to be expert in the subject instructing and explaining it to the student. This may suit a fixed curriculum and static location but, for distance students, it encourages dependence on the spoon-feeding of information and, when combined with an entirely reading approach, is highly passive. In a rapidly changing world a one-coat-fits-all approach is not suitable for a diverse body of international students and simply attempting to fill an empty vessel is not viable.

Pedagogic Change

The Programme's target students are aspiring professionals seeking a course that is flexible, relevant, engaging, value for money and fits into busy patterns of work and domestic life. In this respect written explanations alone are flat and one-dimensional and cannot convey the same impact as actual experience. Given a student's position in a workplace a problem-based approach is preferred as it allows learning to reflect the real world and adds an important second dimension to study. Its effectiveness results from the cycle of visiting and revisiting concepts and ideas within a real life context to form and develop new relationships, links, insights and further possibilities. Providing experiential learning opportunity is difficult enough within a standardised curriculum and this can seem impossible at distance. When delivery of distance study is limited to paper based materials, so called 'sacred text' (Jarvis, 2004), this barrier does remain insurmountable but technology now offers the means to remove this obstacle. To do so, however, requires a shift in the pedagogic delivery away from mere dissemination of information to one that is more developmental of the individual. In a developmental approach learning becomes a process of transforming experience into the required knowledge, skills and competencies. We consider this is an important added value for the maturer student who is returning to education from practice and is more consistent with a changing market environment for education. To maximise value added in this uncertain environment optional study needs to be available that offers flexibility through multiple routes to alternative qualifications. Adopting a developmental model and problem based learning enables greater flexibility for study and is also more consistent with delivering postgraduate level education. To demonstrate masters level study the student must be able to 'make sound judgements, be self directed and original in solving problems, able to act autonomously, exercise personal responsibility and be informed decision makers' (adapted from QAA descriptor, 2001). Thus a level of critical independence is required but this should not be conducted in isolation.

Assembling the Components

Adopting a problem-based approach places the student and their workplace at the centre of the learning process and requires the tutor to become the facilitator, guiding and assisting the student to learn actively within their own particular context. To achieve this requires a level of discourse that has only become possible with the spread of affordable communications technology. We see dialogue between students and their tutors as potentially the greatest value added as it enriches the learning experience and provides the critical third dimension that enables inter-dependent as well as independent learning to occur. The ability to engage in continuous, albeit asynchronous, communication has had the greatest impact on distance education since the invention of the printing press. It allows differences in culture, language, practice and procedure to be acknowledged and discussed in a way that is not possible in the written word. Mobile devices now extend the opportunities for this to occur at even more convenient times for the student. Apart from enabling participants in the learning process to engage in many to many discourse the power for interaction is increased when combined with information technology. Students may now question and obtain clarification on the words that they read on paper or screen. Rather than being limited to supplied texts, students can refer to source information on web sites that

are kept up-to-date by the host. They can make use of information produced by, and used in, their own organisation. Digital information is more transportable and accessible from any location. It is also more easily shared between learners and can be converted into alternative formats for use by the disabled or translated for better understanding in a mother tongue. Colour printing continues to be a cost barrier for distance course providers forcing a continuation of dull greyscale resources that contrast starkly with the full colour work environment. Technology changes this by providing students with access to high definition imagery. Photo galleries enable students to view images that give a better explanation than words. Video enables students to be taken into situations and locations that they would otherwise not have access to. Audio allows them to listen to experts talking about their practical experience. Three dimensional computer graphics allow a student to 'walk through' buildings or to take a virtual tour of a case study. These add value to the learning experience and, when combined with black and white texts, provide the student with a comprehensive resource. However, when used as stand-alone components these require very careful scripting or lengthy written explanation for study purposes. The difference that online technology makes is that the student can now access a wider range of resources at a time that is convenient to them and, importantly, to then engage in discussion of what they have seen or heard with their peers and tutors. We are constantly seeing new opportunities for still or moving images to move to the centre of learning and form the basis for discussion, debate, analysis, interpretation rather than simply providing a support for study. Information technology also plays an important role in helping independent learners assess their own study progress. Traditionally this has been achieved in distance learning by providing students with self-assessment questions, which they are invited to answer from the knowledge they have gained from their reading. Our experience is that when these questions and answers are available 'on the same page' the student invariably takes note of the answer but does not attempt to process the question. This is a failing of paper-based learning which interactive technology rectifies by providing a level of separation between question and answer that intrigues, engages and motivates the student to complete them.

Delivering Added Practice Value

Making resources, such as reference papers, journal articles, research papers, web sources, textbooks, videos, tapes and CD-ROMs, available to students enriches and adds value but has to be structured and managed – too much resource can as easily devalue study as it can enrich it. Simply telling the student that the resources are there to be used as required is not sufficient to deliver a quality experience. In this respect the issue of time becomes a huge issue for busy professionals, combining work, home and study, and a typical commitment of 14 hours per week is very demanding. In this circumstance the key to active problem based learning is to provide the student with designated periods of time, or learning pools, in which they can interact with the study resources, other students and tutors in order to construct and develop their knowledge. The concept of learning pools (Fawkes and McNeill, 2005) is highly appropriate for vocational education. A carefully designed sequence of structured events allows the student to complete activities designed to meet the learning outcomes but within their own context and need. Thus students can approach the same problem from a different sub-discipline, geographical location, language, learning style, practice convention or employment culture and still achieve the outcome but in a manner that is relevant to them. The added bonus is that by exchanging ideas and solutions with other students they learn more widely than when presented with pre-prepared answers. Building in sequence and structure can be regarded as constraining and against the principle of developmental learning, however, our response is that they are important to maintaining pace and mature students work well to task and assessment deadlines. Our experience is that our students are highly motivated by their personal career development. The rationale that underpins the learning pool's model is that if the student wants a qualification they must complete the assessment; to complete the assessment they must complete the activities and to complete the activities they must understand and use the full range of resources. The model derives from a learning objects approach to study design as a means of integrating the diversity of components. As a result, the activities set within the learning pools employ a mix of:

- Creative thinking techniques requiring the student to engage in problem solving;
- Critical thinking techniques requiring the student to conduct detailed research and evaluation;
- Collaborative thinking techniques requiring the student to undertake team working.

(Adapted from Bonk and Reynolds, 1997)

Module:	INTRODUCTION TO LAW	Code: K103LAW
Title:	Activity 2.1: Standard Business Terms	
Preamble:	Business involves the exchange of goods or services usually for money. In practice, however, this simple concept is full of problems, which the law of contract seeks to address and to clarify. You will need to refer to the reference paper **P6031**, 'Formation of a Valid Contract' in completing this activity.	

Instructions:

1 Look around your workplace. How is the contractual side of your business managed? What paperwork is involved? What 'agreements' are in place before goods or services are exchanged?

2 Obtain a standard form of contract, ideally from your place of employment. If this is not possible, choose one that you have had personal involvement with, eg rental agreement, insurance contract. Identify whether the contract contains a clause to the effect that the contract will only be concluded on the terms and conditions of the person who presented the form.

3 If it does contain such a clause, what effect do you think it has? Would such a clause 'win the battle of the forms'?

4 Compare and discuss the main clauses with other students on the VLE.

Figure 1. Sample Blackboard Learning Activity

These techniques may be combined into activities and equally any activity may combine the use of a single object or multiple objects depending on the student's learning needs. For example, in Figure 1 three objects are used – the supplied reference materials, the online discussion board and the student's own work environment. Guidance for the student is given in the preamble, which sets the scene, explains the purpose of the activity and directs the student to appropriate background reading. The instructions explain what the student is expected to do in order not only to understand the nature of standard business terms in the general sense but also within their own field of work. By bringing their findings to the discussion board allows them to both demonstrate understanding to their tutor and provides an opportunity to recognise differences between sectors, countries and employers. Such an understanding would be impossible to achieve if all the permutations were to be written into a comprehensive written paper. By creating activities of this nature allows the minimum activity to be defined but does not constrain students from going further, e.g. to explore the web or textbooks if they choose. What is evident to us is that it is the tutor and workplace mentor who are critical to a student achieving success. Their presence in reviewing the outcomes of activities with students, both during and on completion, is fundamental to the model. It is their encouragement and remedial guidance that we consider adds the most value, stimulates the student to participate and motivates them to continue through the learning process. A logical progression between activities is essential and ensuring learning activities relate to the summative assessment keeps the student on track. For the example shown in Figure 1, the conclusions from the investigation and online discussion are debriefed in the next assignment. To make sure that a student has understood later activities use self-diagnostic interactive quizzes to enable the student to check what they have learned from the activities.

Conclusion

There is a well worn, but true, saying in education that goes 'tell me and I will forget; show me and I will know; guide me and I will master'. Within vocational distance learning the continued use of exclusively paper-based design restricts the professional studies student to the second of these at best. To allow the student to benefit from all three requires their active participation and course designers must step outside the box if they are to harness all the available resources that exist within the student's personal and professional environment. Conventional lecturers, tutors and trainers must shed conformity and look for novel application of the technologies which are widely available both within the student's home and workplace. Devising study that fits with the aspirations of the student and meets the needs of their employers requires creativity, flexibility and innovation. Our experience of integrating these into our new course design has yielded exciting initial results. Enrolments have been

much higher than expected due partly to the attraction of the course mode and academic level but mostly from the flexibility and choice built into the design. Students tell us they are drawn to study that makes use of learning technologies and participate in activities which they find engaging and relevant to their immediate work. Our tutors attest to the knowledge and competence displayed by students both in their assessed work and in the online discussions. This active involvement is reflected in their results with a visibly higher standard of grade achieved by students who fully participate. Such an outcome is not only good for the student but also for their employer and the professional bodies and demonstrates that it is possible to add real value to practice at distance.

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NEW WAYS TO COOPERATE IN ORDER TO IMPROVE STUDENTS' EMPLOYABILITY

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Background

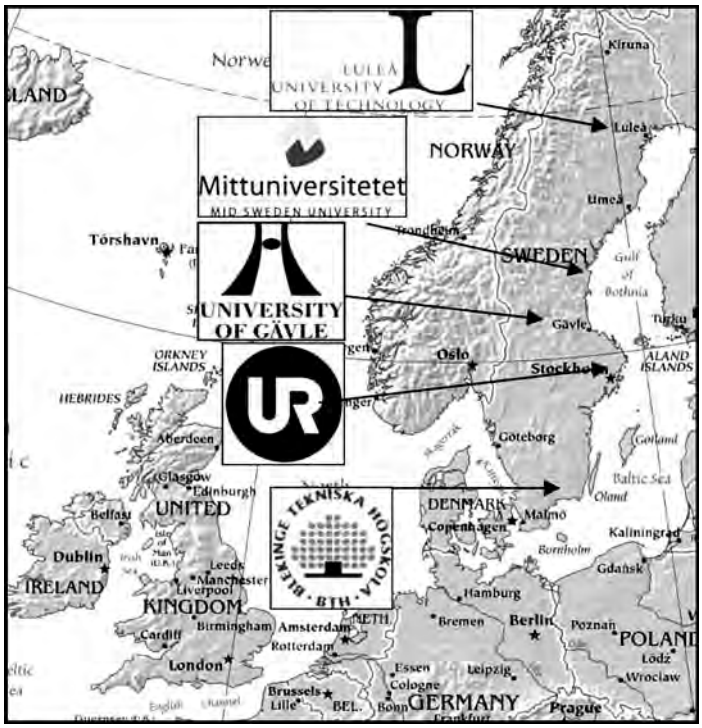
Sweden has, through a government bill, Den öppna högskolan 2001 (The Open University 2001), stated that 50 percent of the population should start academic studies before 25 years of age. One intention is to improve the number of citizens active in the labour market. Some areas of Sweden are sparsely populated, and geographic distance can be a severe obstacle to the commencement of studies. Flexible learning is a method used to achieve the goal, and the number of non-campus-based courses and programmes has increased substantially.

The 50% goal is not far from achievement, but the resulting effects in the labour market are not so obvious. One possible explanation could be that the expansion has generally resulted in an increased volume where the traditional job offer has been made in a new mode. The topic of the employability of students has been put forward during discussions coupled to the Bologna process and is included in the Bologna Declaration. In any event, so far this aspect has not drawn much attention in discussions dealing with Swedish net-based courses and the recruitment of new groups of students.

This paper gives two examples of how the cooperation in SNH has improved the employability of students.

SNH

SNH (Collaboration for Higher Education) is a cooperative effort between four universities and UR, the Swedish Educational Broadcasting Company. The universities are Luleå Technical University, Mid Sweden University, University of Gävle and Blekinge Institute of Technology. The cooperation is about net-based flexible learning and is focused on the development of courses and the achievement of results that exceed what can be accomplished by a single party. The courses developed are supported by web sites and TV and radio programmes that are broadcasted in the national net.



Courses are presently primarily given in the sciences of Information Technology, Health & Nursing, Pedagogics, Social Science and in Economy and Leadership.

The parties to the SNH have prior experience of cooperation for development of courses in distance mode. The size of the universities varies from 5,000 to 13,000 students, with a majority of campus students. UR is a public service corporation that produces educational radio and TV programmes on a nonprofit basis. During 2004, more than 2000 students were registered in courses developed within SNH.

The experiences from the first years of the cooperation show that the goals proposed for joint development of new courses have been achieved. But the most valuable results are linked to the work during the development phases. The main ingredients of these processes have to do with the building of networks, evaluation of existing methods, media, routines and pedagogic approaches. These effects were not strictly aimed for from the start.

One of the goals of the Bologna process is to improve students' employability after completion of studies. Two examples of course development within the SNH that aim at fulfilling this ambition are a Master of Public Health Service programme and courses in Geriatric Care.

Improvement of Students' Employability

The courses referred to are both special in that they address students that are already employed. The motives for the students to engage in further education are to increase competency and to improve their chances for advancement.

Master of Public Health Science

In the beginning of 2005, Mid Sweden University, University of Gävle and Blekinge Institute of Technology started a joint education programme, a net-based Master of Public Health Science. The project includes UR, the Swedish Educational Broadcasting Company, which has produced radio and TV programmes.

The programme addresses those who have a university degree from other subject areas and want a supplementary degree in public health on a master's level and it extends over two years of part-time studies. The courses are all net-based without compulsory classes.

The objective of the programme is that the students will gain knowledge and build a scientific ground for public health work within various sectors of society. By means of the students' different interests, experiences and occupational backgrounds, the programme promotes opportunities to widen perspectives and to increase cooperation within public health work.

Geriatric Care

In Sweden, as in most western countries, the population is rapidly aging, and there are concerns about how this large number of people can have their needs fulfilled. There is an obvious risk of shortage of competence in this field. The main difficulty is probably not a matter of recruitment, but rather a shortage of relevant education opportunities.

The situation is complex, and it is probably not enough just to offer relevant courses. These must be complemented with clear signals from both the employers and the union that it is not just acceptable, but also relevant to study in order to deepen and widen personal competence even after employment.

In order not just to create courses that are relevant, but also to create acceptance of and demand for them, a series of seminars was held to inaugurate the development process. These seminars were attended by a mix of lecturers from the universities as well as representatives of the potential students and their employers. This means that SNH members were complemented with people from:

- the Swedish Municipal Workers' Union – Kommunal (http://www.kommunal.se) with about 585,000 members whose work includes geriatric care, childcare, health care, bus services, roads, parks, refuse collection and agriculture,
- the trade association responsible for geriatric care,
- the Swedish Association of Local Authorities and Regions (http://www.skl.se), representing the governmental, professional and employer-related interests of Sweden's 290 local authorities, 18 county councils and two regions.

Based on the results from the seminars, two courses have been developed so far. One is about healthy aging, and the other deals with the situation when the health of an elderly individual fails. Three more courses are planned. During this process, the plans were successively tested with the other groups from the seminars.

Experiences

The focus of the experiences gained differs depending on whether we discussing the cooperation between the universities, the universities and the UR (i.e. SNH) or SNH and third parties.

Universities

It is stimulating to work across the bounds of institutions. It is a way to gain new experiences and to take advantage of the different institutional cultures. The universities involved use different web platforms, different ways to stimulate interaction on the platform and different ways to conduct examinations. The work in the groups is characterized by discussions and questions. The results are not restricted to the course in question, but also affect other courses to which the developers contribute.

All courses are evaluated by the universities. Student satisfaction is on the same level, or more often than not, on a higher level than for other courses.

SNH

It is a challenge to handle the different functions and cultures in university education and public service, radio, web and TV. The traditions in media and universities reflect the different natures of their missions. The groups often share the same terminology, but use it with different intents. It takes time and effort to develop material acceptable to both parties. But this process is rewarding in the long run and can be seen as an investment for the future.

The cooperation in SNH between the universities and UR has opened an interesting possibility for pedagogical and technical development. An example is the new ways of digital distribution that are now being tested. They take advantage of the new digital systems that make it possible to transmit programmes and study modules. UR transmits programmes and study modules to the university libraries. The materials are stored on servers or are burned onto DVDs. From the library, the programmes are made available on DVD or as streaming video or audio through the Learning Management systems used in various university courses.

A group has described and evaluated their work process based on collaborative learning in a report. The positive experiences have been implemented in later projects. The web site (Veteran TV) for a course in geriatric care is now being evaluated by an external group. The site, in Swedish, is public and is not just visited or used by persons involved in the courses. It contains study modules linked to the course. These are text based as well radio and TV based. The site has been developed jointly by the academics, TV producers and representatives of the potential students and their employers.

SNH and the External Parties

Especially the courses dealing with geriatric care have addressed new groups of students, and in this case contact with employees and the union has been especially valuable in several ways, such as:

- Identifying areas with special need for courses
- Developing course content
- Creating acceptance for studying
- Marketing of the courses

Results

The very active development stage has been a success. It has resulted in the development of academic courses for untraditional groups. It gives nurse's aides new opportunities to "grow" within their field. UR has developed, together with the other partners, a web site with most useful study modules. These are useful not just for the students, but also for nurse's aids and others. They can look into it and decide if they want to take the course. The study modules can also be used in other courses.

A way has been shown to cooperate in a field where a single university can have difficulty recruiting enough students to justify a programme. A larger variety of courses and possibilities to specialize greatly improve the students' opportunities in the labour market. This cannot be achieved by a single party due to limitations of economy or authority. There is an increasing interest in the programme, and the students' evaluations of the courses have mainly been very positive. Many students have declared that net-based studies have provided opportunities to study that they otherwise would not have had.

Together with the courses, TV programmes were developed. These programmes are sent via the public network and are accessible to all. They have been followed by a large audience and have thus increased knowledge and interest in the field.

The two examples have shown ways to cooperate in order to create courses that improve students' possibilities for a successful working life.

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UNIVERSITIES TO COMPANIES CONTENT EXCHANGE PARTNERSHIPS & E-LEARNING SERVICES

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1. Introduction

This paper focuses on content exchange partnerships and ways to enable the provision of academic e-Learning services for companies. It especially highlights the increasing interest of Universities to provide e-Learning services to the corporate world through technology-enhanced learning scenarios.

Through ICT, the whole range of online courses and services offered by academic institutions is now more transparent than it has ever been before. The window of opportunity is to make the offers visible not only on universities own web pages, but also promote and market them with educational brokerage platforms at an aggregated level. The core business of such intermediary services/platforms is to enable life long learners in schools, universities, and at the workplace to choose among courses offered in one discipline. They could then select the one most appropriate for their specific needs depending on cost, time, and credits. This is especially relevant because of the individualisation of demand for tailored courses being mostly short and targeting topics presented in forms of modules or even learning objects (short piece of learning material that can be combined with others to form a course of learning modules). Such approaches imply the necessity of credit systems and accreditation methods to ensure the transferability. Thus, and driven by needs of strong interoperability in contents and servers, brokerage platforms have to enable the learning objects or course modules to be tagged with appropriate metadata and to be stored in data repositories. Those would form a pool from which one can create new courses by composing several elements [1].

As more and more courses are now targeting professionals or part-time students along their professional careers with sufficient financial income, innovative financial models are emerging for online courses. This is interesting for traditional European Universities which have to finance more and more their own institution with a growing part of private funding. But while corporate trainers have been able to show cost savings in moving to ICT-based training, it is interesting to notice that most universities claim that the production and operation of ICT and technology-enhanced learning creates additional costs. Nevertheless, many of them invest in complex, innovate and high quality technologies, such as modern learning management systems. Naturally, the more emphasis they put on improving quality, the more expensive online learning becomes. Different ways are currently seen to overcome this hint: some universities are creating own spin-off companies to market their technology-enhanced learning contents and services to different target groups. Others are building partnerships and consortia to get a critical mass of content by sharing online teaching resources among the partnering organisations. While several inter-university approaches exist, a gap is seen in the exchange between academic and industry organizations [2, 3].

2. U2C Venture and Partnerships

A way to foster the needed exchange is to establish brokerage services targeted on the active dialog between the potential partners. The Western Governors' University (WGU) in the USA and Learndirect in the UK are two examples of this kind of educational brokers. WGU can be described as a non-profit university that was founded by 19 state governors. However, it is a private university, not a state school. Its business model is based on a brokerage approach. The consortium mobilizes a wide range of partners to deliver innovative kinds of academic programs to new target groups of learners, based on a competency model. 30 participating institutions including universities, colleges and corporations such as KPMG, Microsoft and Apple, develop and deliver courses. The WGU consortium offers online

courses, provides assessment services and enables students to receive credits, either for their successful participation in formal courses or through their participation in innovative forms of learning. To ensure high quality of the offers, three councils provide quality assurance of the combined products and services. The program councils ensure the integrity of academic content; the provider council reviews and select individual providers (i.e. institutions and training providers that supply teaching staff) and the assessment council is responsible for the reliability of assessment instruments. From an organizational point of view, WGU is governed by a Board of Trustees consisting of state governors, industry leaders and educators. Furthermore, WGU continues to draw support (but no state funding) from the Governors of the Member States that co-founded WGU.

In the UK (with an additional Scottish organization), Learndirect has first started under the name of "University of Industry", corresponding to a U2C brokerage venture. It can be described as a national initiative financed by government and private investment. Learndirect acts as a broker between learners, companies and providers, supplying "courses and learning packages" through an electronic learning centre in a range of convenient locations. A nationwide guidance service supports the relationship of learners with appropriate provision. Learndirect aims at increasing the demand for learning and to provide access to learning for the whole population, including the most disadvantaged, which is an important point, as currently the life long learning market tends in general to strengthen the already good qualified peoples and leave behind the less qualified ones.

Another approach to bundle already existing contents and services is to integrate several partners in so called virtual universities. National initiatives, as well as numerous inter-state initiatives have announced virtual university initiatives of various kinds, for instance in UK, Finland, Sweden, Pakistan and Greece. Most of these initiatives aim at extending and enhance local provision while others are targeted at international markets. The oldest one and still one of the most accredited is the University of Phoenix that was founded in 1976 and became the first to offer online college education with complete degree programs via the Internet. The UNESCO report on "Virtual University" underlines that the commitment of the University of Phoenix to "educational excellence and unsurpassed student service has made UOP the leading accredited university offering online courses in the United States, with 17,000 highly qualified instructors, 170 campuses, and Internet delivery worldwide." Since 1976, more than 171,000 working professionals have earned their degree from University of Phoenix. With more than a decade of experience in web-based delivery of e-Learning services, UOP popular format has proven effective for thousands of successful graduates. Beyond the convenience of an online college education, University of Phoenix Online also offers some of the most up-to-date and relevant curriculum available. Created in cooperation with business and community leaders UOP's online education degree programs provides skills and expertise with high demand [4, 5, 6].

Among the recent initiatives,the UK e-University, was targeting the world market with English e-Learning courses had dramatically failed in 2004 after four years of promising activities. Bacsich analyses several reasons for failure such as a too supply-driven rather than a demand-led approach, a lack of face-to-face options (blended learning), brand confusion, with the objective to provide only the best of UK Higher Education Institutions and the reality of much more universities involved, culture clash in partnership with the private partner SUN (lack of homogeneity and managed diversity) and not enough research studies in a fast changing environment as well as a too complex approach of creating a new platform. Part of UK e-University's problem was that students preferred to work with existing universities having established reputations and which have been developing their own e-learning materials. This example may help in order to bring more attention on public-private partnership business models for U2C brokerage ventures [7, 8].

3. University to Companies e-Learning Services

During the eduXchange-project (www.eduxchange.org) a survey was done to investigate the current available e-Learning services offered from universities or universities consortia to companies. A series of face-to-face interviews with several universities offering such services were carried out. The approach was not quantitative but more qualitative in order to identify not the volume but the design and packaging of services offered. To that extent despite the relatively small group of interviewed parties the collected input was of interest to our project results. The following points are demonstrating central aspects of the catalogue of services provided from universities to companies and/or individuals.

The main issues raised in these interviews were the business concepts followed to the provision of the services and the underlying technology that supports their processes. Most of the services are organized within an academic context and content is prepared within the universities premises. Several examples are from Germany and France that follow the demonstration of this procedure [9].

As a traditional state-funded university, the University of Kassel (UniK) was analyzed. In the UniK over the last two years different kinds of course-videotaping projects were conducted. In the near future they will record multiplicity courses. Every auditorium will be equipped with videotaping hardware. By recording a live lecture it will be possible to provide it in a different auditorium and/or on the Internet. One reason why this will be done is because of the limited space inside an auditorium and the increasing numbers of students. Another application is used to record single speeches of professors and provide them into the internet and archive them. As technology, the university uses server from Real (real-time and other formats) for the target group that is students. The university believes that the possibilities are wide ranged. In the scope of an efficient evaluation system for the professors, videotaping is a useful instrument. In the past, UniK offered different courses on the learning platform Lotus Learning Space. Today they have installed a new platform based on Zope/Plone and Eduplone. It's an open source product with optional expandable. On this platform they offer different courses. Within the UniK WBTs are offered, too. The multifunctional use of the LCMS will be an exciting experience. The LCMS has got different kinds of functionalities, such as to act as a virtual classroom and also as a project management system. High potentials are seen in the area of groupware functionalities and in the interaction between students that participate in a specific course. Every student with an account of university's computer centre has got a login to the LCMS. About a student management system of the university the university's chairs are able to administrate if a specific student should get access to specific courses. Every chair has got an autonomous possibility to use the LCMS and to offer specific content for student. They are administrating their courses by their own. The main question, which has to be answered, is how the specific learning content can be adopted into learning platform and how professors can work more efficient with the possibilities of this platform. To solve these problems, the coordination centre of multimedia offers chairs their consulting services.

As another example of e-Learning services' implementations in Germany, the University of Applied Sciences Furtwangen was interviewed. Fachhochschule Furtwangen supports the web-based training with short videos or audio files for introductory or motivational purposes in distance-learning courses provided from professional training videos, self-produced streams, music/meditation. The target groups of this procedure are mainly professionals in part-time/distance learning programs/courses. Fachhochschule Furtwangen supports the learning management system learning procedure with learning platforms, online courses, and threaded discussions. The university uses the eCollege and Clix platforms and the content is self developed with off-the-shelf add-ons. The target group is blended from undergraduate students and master students to professionals. The university has a simple system-emulating editor for the content management system; for the faculty and staff the content is again self-developed.

In France HEC School of Management has implemented computer-based training through web-based training. web-based training is implemented by a unit of New York University, Stern School of Management. It relies on an Ed-Web platform, which is based on an implementation of Blackboard. With the use of the internet the participants and the instructors can access the provided web-based training. Finally asynchronous learning represents about 15 hours per week of work for participants between the residential sessions.

Campus of Europe in France uses e-Charlemagne's Learning Content Management System. They have designed and developed their own platform which is accessed by both teachers and learners, and as standards it uses Microsoft .NET, and XML. Each university for its own internal use provides the content. Each university can define the content that can be made available, for free or for a fee, on the Campus of Europe brokerage or the EducaNext brokerage. The platform has been implemented in several French Universities and Higher Education Institutions, both in the management and the engineering areas. It has also been implemented by 49 Higher Education Institutions (including all Algerian universities). The Polytechnicum used to have WebCT but they were not satisfied with it, especially because of the pricing policy and the lack of real new features. They found an agreement with a small IT company and they have developed their own LMS/LCMS that fits their needs completely.

They paid attention as well to the existing offers in the open source community. SCORM, LOM, and XML are the standards that the platform uses and the target group are students and executive learners. Finally the content of the platform is created 100% from the Polytechnicum [9].

Teleakademie Furtwangen (TF) makes a difference between learning material and communication tools. Relating to learning material they use electronic scripts, mainly pdf documents. web-based trainings are in use as interactive applications. Actually the scale of use of web-based trainings is small but will be larger in future. TF integrates video and audio features inside web-based training courses, e.g. video files. Everything has to be well integrated in an overall training concept. Teleakademie Furtwangen has to regard the participants' needs. On one side participants like to work in a traditional way with paper scripts, on the other side they don't want to do it without the advantages of interactive training courses. Teleakademie Furtwangen supports their needs by downloadable versions of Web-based trainings. Participants can use the course in an offline modus. Furthermore Teleakademie Furtwangen has made another interesting experience with web-based trainings. It seems that it is more important how learning activities are forced then the way the content is designed is. A reason for this might be that to reach complex learning goals the learners have to understand the importance of the learning tasks.

4. Conclusions

Educational brokers of all kind could find in the near future a significant growth through the expansion of educational content, services, including educational guidance, testing, learning support, assessment and electronic libraries and accreditation services. Also the concept of content enrichment through innovative and multilingual metadata finds a growing interest in the European Commission funding strategy (e.g. in the eContent plus program).

As different kinds of service are more and more dependent on electronic media, the technology ventures (both software and hardware companies) are more and more involved in the provision of educational services. A trend is seen in the development, that several corporate universities involve contractors for the development of tools, templates and expertise not available in their know-how. Some educational service companies start offering to set up and run the corporate university for the company, providing enrolment systems and facilities' management services.

And last but not least, as traditional universities invest in large scale networked learning to develop "managed learning environments", they increasingly are also becoming dependent on commercial service providers.

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IMPLEMENTING CONTENT PROCESSES INTO BUSINESS STRATEGY

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1. Adding Business Value through Workplace Learning

With information technology progressing on a nearly day-to-day basis with respect to technical feasibility, general availability and individual familiarity, challenges of eLearning at the workplace no longer reside in technical impediments. Whereas bulky, unhandy software, weak network connections or low usability used to present the major obstacles, it is now the missing integration of eLearning in organizational processes that hinders its true business value to unfold [1]. Thus, respective research efforts no longer need to focus on pure technical implementations. Rather, they must tackle the issue of effective, i.e. business-driven learning strategies realized by cutting-edge technology. Methods, concepts and information systems that allow eLearning tools, environments and solutions to be integrated and aligned to companies' major business infrastructure loom large in the field of technology-enhanced learning (TEL) as outlined in this paper.

Today's organizations still have difficulties recognizing and realizing the potential business value of technology-enhanced workplace learning. Nevertheless, in the year 2000 United States' enterprises already invested 20 percent of their budget (13 billion US$ out of 66 billion US$) for professional education in eLearning activities [2]. A similar trend is now becoming apparent for Europe as well. Whether these developments will tap the full potential of TEL will largely depend on the actual impact of research and development (R&D) on innovative learning technologies and business-administration driven solutions with respect to strategic business relevance. Existing eLearning approaches miss consistent alignment with business operations and objectives. Especially small and medium-sized enterprises (SME) mostly depend on external eLearning- and/or Application Service Providers due to financial restrictions and lacking in-house expertise [3]. Such dependencies hamper flexible usage and application of workplace learning in a consistent way. Thus, there are little enterprise-adapted i.e. business-driven TEL activities so that the real value of TEL cannot unfold. In order to further promote and push workplace learning, the research focus must shift on the economical impact of eLearning strategies within the overall enterprise architecture regarding organizational, business and technological infrastructures. Having understood workplace learning as decisive business driver, the market will ask for interoperable systems based on methods and methodologies that empower every organization to govern their own TEL strategies instead of hiring external eLearning experts with little insight in the daily business. By placing workplace learning within their overall value chain, organizations will realize the merits of consistent, technology-enhanced corporate learning strategies. Hereby, the overall goal must be to quantify the learning ROI ("Return on Investment") in a business context and therefore demonstrate how workplace learning adds measurable business value.

Applying the concepts of business processes on eLearning activities will facilitate a more business-oriented comprehension. Hereby, it must be understood that pure eLearning technology and information systems themselves provide no real competitive advantage any longer [4]. What differentiates enterprise A from enterprise B is not necessarily the availability of a systems infrastructure but the specific learning content provided to the learners depending on their specific context [5]. Therefore, this paper focuses rather on the content processes formed to a chain than on learning processes, in which it differs from other approaches such as [6]. Figure 1 illustrates this as a three-step course of action. All three steps are core functions and can be described in more detail. Thus, they represent business processes in themselves that interact with other processes: (1) *Content production* refers to the development of eLearning content, i.e. web-based trainings (WBT) or Learning Objects [7, 8] in a purposeful manner – purposeful in the sense of fulfilling business needs and leveraging internal resources. The content development process needs input e.g. from marketing processes, research and

development as well as manufacturing. It therefore becomes a very interactive, collaborative process that demands integrated data resources and seamless cooperation [9]. (2) *Content delivery* in a second step aims at the purposeful provision of learning material at the right time and at the right place. This requires a close matching between business needs and requirements on the one hand and learner's individual competences and needs on the other. These business needs are represented by the operative business processes and their respective functions. Changing business processes brings about changes in competency requirements [10] that need to be met by flexible content delivery [11]. (3) Last but not least a reflecting step of *content control* monitors the business success of the content produced and consumed. This again refers to the business process that was to be improved. In order to reveal the impact of content-specific workplace learning on the overall process, training measures must be added to the already common key performance indicators of process monitoring system. This is where the true ROI, i.e. the added value, is quantified and provides feedback for content improvement.

Figure 1. Core activities of the Content Process

This paper presents two research projects that focus on different parts of the learning content value chain: the nationally funded research project EXPLAIN (http://www.explain-project.de/) focuses on the content production process. It aims at an intelligent ICT environment that empowers organizations to flexibly implement their training modules in the course of their major business processes. In addition, the steps of content delivery and control are covered by the EU/IST funded Integrated Project (IP) PROLIX (http://www.prolixproject.org/) that deals with the tight coupling of business and learning processes on the base of competency profiling and modelling.

2. Integrated Content Production

The process of content production is extremely resource-intensive and complex especially for SMEs. In order to develop eLearning content in a meaningful manner, many employees from different departments have to collaborate and exchange relevant data across departmental boarders. Most enterprises cannot afford to assign the content production to an external team of experts, but on the other hand the internal staff lacks didactical and technical expertise to develop the content in-house, or the enterprises are not able to release some employees from their work for the production of content [3], [12].

In practice, enterprises usually hold views of the ideal process of content production that do not match their as-is situation; instead, ideal and reality often diverge by large. To enable an effective and efficient use of eLearning at the workplace, the following requirements have to be met:

- Tools for content production support should be *low-priced* and *easy to use*, so that the process of content production can be carried out by internal employees. They should provide *didactical and conceptual* support empowering technical experts to contribute their existing knowledge and material to the content development process. Having such "smart" content production solutions in use, companies would circumvent outsourcing eLearning projects to external service providers and avoid extensive pre-investments.
- Furthermore, all activities affected must be organized in *transparent and lean processes.* Engineering these processes towards efficiency and effectiveness must be of top priority. This entails integration of data, people and functions with the aid of collaborative and workflow-supporting systems.

Despite the desire of enterprises for reduction of complexity, they express great quality demands on a potential use of eLearning technologies and require strong customer orientation and highest usability. However, the reality in the area of content production is still quite different: the processes of content development remain very intricate, irrespective of any tool support. Usually, multiple departments are involved in these processes, because many interdisciplinary competencies and detailed knowledge (technique, tools, project management, media production, and didactic expertise) are needed.

The expenditure of time for internal experts is comparatively high, because their know-how is required for the development of content, but explaining their – often implicit – knowledge is not a routine activity at all [13]. Furthermore, already existing tools support only singular aspects of the content production, but do not provide holistic process integration.

In order to solve the above-mentioned issues, the objective of the EXPLAIN project is to combine simple processes of content production and tools for content development, furthermore to equip them with didactic intelligence and to integrate them with the actual product development processes within the enterprises [9].

Current authoring tools mostly start to support this process at the point of the actual technical development of training media. But they do not provide support for the internal experts in conceptually designing and preparing training media production already during the process of product development. As mentioned above, the production of content, especially regarding intricate products, which need intensive explanation, requires a high amount of time to be invested by the internal experts, in the majority of cases engineers or product developers. It is likely that this high expenditure of time by "expensive" employees of an industrial enterprise is the main reason that no wide usage occurs. Only if this group of people is supported by effective tools integrated into a well organized development process, content production will become beneficial for enterprises. Currently, the expenditure of time of these people is as high, because data collection, graphic design, knowledge provision, coordination of content and the development of appropriate didactic models for the prospective users have to be accomplished before the production of content can be started. As a consequence, these internal experts have to accompany the entire process of content production with their expertise, which is a very time-consuming endeavour. This effort is seen as comparatively higher than the effort to develop content for classic classroom trainings [1].

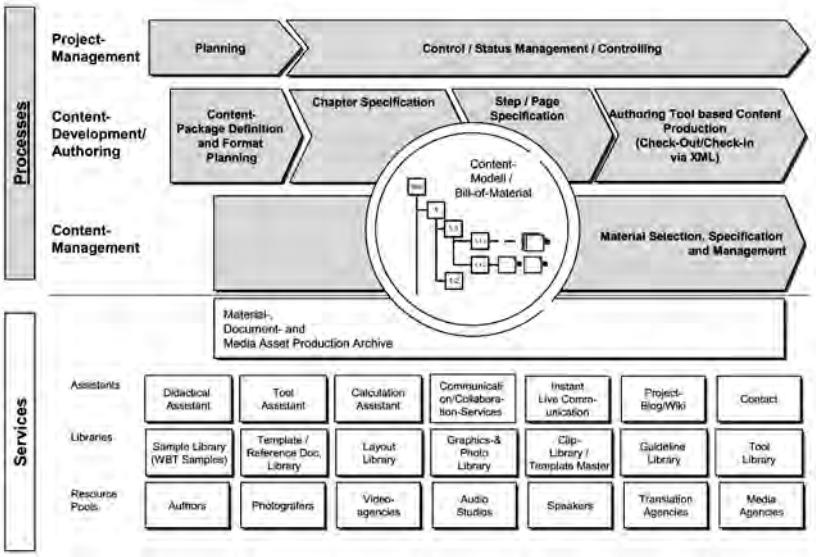

Figure 2. Process and Service Landscape of the EXPLAIN Authoring Management Platform

Hence, the challenge is to provide an integrated, tool-supported content production process with all involved departments sharing required information while seamlessly cooperating with each other. The process of content development has many interfaces with the process of product development for example and therefore provides possibilities for potential reduction of complexity, redundancies and optimization of effectiveness and efficiency in the case of integrated processes. The inherent challenges are to be analysed, elaborated and conceptually overcome within the project EXPLAIN. The main objective of the innovative cooperative project is to develop a new generation of authoring management platforms [14]. This will facilitate a simplified proprietary content development process and will enable enterprises to produce their own multimedia trainings, thus, it will open the gates for a wider utilization of eLearning in medium-sized businesses. The project's development approach is based on a systematic analysis and reengineering of as-is content production processes in cooperation with professional content development companies and industrial enterprises. From here, an integrated platform supporting the authoring processes of content management, content development as well as project

management including open interfaces to learning management systems and authoring tools is developed step-by-step (cp. Figure 2). Beyond process integration, a variety of additional services will further facilitate specifying, producing and managing media and content.

The resulting EXPLAIN authoring management platform follows the thesis that it does not make sense for corporate training managers to run and maintain an own authoring infrastructure within the enterprise and have all the skills in an internal team – unless the volume of media production is on a very high level. The intelligent integrated solution will instead provide a multitude of authoring tools, assistants and services on-demand over a web-based platform. The idea is that enterprises can use these services whenever they need it. By this, services and tools can also be provided at the newest level of technology. Corporate training departments avoid pre-investments into own infrastructures. The provided value-added services in the platform will also support communication and collaboration activities within the team and by this increase the process efficiency for review and creative team processes [14], [15].

3. Process-Driven Content Delivery and Control

Problems regarding today's workplace content delivery through eLearning systems persists in the disregard of the active information need of the learner in terms of his daily work. It has been proven that it discourages the learner, if information that is very present in his daily life is merely depicted by learning objects or complete course structures so that they often fail in creating an increase of benefit [4]. This can be avoided by providing a personal learning unit fitted to the current task context and offering the needed state of knowledge without great redundancy. Contrariwise, information and knowledge supporting systems can profit from the user-friendly, learning-goal-oriented and didactically-prepared presentation of information units. These provide usually only information according to the estimated user's need, whereas standard of knowledge, learning goals and learning units are neglected. Due to their function-oriented architectures and focus, the drawback of – more or less – monolithically knowledge supporting systems is the missing consideration of the learner's (individual) view on the presented information [11]. Without any linkage to the core IT-infrastructure, learning environments are too distant from the points of interest, i.e. the business functions requiring trained employees (see Figure 2).

Therefore, innovative and extended methodologies, architectures, frameworks and tools that support the process-oriented deduction, retrieval as well as the distribution of relevant knowledge to the workplace learner are needed. The fulfilment of the defined goals will be outlined by the activities of the EU/IST IP on *"Process-oriented Learning and Information eXchange (PROLIX)"* (http://www.prolixproject.org). PROLIX's major goal is to align people and processes in complex and dynamic working situations by addressing the needs of employees and companies at the same time. Due to this, it is aimed at the creation and implementation of an open, service-oriented TEL architecture for process-driven learning and information exchange that supports a complete organizational and individual learning process life cycle comprising:

1. the analysis of complex business situations;
2. the identification of individual and organizational learning goals;
3. the analysis of competencies and their matching with individual skills;
4. the definition of appropriate learning strategies and the simulation of learning processes;
5. the execution of improved learning processes;
6. the monitoring of learners' performance according to the goals.

Overall and seen from an organizational point of view, PROLIX significantly contributes to the change management within companies that need to develop into a holistic learning organization enabling the integration of learning processes into daily working tasks. Corporate culture requires the provision of strategies, methods and concepts to satisfy heterogeneous learning needs. Mechanisms and concepts for the organizational introduction of TEL in corporations have to be co-ordinated with the own philosophy and company vision. Aligning learning with business processes based on advanced technology and skill matching is profitable for companies as well as their employees. The key innovation in PROLIX

consists of a process- and competency-driven framework for interlinking business process intelligence tools on the one hand with knowledge management and learning environments on the other. Learning is seen as a key enabler of business process change. Solving this complex task will open new segments of technology-enhanced learning and by providing sustainable and transferable results, which contributes to the emergence of the information society as a whole.

4. Towards Competency- and Process-driven Workplace Learning

In retrospect, the initial wave of eLearning and Knowledge Management initiatives was doomed to failure in the long term. Even the most modern systems, which were able to create and deliver, learning content, remained stand-alone platforms, isolated from business-driven infrastructures. Today, academia and industry have come to the recognition that only those information technologies will remain relevant which proves to be crucial for the creation of value within an enterprise. Therefore, as demonstrated in this paper, most recent TEL approaches put workplace learning activities into a strong business context.

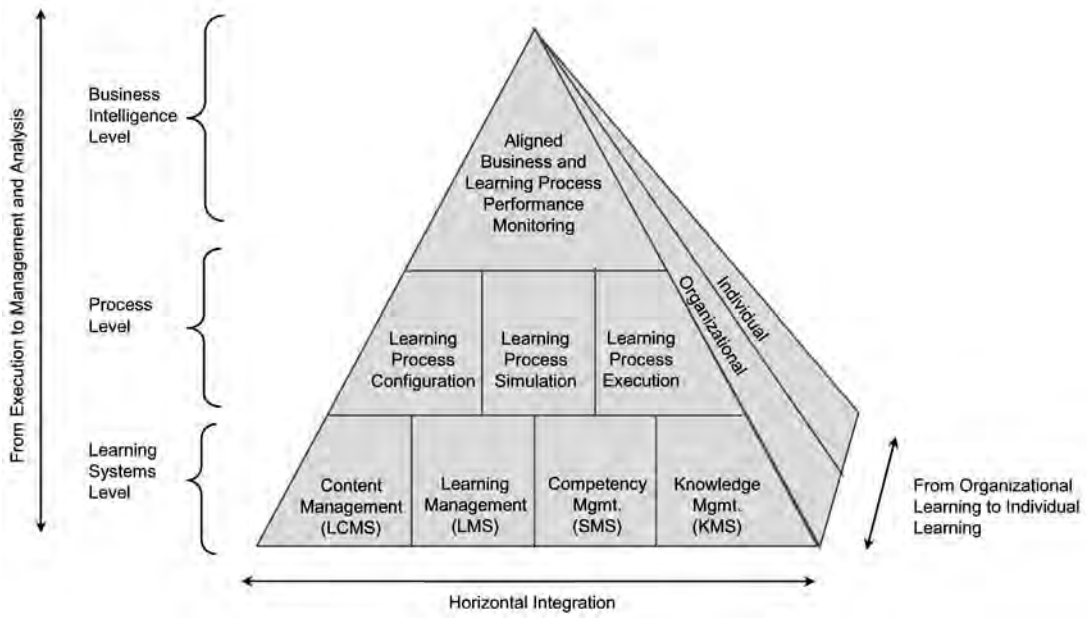

Figure 3. Innovation through integration of Business Process Management, Learning Technologies

In the course of the past years, business processes turned out to be the most common entities to represent a company's business characteristics. Thus, the major goal of business process management – to intertwine activities across functional department and systems – must also be set for TEL management (cp. Figure 3): Integrating content processes such as content production and content delivery into the overall business process architecture pinpoints how eLearning may leverage the probably most crucial business factor: a company's workforce. By empowering internal, technical experts to incorporate their knowledge into training modules "on-the-fly" [16], the EXPLAIN platform integrates the process of content production into existing organizational structures. Contextualizing learning content in a business-driven manner, competencies appear to be the most relevant linkage between business processes and training: functions of a process, carried out by human beings, require a certain competency profile. The gap between the to-be profile and the as-is profile of an individual employee drives learning activities supported by ICT systems such as the aimed PROLIX architecture. Context-driven learning, i.e. learning activities specifically geared to the actual need, depends on cutting-edge technology. However, whereas TEL systems used to be totally driven by the most recent ICT trend, the second wave of eLearning will be driven by the learner's need instead, with technology only being the facilitator of a mostly integrated way of learning.

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THE COMPETENCY-BASED COMPANY DEVELOPMENT SYSTEM

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The Russian Education Society has made the move towards the integration in the European Education Area, created on the basis of the Bologna and Copenhagen Declarations; therefore it is important to develop realistic strategies for this process, taking into account the peculiarities of our Education Society. Moreover the Russian Education Society has taken a step forward in the implementation of the competency-based approach to company development, generally recognized in Europe.

1. Competency-based approach principles

Success in today's business environment requires the combined efforts of all of the company staff. Thus human resources development becomes increasingly important to the success of any organization. Therefore a lot of companies provide training services that will enable their staff to maximize the productivity, define the desired future and engage the company to make that successful future a reality.

Russian enterprises have begun to admit that their main area of differentiation and competitiveness is their people. Each day there appear more cases of business organizations that direct their competitive efforts towards to strengthening their human assets. Generating spaces that promote innovation and lifelong learning are objectives that are supported by training processes aimed at developing labour competencies.

Ulyanovsk Virtual University has been taking an active part in the development and implementation of the competency-based company development system in Russian organizations, companies and enterprises.

The key aspect of the competency-based approach is the development of a competency model – an organizing framework that lists the competencies required for effective performance in a specific job, organization, function or process. The competency-based company development system is increasingly viewed in the context of a company strategic management and human resources development for improving the effectiveness and competitiveness of the company. Moreover many Russian companies and organizations are committed to a staff development policy which promotes the continuous improvement of the organization as a whole and enables the growth of all individuals within it.

The competency-based approach to the company development has its advantages:

- Competency model can be viewed as a common language in the sphere of human resources management;
- A properly developed competency model identifies the real situation in the company and its strategic development plans;
- Competency model is a critical step for shaping corporate culture;
- Competency-based training is a new paradigm in education, for which the interest is growing worldwide and which promotes the continuous development of intellectual, social and emotional components of individuality;
- A company specific core competency model is a platform for the further development of a technical competency model.

Thus a company development system is built on the competency-based approach and includes the following stages:

The first stage is the preliminary analysis of the company and includes the definition of objectives, strategy, aims and values of the company; the estimation of employee training strategic aims in the context of company mission.

The second stage is to specify the target audience (top executives, general managers, specialists) in order to provide individual solutions for their needs and requirements.

The third stage is the selection of the required company development direction:

- Company development on the basis of core competency model. This direction means the core competency model development and top managers training.
- Core department development on the basis of core competency model. This direction means the development of the department competency model and specialists training.
- Problem department development on the basis of core and technical competency models. This direction means the development of core and technical competency models and specialists training.

A company has an opportunity to choose one of the offered development directions and we begin our work in the framework of the chosen direction.

In the context of the forth stage we set training results requirements together with a company representative. To realize the competency-model company development system we need to ensure that people are constantly aligned throughout, therefore we use motivation seminars as a key to keeping people energized and motivating on the same path.

The fifth stage is the competency-model type development in the context of the chosen company development direction.

Company development direction	***Competency model type***
Company development on the basis of core competency model	Core competency model
Core department development on the basis of core competency model	Core competency model
Problem department development on the basis of core and technical competency models	Core competency model Technical competency model

The team of high-qualified specialists from Ulyanovsk Virtual University develops and implements competency models which include competencies with a description of sub-competencies and its indicators.

The developed competency model can be used in different spheres:

- Strategic workforce planning;
- Selection;
- Training and development;
- Performance management;
- Succession planning;
- Rewards and recognition;
- Compensation.

Ulyanovsk Virtual University not only facilitates the competency model development and implementation but also develops study programs and course materials and conducts the education process on the basis of competency model usage results.

The education process is built on blended learning which includes the usage of both distance and traditional technologies. Whereas traditional technologies imply conduct of traditional training and role plays, employee training via distance technologies is based on the Complex Automated Management System of the Higher Educational Institution (CAMS HEI).

2. Staff training on the basis of CAMS HEI and traditional approaches

CAMS HEI is a full-scale system, specially generated to manage the activities of Russian higher educational institutions, in particular, the employee training process.

CAMS HEI consists of two multilevel and multifunctional subsystems: an education and training management, organization and technology system (MOT) and an integrated environment for network-based courses development and implementation also called an educational resources technology system (ERT).

The MOT subsystem has the following characteristics and functions.

Learning is provided in a number of institutions using various educational programs in different locations. The structural-logical schemes are used in schedule drafting. To make the most out of the schedule, this subsystem allows prioritisation of different disciplines.

Form templates are used for drafting final documents. The outcoming Word and Excel files allow the creation of an electronic document archive. The use of employees biographical particulars report constructor provides the requisite documents classified according to specified levels. The variety of existing manuals allows the subsystem to be controlled with ease.

The input information logical control provides the database authenticity. Database information control operating modes are provided. Information selection due to definite criteria determines decision making in the process of subsystem exploitation.

The software has been developed with the use of Visual Studio.NET in C#, Microsoft Access 2000 and Microsoft SQL Server 2000 database management systems; networking process is provided. The existing parole system limits access to data. Context hints and comments in documents have been designed to assist users in their work with the subsystem. Employee archive information organization in a separate database allows to shorten the time for employee information processing.

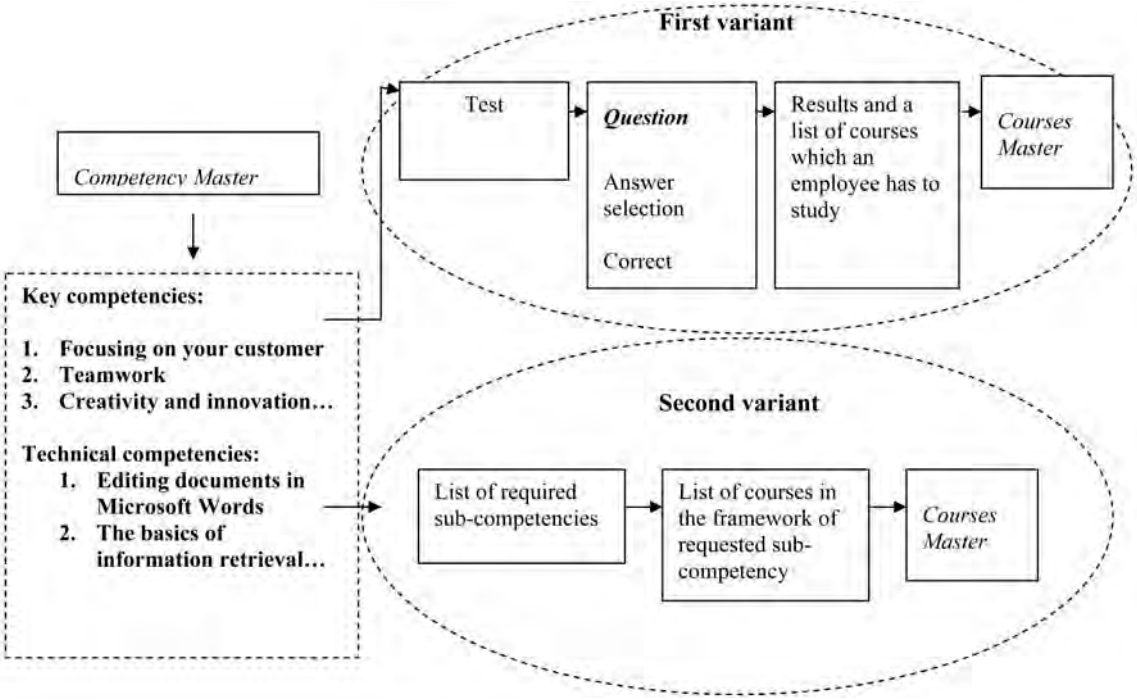
The subsystem has provided automation of the following departments: the admissions office, the dean's offices, the chairs, the office of the head of studies, the personnel department, the business, bursary and accounting departments.

The MOT subsystem functions allow the creation of a pioneer Internet site. The site contains both information and educational components, provides the process of distance learning materials transmission, educational processes conduct and organization of learning via the Internet.

The functions and characteristics of the ERT subsystem are as follows:

- Object-oriented learning materials development;
- Learning objects classification;
- Object automated design;
- Course representation: content, markup and structure search, review and updating;
- Storage of the learning materials in the object repositories;
- Search engines and authorization systems;
- Educational process management (discipline study, educational management, learning outcomes registration, learning interface).

The ERT subsystem provides implementation of the bivariant scheme of employee training. The core scheme units are the "Competency Master" (a combination of methods and means for employee competency testing) and the "Courses Master" (a combination of methods and means for providing courses for the development of the required competencies).



The first variant of the scheme includes a test for every key competency. A test completion report provides a list of courses, which should be learned in the framework of every competency due to the revealed gaps in knowledge. Thus the "Courses Master" provides a list of courses on the basis of results from the "Competency Master".

This process is based on the principles of individualized learning. At this moment we are working on the practice-oriented platform for our training process, therefore we revise and develop a new test system on the basis of business situations and business cases simulations.

The second variant of the scheme means that an employee can get, first, a list of sub-competencies in the framework of every competency and, second, a list of courses in the framework of every sub-competency without testing.

The education process results are transmitted to the employee record book, stored in the MOT subsystem, which also monitors the next training dates.

Ulyanovsk Virtual University supports an employee educational process by means of different intensive training forms (trainings, seminars, brainstorms, individual coaching, workshops and subject conferences) which facilitates the process of qualitative professional knowledge acquisition.

3. Employee training on the basis of traditional education

Employee training is more easily identified and provided when mechanisms of competency assessment are employed on them, thus facilitating the identification of those competencies that are to be developed in each case, and therefore, the training actions that are required. Many entrepreneurial training programmes often end up with the inefficient formula which, because of its repetitiveness, only manages to provide resources in the form of time and money, but they do not imply further progress with regard to employees.

Ulyanovsk Virtual Universtiy not only facilitates the competency model development and implementation but also develops study programs and course materials and conducts the education process on the basis of competency assessment.

Ulyanovsk Virtual Universtiy is highly involved in the employee training process, which is carried out on the basis of the competency model implementation, traditional training conduct and the Complex Automated Management System of the Higher Educational Institution (CAMS HEI), which, as a whole, stimulates the realization of life-long learning principles.

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SMALL BUSINESS LEARNING USING E-PORTFOLIOS

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Abstract

This paper explores the process of designing an e-portfolio for use by owners and managers in small businesses. It examines the issues of learning within small businesses and the evidence of attempts to introduce e-learning into the context of small and medium sized enterprises (SMEs). The paper considers the portfolio approach to e-learning and its possible application to this area. Finally the paper examines possible mechanisms to evaluate the use of e-portfolios by learners within SMEs.

Introduction

Small and medium sized enterprises are a significant feature of the European economy and their growth is seen as a key factor in the development of the EU. According to a recent policy statement "They are the backbone of the European economy, a source of jobs, new ideas and skills and make a valuable social contribution to local communities" (Enterprise Europe Issue 21 27/1/06). Within the UK the Davies Report of 2002 highlighted the significance of enterprise in terms of both economic activity and social participation and strengthened the link between education or learning and enterprise skills. Ulrich (1997) encapsulates this when he affirms that "the importance of entrepreneurial education is derived from the importance of the entrepreneur throughout the education system" (p. 1). Support for small business learning and the development of enterprising citizen's are however two very different policy objectives and whilst they may have some synergy it is sometimes useful to distinguish the precise purpose of a given programme. Thus whilst we would agree with Davies when he suggests that "We think that these distinctive attributes associated with running your own business are relevant to a wide range of occupations and roles" a programme located outside small businesses may not have immediate benefits to those located within them.

This contrast between what du Gay (2004) has termed big E enterprise (or enterprise as part of a market orientation to citizenship) and the actual world of the small business owner is one of several possible dichotomies within the area of small business learning. It is not simply the difference between citizenship and running a small business which is significant but also the nature and role of learning which supports them. It is therefore important to distinguish the precise aims of the learning as well as its context. This is particularly true when exploring both learning needs and the small business as a context for learning.

Learning needs

Despite their obvious similarities different models of enterprise tend to focus on different learning needs. Jameson (1984) identifies three types of enterprise teaching – teaching about enterprise (which could be categorised as awareness) teaching for enterprise (which relates to specific skills for starting up a business) and teaching in enterprise (which relates to growth and development) these can be differentiated either by content or perhaps more interestingly by the locus of the recipient. On the other hand, such distinctions are not always apparent in educational design. Davies *et al.* (2002) provide a useful example of how educators have recently switched from analysing the specific needs of the entrepreneur to mapping these to "benchmark standards" in order to define programmes without any obvious recognition of the role of the educator. This is in stark contrast to those such as Jack and Anderson (1998) who see entrepreneurship education as essentially an enigma involving both science (predetermined knowledge of the domain) and art (in relation to innovation and creativity) indeed some have gone so far to indicate that some elements of entrepreneurship related to the art are non-teachable (see Carswell 2001). Even here however, the debate links back to the nature of the entrepreneur within society rather than the role as manager of a small business.

Small business as contexts for learning

It is not only the form of enterprise which influences learning in small organisations. The relationship between the learner and the business is significant. Cope and Watts 2000 describe the relationship between personal learning and business survival in terms of managing a sequence of crises. Wyer *et al.* (2000) go further to suggest that "the extent to which such a business is able to sustain long term development is dependant upon the owner managers ability to identify and cope with open ended change situation by reconstructing his or her personal constructs and to effect appropriate change in the business" (Wyer *et al.,* p. 242).

Hughes *et al.* note the tendency for small firms to display a short-term view of development needs with lack of resources (both cash and time) to devote to development. This accompanied by fear of poaching and demands for increased wages and an absence of the right kinds of training and support mans that learning activity has tended to focus on the owner manager. The outlook of the owner/manager on the firm's growth and survival prospects emerged as critical in her research "If the owner/manager wants to respond to a business change or opportunity, then he or she will introduce it, and training to meet new skills needs might follow". Learning per se or indeed learning to learn must therefore be seen as a sub-theme within learning to do business.

Use of ICT in SME learning

Salmon (2002) found that "the majority of VLEs appear to be based on an instructional model of teaching" (quoted in Meredith and Newton 2003) even though much of the literature distinguishes e-learning from more traditional approaches in terms of its approach to the learner. Academic courses have struggled with the competing demands of personal versus business learning. Some universities, such as Durham, have sought to use a project as a developmental tool for teaching learners about enterprise. Other seek to create a balance between the use of existing knowledge, business skills (mainly problem solving) and the personal domain often further complicated by the need to conform to academic assessment regimes. Davies *et al.* (2002) suggest to provide a useful representation of the relative weightings of different factors. Their approach (which is not untypical of higher education interactions) cites no less than 14 outcomes for their enterprise programme which can be grouped under 4 broad headings.

- Managing the business (i.e. possessing knowledge of and subsequent application of management models) – 2 outcomes.
- Problem solving – which includes innovation and collective problem solving – 4 outcomes.
- Learning which includes web research together with reflection on learning styles (but has no explicit mention of learning process of experience) – 2 outcomes.
- Together with a number of clearly academic (research related) – 5 outcomes such as wrating reports on problem situations and designing a strategy for a major research project.

In their recent work Moon *et al.* identify learning needs in more focused terms with clear sets of "business needs".

1. Move the business forward: create a culture of constant change.
2. Build a winning team: build a team of people who share your vision and will help you to achieve it.
3. Communicate effectively: establish good communications at all levels.
4. Cultivate networks and relationships: cultivate a network and build relationships with other people.
5. Gain insights: learn from experience, admit your mistakes.
6. Deal with people: understand what makes people tick, be aware of your impact on others.
7. Handle information: retrieve what is important, monitor key trends, improve your search skills.
8. Manage tasks: plan thoroughly, establish priorities, delegate.

9. Focus on process and product: correct balance can mean the difference between success and failure.
10. Take risks more safely: move out of the comfort zone; be proactive, anticipate.
11. Tackle problems: have a repertoire of strategies and creative approaches.

Moon notes that of some of their themes have "more relevance to study courses with prescribed learning tasks and outcomes which would not be relevant to the time poor SME manager" (p. 375). What is needed is a mechanism which allows the small business manager to compile evidence about their business as well as their personal competence. Moreover a mechanism which allows the to use that evidence as a basis for further learning (through reflection) hence our interest in the portfolio.

e-Portfolios overview

There is a developing consensus that e-portfolios will be at the centre of the lifelong learners experience within the next 5-10 years. This is conformed by policy statements at the Europeani and national level in the UK. At the European level we have the mission statement of EIFEL (European Institute for ELearning) which is 'to support the continuing professional development of individuals and the transformation of organisations to build a knowledge economy and a learning society'ii. As part of this project the organisation proposes that by 2010 every citizen will have access to an e-portfolio. In the UK recent statements from the DƒES national elearning strategyiii as well as JISCiv, the QCAv and Bectavi have recognised the importance of e-portfolios. HEFCE has included e-portfolios as one of its strategic aims in its recently announced strategy for e-learning[vii].

What are e-portfolios? Essentially they are tools for facilitating lifelong and lifewide learning. These goals are achieved through the creation, collection and storage of digital artefacts (sometimes called assets) which represent what a person has learned over time. What distinguishes e-portfolios from traditional paper-based forms of Personal Development Planning is the storage not just of text-based materials, but of graphical and multi-media assets which can be archived and presented in any digital format, including the World Wide Web. Another key feature of e-portfolios is that they can facilitate the exchange of ideas, reflections and feedback between the creator of the assets and anyone with whom that individual wishes to share. For such an exchange to continue throughout the lifelong learning journey e-portfolio platforms need to achieve a measure of interoperability so that assets can be portable both between platforms and across frontiers. The recent Memorandum of Understanding reached between HR-XML and EIfEL has established 'a strategic partnership to address the issue of interoperability raised by the rapid development of e-portfolios in Europe'[viii], recognising that such interoperability is critical to the continuing take-up and success of e-portfolios. Luke Vervenne, member of the Board of HR-XML Consortium Europe has declared that 'the rapid development of the e-portfolio worldwide, is an opportunity to increase significantly the efficiency and effectiveness of tomorrow's human resources and public and private employment information systems'. (ibid)

Despite this wide acknowledgement of the importance of e-portfolios there is no clear consensus about their purposes, design or use. As long ago as 1994 the Paulsons identifiedi a key debate about the purposes of portfolios. On the one hand a positivist approach to the use of e-portfolios emphasises 'the purpose of the portfolio is to assess learning outcomes and those outcomes are, generally, defined externally. Positivism assumes that meaning is constant across users, contexts and purposes… the portfolio is a receptacle for examples of student work used to infer what and how much learning has occurred' (p. 36). On the other hand constructivists argue that 'the portfolio is a learning environment in which the learner constructs meaning. It assumes that meaning varies across individuals, over time and with purpose. The portfolio presents process, a record of the processes associated with learning itself; a summation of individual portfolios would be too complex for normative description.' To some extent this debate has informed the design of different e-portfolio platforms, some of which emphasize assessment, both formative and sumative, through competency frameworks and learner profiling tools, whilst others make greater use of weblogs and webfolios to encourage reflective learning.

Current e-portfolio use in UK HE reflects this diversity. e-Portfolios are currently used in a multiplicity of ways: for assessment and accreditation, for self-presentation and job application (electronic CVs), appraisal and personal and professional development. Additionally some e-portfolios fulfil institutional

requirements such as providing evidence based transcripts of student achievements. Most of the currently available e-portfolio platforms permit tutor-leaner interaction without the constraints of physical, temporal or spatial boundaries. Whilst there is a growing body of evidence about the efficacy of e-portfolios in many areas of UK HE, especially where they are used to facilitate reflective practice, there is relatively little research on their use for Continuing Professional Development or work-based learning in a professional context.

The aim of this project is to explore some of the potentialities of e-portfolios for entrepreneurs to:

- support and personalize the learning experience of the independent lifelong learner;
- encourage the development of e-portfolio resources drawn from the 'naturally occurring curriculum of experience' (Thornton 2004) and the sharing of those resources and services between project participants and the accrediting institution;
- facilitate reflective practice through the relationship network established via the e-portfolio, this can be both peer-to-peer, a mentor-mentee relationship as well as tutor-student;
- map existing processes for personal development planning and reflective practice to the use of the new e-portfolio system.

Another potential use of the e-portfolio pilot project for entrepreneurs is to facilitate and promote the development of Lifelong Learning Networks (LLNs). These networks are a recent initiative established by HEFCE, the D*f*ES and Learning Skills Councils which can lead to the accreditation and validation of work-based learning with HE partner institutions.

The e-portfolio project will

- provide guidance on the forms of evidence needed, encouraging the creation of multi-media assets including a webfolio (specifically using Moon's 12 catagories as a potential framework);
- facilitate the organization of evidence and the production of a reflective commentary;
- enable mentor commentary through the sharing of content;
- provide evidence for assessment purposes;
- make the completed e-Portfolio available to an external assessor.

Evaluation

Evaluation of the project will draw evidence from both the students and staff involved in the project. The focus will be on establishing the utility of the e-portfolio (for the purposes of the pilot study *Pebblepad* is the chosen platform) to meet the goals identified above. Pebblepad permits the creation of individual action plans, reflective commentaries, weblogs and webfolios. Some of the evaluation will be carried out using the tool itself and will take the form of reflective diaries and a final questionnaire. Where possible this will be reinforced by focus group interviews (semi-structured) with all participants. The learners will be also asked to compare their evidence to Moon's categories and comment on the extent to which they represent meaningful descriptions of their needs. Finally in order to capture the subjective (Gorton) learners will be asked to evaluate their own learning processes and their impact upon their business activity.

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Notes

[i] http://www.qwiki.info/projects/Europortfolio/epicc

[ii] http://www.eife-l.org/eifel

[iii] http://www.dfes.gov.uk/publications/e-strategy/

> 'We will encourage every institution to offer a personal online learning space to store coursework, course resources, results and achievements. We will work towards developing a personal identifier for each learner, so that organizations can support an individual's progression more effectively. Together, these facilities will become an electronic portfolio, making it simpler for learners to build their record of achievement throughout their lifelong learning'. (D*f*ES, 2005, para 10, page 5)

[iv] http://www.jisc.ac.uk/uploaded_documents/epfr.doc

[v] http://www.qca.org.uk/7192.html

[vi] http://www.becta.org.uk/etseminars/presentations/presentation.cfm?seminar_id=37&presentation_id=115&chunk=2&section=7_1

[vii] Encourage e-based systems of describing learning achievement and personal development planning (PDP). JISC and the academy to continue to investigate the use of e-portfolios and other systems to support learner achievement and progression; and to promote and disseminate good practice in the development of new approaches for the use of e-portfolios and PDP. JISC continues with the development of technical tools to support the use of e-portfolios across institutions and sectors. HEFCE encourages the Europe Unit to support collaboration with European partners on the European Diploma Supplement. JISC and the academy promote links with agencies such as the Universities and Colleges Admissions Service, the Qualifications and Curriculum Authority and the British Standards Institution in developing e-based systems for PDP. http://www.hefce.ac.uk/pubs/hefce/2005/05_12/

[viii] http://www.eife-l.org/news/pressrelease/hrxml_eifel

PERSONALIZED HYBRID LEARNING ENVIRONMENTS FOR A SUCCESSFUL KNOWLEDGE TRANSFER IN SMES WITHIN FOCUS SIAT

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Abstract

By means of an effective e-learning strategy small and medium enterprises (SMEs) can increase their management proficiency levels. The main goal of developing an appropriate e-learning environment to SMEs is to meet their demands concerning knowledge transfer and thus improve their employees' qualifications. In order to achieve this goal it is necessary to develop personalized educational material based on pedagogic and didactic aspects with an individually tailored combination of all different kinds of learning and teaching methods to increase professional development (PD) within every single company. A very promising approach to meet the economic goals of an enterprise is given through hybrid learning environments such as blended learning tasks helping to improve knowledge exchange efficiently. Personalization is the buzzword within the scope of the project FOCUS SiAt and can be considered as an important aspect for teaching and learning in general. This paper addresses different ways of personalizing the learning process in the traditional classroom situation as well as in the distance learning phases. With respect to pedagogic principles, the educational and technological concept of the research project FOCUS SiAt is described. Subsequently, aspects of the personalization effort within the scope of the project are shown. Finally, findings of FOCUS SiAt are reported.

1. Introduction

Professional development (PD) is a buzzword in today's business world. Due to high training costs it is especially difficult for SMEs to offer enough training to their employees. Remarkable advances in computer technology and the progress of the Internet have led to new approaches in learning and training, which are summarized under the term e-learning. This paper highlights the benefits and analyses critical aspects that might occur when introducing e-learning based knowledge transfer to SMEs. The main goal of developing an appropriate e-learning environment to SMEs is to meet their demands concerning knowledge transfer and thus improve employee's qualifications. Pedagogic and didactic requirements for the e-learning settings will be pointed out and other concepts such as a personalized teaching approach adapted to the needs of every individual learner will be described and implemented. Due to the fact that pure e-learning will never replace traditional teaching, this paper is dedicated to individually tailored combinations of all different kinds of learning and teaching methods helping to increase PD within every single company.

This paper is structured as follows. Section 2 describes the research project FOCUS SiAt, a European initiative for cross border learning between Slovenia and Austria. Section 3 is the main part and gives an overview of the estimated impacts and target groups, the educational and technological concepts, such as blended learning and didactic aspects especially tailored for SMEs, and experiences made. Section 4 concludes the paper and gives an outlook to future activities.

2. The research project FOCUS SiAt

Focus SiAt, the abbreviation for "Fostering Cross border e-business cooperative environment through usage of advanced networked e-learning and e-business services", was an international project founded by the PHARE Cross Border Region Goes Digital (CRBGD) [1] and carried out by the Institute of Automation and Robotics at the University of Maribor, Slovenia, by the Jozef Stefan Institute at Ljubljana, Slovenia, as well as by the University of Applied Sciences Degree Program in IT and IT-Marketing CAMPUS02 in Graz, Austria.

The general objective of the project was to increase the management proficiency levels in SMEs, local authorities and other beneficiary bodies through improvement of knowledge skills of employees and unemployed people in the regions. These learner groups have been supposed to be prepared for e-business by changing the ways of thinking and working. In other words: this research project aims to make the participating students capable of understanding how the knowledge economy infrastructure works and how it can be used in their everyday working environment.

The training within FOCUS SiAt project was performed by holding courses including e-learning phases and the usage of appropriate information and communication technology (ICT) tools for chosen attendees. Each learner group received ICT based training by the use of the EducaNext [2] portal in combination with the help of the teacher. Due to different learning and teaching styles, the variety of the members of the learner groups and their different demands and expectations, we tried to promote new methods of value-added training and coaching through the usage of best practice models and business cases that encourage the learner and are essential in the digital world. According to the expected results defined within the research project FOCUS SiAt, the following summary points out what objectives could successfully be achieved, and describes problems that occurred within the learning environment.

ICT technology was the first barrier that had to be overcome due to the fact that few participants were not at all familiar with it. Investigating the pedagogic and didactic aspects and identifying an appropriate definition of the blended learning approach helps to succeed in overcoming the difficulties. Due to the fact that at the outset EducaNext and its database was fraught with problems flexibility was in demand. CDs helped to bridge the gap during the first teaching sessions.

The design of a personalized teaching approach adapted to the needs of every individual learner aimed towards:

- A participatory mode in all aspects of learning and decision-making;
- A climate of trust in which curiosity and the neutral desire to learn can be nourished and enhanced;
- Helping students to achieve results they appreciate and consider worthwhile, to build their self-esteem and confidence, while at the same time, keeping to the curriculum;
- Uncovering the excitement in self-initiated discovery, which leads students to become lifelong learners.

Additionally by designing this special approach the teacher's attitudes of realness, authenticity or transparency; acceptance or respect and empathic understanding extremely increased and has shown to be most effective in facilitating learning. Furthermore it enables teachers to grow as persons finding rich satisfaction in their interaction with learners.

3. Educational and technological concept

As there is no educational concept for the research project, we had to build up our own, where we decided not to use a fully featured e-learning system as described e.g. in [3], because we simply do not need most of the functionality. Instead, we use the EducaNext portal which provides all necessary functions to create the learning content and allows us to offer learning resources to the attendees. Furthermore, the system records some statistical information about booking and accessing the resources using a slightly extended learning object metadata (LOM) IEEE standard (see [3]). The lecturer is responsible for personalizing the content according to our concept.

3.1 Blended learning approach within SMEs

Blended learning is described in general as a combination of traditional forms of teaching and learning in seminars where teachers and learners come together face-to-face on the one hand and e-learning elements in the form of computer based training (CBT) and web based training (WBT) on the other hand. This should be extended to cover the integration of different forms of teaching and learning regardless of the issue of technology support. For example, such a program might start with a kick-off

course that brings together learners in co-presence. Subsequently, a CBT/WBT would bring learners to a roughly similar level of knowledge in the domain of expertise addressed. Another seminar in co-presence might then allow building on this or to discuss and apply what has been learned, for example in the form of role playing. This might then be followed by another e-learning phase that provides additional information and ongoing exchange with co-learners through discussion forums.

Elements of blended learning might be presentations or lectures, self study activities, cooperative learning activities, tutoring sessions and tests. Rather than following a strict series of events of instruction (gaining attention; communicating educational goals; connecting to prior knowledge; presenting learning materials; supporting retention; application; provision of feedback; testing; supporting transfer), it has been proposed to take a more flexible approach. The following aspects have to be kept in mind to design a successful learning environment:

- Information about course and content providing orientation;
- Learning materials;
- Tasks and exercises provided for learner activities;
- Communication;
- Cooperation that provides support for learner;
- Testing that provides orientation and motivation.

According to Singh [4] blended learning is defined as follows: *Blended learning focuses on optimizing achievement of learning objectives by applying the "right" learning technologies to match the "right" personal learning style to transfer the "right" skills to the "right" person at the "right" time.*

3.2 Motivation for blended learning

Cost-saving arguments have been replaced with a more sophisticated and practical understanding of how to integrate technology into an overall learning strategy. The different views why learning professionals are interested in blended learning raise interesting differences between the corporate and academic sectors. Sparrow [5] reports on an online survey conducted by Training Magazine in June, 2003 that the following reasons have to be highlighted when developing blended learning solutions:

- Ability to match learning styles (80%);
- Individualization in tailored solutions (70%);
- Improvement of learning rate (62%);
- Exploitations of the investments they have already made in re-usable training resources (59%);
- Shortage of time to use purely classroom events (57%).

Further advantages related to the project FOCUS SiAt are: pedagogic richness, access to knowledge, social interaction, personal agency, cost effectiveness, and easiness of revision. Additionally it has to be pointed out that motivating and activating the students can be put into practice without great effort.

3.3 Learning and e-learning process

To point out that there is a close relation between learning and e-learning it is absolutely necessary to be aware of various learning and teaching methods. Especially in the field of basic business economics, where students do not have to learn a profession but only need to study basic terms such as liquidity improvement, profit centres, balance sheet analysis or key data students need more than only theoretical knowledge. They have to improve their practical experience and therefore increase relating skills. This leads to the statement that according to knowledge transfer pure learning by using a behaviourist approach is important but designing practice-oriented tasks within the scope of cognitivism and constructivism are highly effective in relation to learning outcome.

Whereas traditional teaching and e-learning account for pedagogic and didactic aspects, in the field of e-learning motivation has the highest priority to be kept in mind. Due to less personal contact between learner and tutor the student is solely responsible to their learning progress. In this kind of teaching students cannot compare each other. It is therefore necessary to design appropriate arrangements and

features to compensate for this lack of interaction. To back up the learning progress of the students, appropriate learning environments should not be constrained to enlarge the students' supply of knowledge structures, but should equally address personal and social growth. This requires the facilitator not only to follow the requirements of the curriculum, but also to strive for understanding the students' meanings and feelings and to provide a transparent, open, and respectful learning climate in which students can work on real problems they wish to solve personally.

3.4 Didactic aspects

The consideration of didactic aspects in order to develop a new teaching approach raises the question of what exactly the differences between traditional teaching and teaching within e-learning environments are. Integrating new technologies does not really push for new models in didactics. According to various definitions of didactics and following Baumgartner's idea [6], terms such as target group analyses, focusing on learning goals, taxonomies, and social organization are found in all different kinds of teaching. The only thing that has to be taken in consideration is that by using new technologies, i.e. new media, the learning content has to be adapted to these facilities. A heuristic teaching model, instructional design, target group analysis, pointing out the expected improvement of competences and interactivity are the basics of every adaptable learning environment and thus are an efficient tool for designing an appropriate database.

3.5 Instructional Systems Design (ISD)

In order to meet the pedagogic and didactic aspects defined and to achieve the highest possible outcome of the project, all the learning materials whether these are scripts or new media, a guideline as shown in Figure 1 has been taken into consideration by designing learning and teaching process.

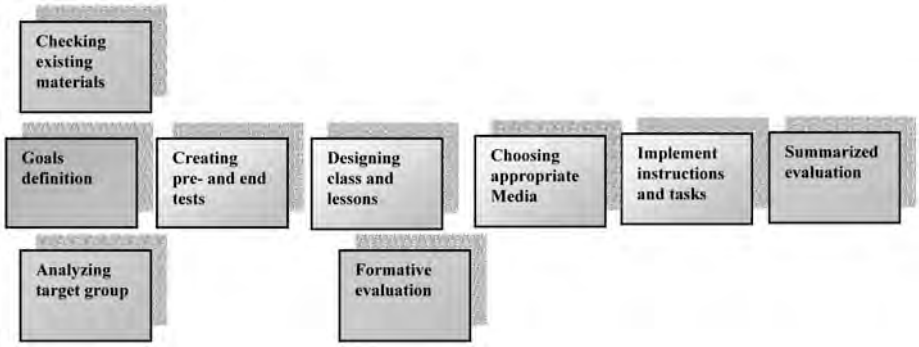

Figure 1. Instructional System Design (ISD) – extended model

3.6 Competencies

A basic principle when designing learning content is to aim for effective improvement of all kinds of competences. Various learning styles and every single individual with their own learning behaviour need a specific design of learning tasks. Thus a basic competence needs more instructional learning content whereas social and decision making and responsibility ask for higher collaborative and social learning methods. Figure 2 illustrates different kinds of competencies.

Basic Competencies	Professional Competencies	Social Competencies	Decision Making and Responsibility	Learning Competencies
ICT skills	Improvement by individual expertise	Communication	Innovation	Knowledge-oriented
Languages		Team Building	Creativity	Learn how to learn
Basic Business Economics		Conflict Management	Realization	Self-management
Project Management		Leading	Practice	Reflecting Practical Experience

Figure 2. Competencies overview

Besides the learning paradigms depicted so far, it is essential to consider some more didactic principles to meet the demands of an appropriate e-learning concept pointed out in Kerres [7]. One of these principles namely interactivity has had certain significance for FOCUS SiAt and is therefore described in the following subsection.

3.7 Interactivity

The interaction between the main actors, student and tutor, may be able to take place either in synchronous or asynchronous activities. The content can be adopted whenever necessary, which gives teacher and student the opportunity to react on any changes. This is the main idea behind appropriate e-learning structures – immediate adoption on demand. In practice this idea helps the learners to improve their social skills and the collaborative learning of content. However, community models bind learners in time, forcing regular sessions or at least group-paced learning.

3.8 Experiences made within the different target groups of FOCUS SiAt

In reference to the Joint Programming Document 2000-2006 Interreg Slovenia-Austria PHARE CBC [1] members of a group have to meet one of the following prerequisites: to be unemployed, work for a local or regional authority or work for an SME.

Within FOCUS SiAt three courses adapted to three groups have been designed. The first group consisted of eleven people from Knittelfeld, Upper Styria. Five of them work for a small tree-nursery and six are unemployed. The focus of the teaching model for this group was face-to-face teaching. The two other groups were combinations of unemployed and employed participants living somewhere in Austria and thus emphasized the teaching model to e-learning environments. Their polychromic approach to the main topic fundamentals on business economics and a very different basic knowledge in computer skills meant a high challenge when designing an appropriate learning environment. The following Figure 3 describes the different amount of face-to-face-teaching and e-learning sessions.

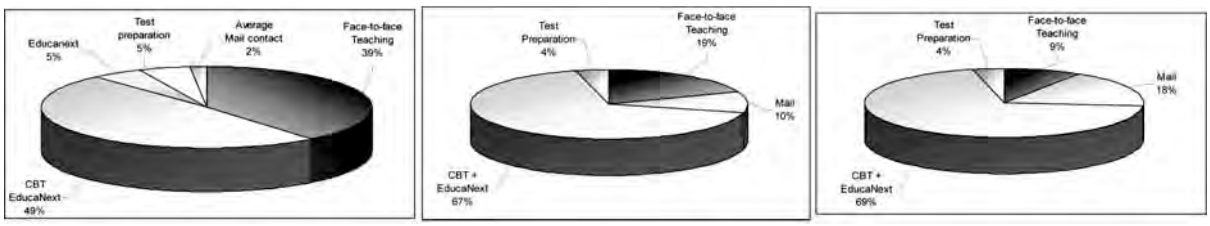

Figure 3. Different amount of face-to-face teaching and e-learning sessions

A statistical evaluation in reference to learning outcome, drop-off-rate and practical relevance pointed out, that within target groups as defined in the project FOCUS SiAt, it is indispensable to design a pure e-learning environment without tremendous loss according to learning outcome. According to this

statement it is vital to describe the results of group 3. Within this group there was a minimum of face-to-face teaching which leads to a drop-off rate of almost 50%. Additionally one participant failed the end-test.

It has to be stated that the relation of face-to-face teaching and e-learning tasks within the blended learning approach has to be 50:50. Otherwise it will be impossible to meet the expected objectives and to achieve the estimate professional development within a company.

4. Conclusion and future prospects

One of the key aspects of blended learning is the gentle approach to blend traditional lecture room style with electronically assisted courses. The major aspect that has to be considered is to meet the demands of both the student and the tutor. The combination of face-to-face learning and e-learning has to fulfil the main aim – developing a personalized teaching approach to the needs of every individual learner. This teaching approach provides choices, activities, project based learning and opportunities for student interaction and active learning.

According to learning theories professional development (PD) within SMEs asks for behaviourist, cognitive and constructive approaches. Pedagogic and didactic aspects are details that have to be kept in mind when planning any kind of learning tasks. Didactic aspects professionally executed in e-learning strategies have a strong impact on the so-called return on education (ROE). Every single effort invested in target group analyzing, competence improving and student motivating is extremely effective to the learner's outcome. Furthermore, it influences the collaboration and communication within an enterprise and enforces effective knowledge transfer within a company. Within the research project FOCUS SiAt blended learning features will be used due to the fact that an individual combination out of face-to-face-teaching and e-learning tasks meet the expectations of an extremely effective e-learning environment to improve employees' competences.

In cooperation with other educational institutes scenery of knowledge transfer is supposed to be put into practice which shall be distinguished by personalized further education concepts to SMEs. Since January 2006 there is a cooperation between the Campus02 and the "European Business Driving License" (EBC*L) – already spread out and well known within 11 European countries where the above mentioned findings are successfully implemented within their teaching approach. These institutions broaden their horizon in the scope of advanced vocational training. An educational platform will be provided and coordinated to the individual demands of every single SME in reference to the pedagogic, didactic and blended learning approach described within this paper.

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INTER-ORGANISATIONAL LEARNING APPROACH IN A SECTORAL SME'S CLUSTER

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Introduction

One of the key features of the European Furniture Industry, as in many industrial sectors, is the high level of fragmentation and the limited dimension of the enterprises. The small size of the enterprises makes difficult to acquire the necessary competences on the weakest areas and to detect and to recognize the knowledge that their human resources acquire informally through the daily tasks performance. Big organisations and companies cover those deficiencies through innovative approaches, such as Organisational Learning and Lifelong Learning initiatives, to foster the transference of knowledge and the circulation of learning through mechanisms to increase the value of informal learning.

However, we consider that in a sectoral SME's cluster have some characteristics to allow them to adopt an Inter-Organisational Learning approach. The general level of knowledge and information built up in the cluster can act good as such, if the level of trust is sufficient to generate an easy and mutual exchange of both tacit and codified knowledge.

The MWEBLEARNING Approach, Collaborative Learning among SMEs Networks

MWEBLEARNING Project, approved by Leonardo Program, aims to collect, consolidate and disseminate good practices which aid to define a new approach by developing an Inter-Organisational Learning Community through Mediator Institutions as dinamisation elements.

The high concentration of enterprises into a sectoral cluster characterizing the participating regions offers an excellent chance for development in the global market, providing that these enterprises would be able to act together under a system approach aided by a Mediator Institution. ICT can facilitate an exchange of good practices and the transference of results and techniques among the companies in the sector, allowing the development of innovating devices for identification, assessment and valorisation of formal and, mainly, not formal and informal internal learning processes, in order to allow the organization (in this case, all the participating enterprises) to recognise and put in value acquired learning.

The participants Industrial Cluster are inter-connected firms working in a particular geographical concentrated location, with specialized suppliers and service providers all in proximity. What the firms have in common is that they work in the same geographical area and all contribute to a system that produces goods that are characteristic of the district. Cooperation, together with competition, are the features of these industrial clusters.

The greatest advantages of a district based productive system in the furniture sector are the following:

- Flexibility, which allows the region's manufacturers to adapt production to the rapidly changing needs of the global market and to survive periods of economic recession;
- Quality and Style which compete with low prices of products imported from Asia;
- Management stability due to size dimension (number of employees) but also to direct control on a critical mass of operations tied to information management and utilization system;
- A friendly environment, where the cultural, political and social acceptance of the enterprises gives a sort of benign differential compared to firms acting in non-district areas;
- Knowledge of all elements of costs and selling prices due to concentration of suppliers in the same area;

- Geographical proximity which facilitates the formation of trustful social networks, with firms linking to each other to form complementary resources synergy;
- Strong buyer-supplier linkages;
- Speed circulation of idea, information and know-how within the cluster;
- The presence of a common culture, values, languages and technical knowledge.

The integration of social context leads to the development of a strong sense of identity: the workers feel as part of a successful productive system, which is not only the source of their income, but also the image of an entire community that shows entrepreneurial abilities and reputation to a national and international level.

However, the weakness of all this furniture productive system is mainly affected by:

- Asian furniture companies which are producing goods that are cheaper and sometimes the exact copies of the one's manufactured by Italian companies;
- The small size of companies sometimes be a weak point in terms of limited number of professional managers and chronic lack of financial resources;
- Low profit due to competition;
- Lack of trained staff;
- Delays in ICT innovation and territorial marketing;
- Lack of facilities;
- A tendency to privilege the imitation of competitors rather than innovation through investments in R&D.

The partnership was an issue treated with special care. They had to be institutions that could develop the role of *"intermediate organisations"* that could provide interesting knowledge and experience (in areas such as technology marketing, distribution and export previously identified as key competencies for the furniture SMEs) and located in areas particularly related to the furniture sector. For this reason, the partnership was finally composed by institutions interested in the adoption of the results of the Project in their organisations, activating their regional networks and promoting the creation of a real European *Inter-Organisational Learning Community* of the furniture sector.

Achievements in Progress

The project has just reached its first half and its main achievements have consisted of:

- Analysis of the Learning Organisation concept, substantially not applied in the furniture sector nor in SME networks;
- Identification of Benchmarking indicators that will be key to the definition of a "Learning Community" and its specific requirements of this kind of enterprises;
- Analysis of the main training needs of the furniture clusters and the Imperative Learning Needs, which will be the basis of the experimentation;
- Creation of an embryonic network of SMEs in the partner regions;
- Set up of an efficient communication system between the enterprises and the "Intermediate Organisations" and empathy has been widely promoted.

The design activity has been based on the following principles:

Inter-Organisational Learning Community: that is, we are trying to define a model based on the creation of an "SME's Community".

Innovation Oriented: focus should be given to the generation of innovation within the enterprises. For training on basic skills we must use other training approaches, although our model can be complemented by "repertoires of resources" facilitating the access to training on such competencies.

Benchmarking Approach: the benchmarking approach may allow the analysis and comparison between the enterprises and the detection of those areas with potential for innovation. Therefore, two different systems based on Benchmarking must be designed and implemented in our project:

- Formative: it is the tool enabling a self-diagnosis for the participating enterprises and the definition of those areas presenting an innovation potential. This is a Sectorial Benchmarking approach addressed to all the target users of the project which is useful to identify the problems/lacks to be solved by the approach that will be tested.
- Scientific/multiplier: it tends to assess the way in which a group of enterprises become Learning Organisations. It must be the basis for the Dissemination and Multiplication Plans both at regional and general level. The objective is to improve the role of enterprises as traditional "learning centres", identifying those processes improving the learning capacities of the enterprises and the individuals making them up. This is a Collaborative Benchmarking approach basically addressed to the project partners.

Research-Action Principle: it means that observation, implementation and evaluation activities are simultaneous and they produce a virtuous circle of improvement.

Work-based Learning: that is, it must produce a contextualized learning directly applied to the activity of the own enterprise (learning takes place within and for the own labour performance).

The last two concepts can lead to the conclusion that learning should produce a direct impact within and between the participating enterprises.

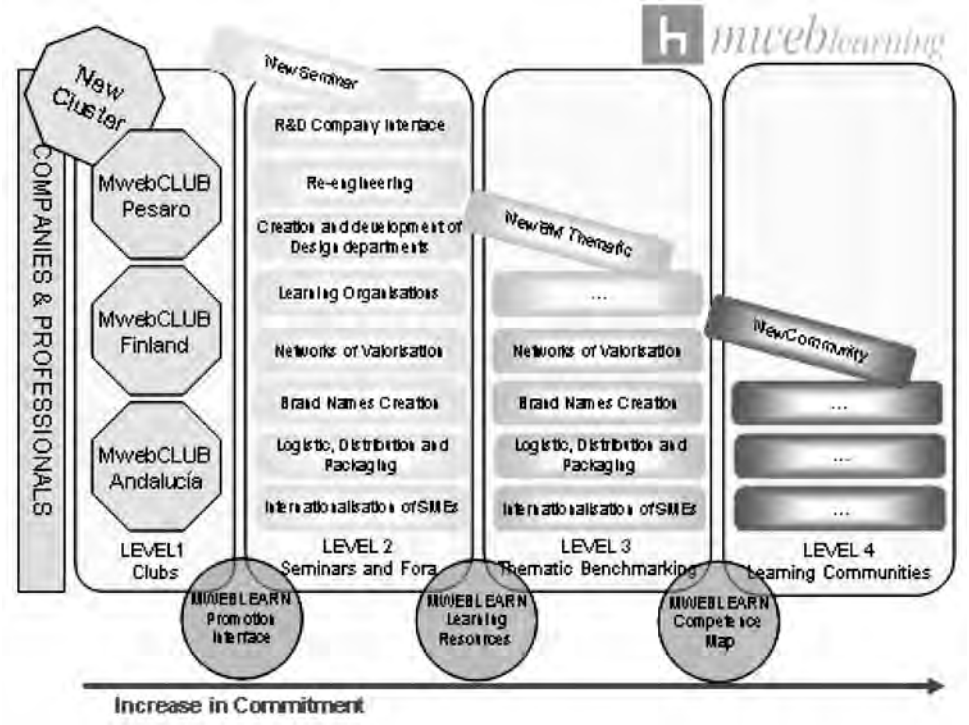
Informal Learning: it has to allow the recovering of informal learning, creating the necessary conditions for its recognition. In this sense, the Intermediate Organisms play a key role since they are the ones able to help in the certification of learning.

Knowledge Management: the system must help to recognise and manage the knowledge as a way to pertain to the community and not just to the individuals. That is, it must allow the consolidation of knowledge.

Finally, an I-O Learning approach was defined, that Hill experimented in April 2006 and that is based on the following operational features:

- It will allow a simplification of the speech, that is, close to the organisations that will be involved in the experimentation;
- It will also promote a wide and volunteer involvement of the enterprises and its workers through the identification of critical issues.

The model, which, up to the moment, has been named informally the *Bus of Inter-Organisational Learning* (due to its dynamic orientation and appearance), will be represented as a process of 4 phases or levels that allow a gradual increase in Commitment.



We will analyse each phase including a short description according to 3 parameters: Description of level, Benefits for the participating SMEs and Commitment.

NIVEL 1 – MWEBLEARNING Clubs

Description of level

Creation of networks of enterprises in different industrial districts of furniture around Europe in order to facilitate knowledge and exchange of experiences.

Benefits

- Be part of an international network
- Visibility of your enterprise
- Access to international references
- Access to descriptive information on how do the rest of enterprises of the clubs operate
- Involvement in a cooperation project

Commitment

- Register in the club
- Provide information (generic and standard) to differentiate your district
- Provide opinions to questions for the development of the project

NIVEL 2 – Seminars & Fora

Description of level

Seminars on themes in which a critical need of change has been identified:

- Attend the seminar as a meeting point
- Register in the on-line fora

Benefits

- To receive updated information from international experts on critical themes
- To interact with others about these themes (creation of network)

Commitment

- Register in each seminar
- Identify 1 or 2 key persons of your organisation to take part
- Attend seminars
- Provide feedback to update the seminars and cooperate in the definition of contents the training course may deal with

NIVEL 3 – Thematic Oriented Benchmarking

Description of level

- Develop a thematic self-diagnosis through simple tools (questionnaires) which shows the situation of your own organisation
- Share the results (presenting the best results reached and exchange impressions with other members of the group)

Benefits

- To find out strengths and possible improvements, comparing your SME in an "indirect" way with other enterprises of your own region and from abroad
- To receive from the responsible experts support for the analysis of your organisation and the definition of improvement plans

Commitment

- To carry out an honest an objective analysis
- If support is requested, share the results with the intermediate organisation and the expert (both will assure confidentiality)

NIVEL 4 – Learning Communities

Description of level

Groups of enterprises which share progress in knowledge and practical operations according to:

- A concrete interesting content
- Some specific learning objectives
- A direct relationship with the working environment

Benefits

- To learn through the comparison and exchange of direct experiences
- To measure results regarding processes of change in other enterprises
- Access to experts and selected resources

Commitment

- To exchange experiences (with the reasonable limits with potential competitors)

Conclusions

Has MWEBLEARNING found a successful approach to help furniture EU companies to meet the challenge posed by Asian competitors? Will we contribute to the progress of Lifelong Learning by applying a brand new inter-organisational learning model for furniture companies? Will this model be transferable to other industrial sectors? Well, the first pilot activity will start in April 2006, with around 100 companies of the industrial district of Lucena (Córdoba, Spain) which will be involved in the "bus" in 4 thematic areas, all related with industrial internationalisation…

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E-LEARNING TO MANAGE KNOWLEDGE WITHIN SME: MYTH OR REALITY? THE CASE OF WALLONIA

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Executive summary

In a context of economic globalisation, organisations are being forced to adapt faster to the changing demands of the market if they want to maintain their competitive advantage. This versatility calls for a capacity to manage the information flow and to put it to strategic use. Having broken down the spatial and temporal borders, the Internet has opened the flood doors to an uninterrupted flow of information and new ideas that allow the organisations to evolve and to stand out from competitors by offering new services (the trend towards a more service-based economy). The learning capacities of the workforce are a key factor in the versatility of companies. The face of learning is changing because the needs for a renewal of knowledge have intensified. The Internet, and e-learning in particular, are a response to a far-reaching change in our knowledge system. The current formalised and rigid learning system (limited in time and based on a dynamic of transmission of "lasting" knowledge) is no longer adapted to the needs of the globalised economic world in which information enjoys a strategic position. This system is gradually disappearing and being replaced by a system centred on the individual and his capacity to use the information made available at all times by the ICT in order to interact with his environment. E-learning embodies this new dynamic in view of the fact that it allows the individualisation of the training channels, as it is extremely flexible and uses the resources available on the web. It will never completely replace the existing educational system but it will provide the indispensable complement that allows the life-long learning of the workforce.

In this environment, where the human capital is increasingly strategic, the management of knowledge and life-long learning are gaining in importance. However, the surveys conducted into the uses of ICT (Information and Communication Technologies) within companies by the Walloon Agency for telecommunications[1] reveal a low degree of dissemination/formalisation of training policies within SMEs as well as a very limited use of e-learning for the updating of the knowledge of the workforce. While putting into the European context the observations recorded in Wallonia, this article sets out to analyse the factors that prevent the SME from making the most of e-learning at its current stage of development and to pinpoint the measures that will allow the dissemination of e-learning in the SMEs as a life-long learning tool.

The intensification of work in the wake of the ICT is steering organisations towards new methods of learning

New information and communication technologies have allowed companies to control their costs, reduce their deadlines, increase their productivity and improve the quality of both their products and their services. That has not been achieved without consequences for working conditions. By controlling time and error in the production process, the human capital has also come under a constant and triangular pressure. This pressure is exerted by the use of technological tools to encode the right information at the right time and in the right way. The services that are corollary to the main activity are being increasingly developed, which leads to the introduction of flexible working hours, the opening of permanent help desks as well as use of remote services. This far-reaching change in economic activity is accompanied by a refocusing on core business and the use of subcontractors for related services. In other words, the services but also the business relations are becoming increasingly complex and are involving an increasing number of actors. This complexity can only be managed with the support of ICT. To take only one concrete example, factories that produce 24 hours a day need an automated system to manage the presences of the various teams, the pay, the leave, the illnesses and

[1] RAIMOND HÉLÈNE, DELACHARLERIE ANDRÉ (2005) *Les Usages TIC au sein des PME wallonnes en 2004,* Agence Wallonne des Télécommunications, http://www.awt.be

availabilities of each. The operators in the field are called upon to encode themselves the information necessary to register the beginning and end of the work. The computerised systems will also record whether this information has been encoded in time, whether the workstation was shut down because of a problem, etc. In short, workers are not only required to carry out their job properly but must also be in a position to demonstrate a capacity of abstraction to use the IT tools, especially if the latter are integrated. In fact, applications that share the same database and whose action is regulated by a meta planning tool (ERP) will share the same information. If this information is wrong, the error is increased as many times as it is taken up by the various integrated applications. The single encoding of the information according to a procedure that is codified within the framework of optimal profitability, introduces the measurement of the lifestyle performances of the versatile organisations. The workers must be available or at least indicate their availability in the system. These new working conditions make the traditional training methods obsolete.

Companies that keep the size of their workforce to a strict minimum can no longer allow their employees to take entire days off to attend training courses. The pace at which knowledge must be updated is intensifying, which means that training courses must therefore be flexible and short so that they can be recurrent and affordable from the point of view of cost. Finally, as technologies are increasingly part and parcel of the parent activities, which are fundamentally non ICT, it is becoming unthinkable not to take advantage of interactive multimedia resources to train workers. This is where e-learning comes in useful and becomes indispensable for the evolution of the human capital of our companies. It makes it possible to carry out simulations without negative consequences but that are as formative as training in the field. Games, role plays, video and hyperlinks make it possible to organise training courses that are much more diversified and more complex than book-based resources. The physical training courses will, however, not disappear as man will remain a social animal but their benefits will be increased tenfold by the pre and post training support provided by e-learning.

Finally, e-learning has become a service to the client on its own. The amount of information associated with new products and services is such, that educational softwares are supplied with these products and services to allow customers to fully benefit from what they have bought. For example, E-bay, the famous Internet sales platform, now offers an e-learning session on its site to learn how to post a sale, how to monitor the auctions and, if necessary, how to adapt the price of the article in line with the behaviour of the potential buyers. The same approach for the designers of video games who propose educational softwares and training modules to learn how to master the controls and subtleties of game plots. These are only two examples among many. As the ICT become an increasingly integral part of human activity, both economic and social (communities and meetings via the Net), ICT are becoming indispensable if one wants to take part in these human activities.

Knowledge acquisition is undergoing a revolution as the tools being used to learn are themselves undergoing a deep change. The human capital on which the use of these depends is becoming more strategic than the physical capital while the use of the means is becoming more crucial than the means themselves.

Finally, the ageing populations of developed countries are tending to reinforce this phenomenon by broadening the range of generations required to cohabit within companies. Young people, due to their media consumption, develop different expectations and experiences with regard to knowledge and learning.

SMEs: the target public of e-learning?

99% of the European economy is made up of by small and medium-sized enterprises. They represent 74 million jobs in the Union of 25[2]. A small percentage of European SME has adopted e-learning and those who have done so often come from the IT/telecommunications and related services sector. In Wallonia, this percentage stands at 6% and at 16% in the ICT sector. The reluctant adoption of e-learning by SMEs contrasts with the practices of larger companies that also come from the IT/telecommunications and associated services sector, which now satisfy 60% of their training needs thanks to e-learning[3]. A recent study carried out by the CEDEFOP and the

[2] EUROSTAT, http://europa.eu.int/comm/eurostat

[3] McCullough, Colin (2005) *Obstacles to small business usage of E-learning in Europe,* http://www.webpronews.com

European Commission[4] puts the spotlight on certain intrinsic characteristics of small structures that prevent them from making the most of e-learning as it now stands. The AWT has analysed these characteristics in the light of interviews which were held with organisers of training courses as well as in Wallonia with higher schools who have begun to post a part of their training courses on-line.

One of the first conclusions that AWT has reached is that learning in the workplace and in particularly in SME mainly takes place during the resolution of problems and exchanges with other colleagues in the course of collective work or informally in the day to day life of the organisation. In other words, SMEs do not formalise their training policy and do not identify their needs.

To encourage this learning, even if informal, it is therefore necessary to analyse it and to put it into relation with the profiles of the company's functions. This work is rarely done within SME due to a lack of means, time and as well a lack of a real perception of the strategic importance of this type of work.

The obstacles to the adoption of e-learning that are specific to SMEs could therefore be summurized as follows:

- the most developed learning processes are informal and linked to problem resolution => difficulties of identifying needs and the related solutions (lack of awareness);
- the means are limited: financial means, human resources and training skills;
- the training needs (excluding basic office automation) are very specific (a lot of small self-employed workers);
- the solutions on the market do not fit these specific needs because sellers of e-learning solutions see SME as a poor market;
- the target groups of an e-learning training course within a SMEs are limited: it is even often one single person;
- few SMEs have both an adapted infrastructure and a broadband connection;
- the information provided by the search engines on the Internet gives an illusion that workers have critical knowledge at their disposal to carry out their job properly.

As we see, the SME do not yet represent a market for e-learning as their economic capacities are limited and the integration of the human resource training strategy in the company strategy is in its infancy.

The appropriation of e-learning by SME will not take place, except for those that are active in "technology centred" fields, unless e-learning actors take into account their learning characteristics when developing the e-learning tools. The SMEs first need to become aware of their training needs and to formalise certain informal learning courses.

Secondly, the training initiatives that will subsequently be set up must imperatively respond to a complex need (the skill to be acquired is necessary for the smooth execution of the work and prompts the positive intellectual tension linked to learning). Thirdly, learning must be done actively and not passively, thus taking advantage of the intrinsic benefits of e-learning (see on this subject the table comparing e-learning to traditional learning in Annex 1.).

Finally, the matter of infrastructures and the software solutions is crucial. Actually, the development of cheap e-learning solutions is a myth. Agoria TIC (Professional Federation of the ICT sector in Belgium), which has provided its members with an e-learning platform for computer engineers, experiences average development periods that vary from 12 to 18 months according to courses, each of which required a pluridisciplinary team of 2 to 3 persons. In terms of average costs, the American studies currently available estimate that one hour of an interactive multimedia distant course costs between USD 20,000 to USD 80,000, depending on the complexity and specific nature of the subjects in question[5].

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[4] CEDEFOP FOR THE EUROPEAN COMMISSION (2003) *E-learning in life-long learning, in particular the workplace, targeting small and medium-sized companies,* Final Report (EAC-REP-003), http://www.cedefop.eu.int

[5] MCCULLOUGH, COLIN (2005) *Obstacles to small business usage of E-learning in Europe,* http://www.webpronews.com

Furthermore, a "minimum" infrastructure is "required" for each "e-learner": a new generation PC, a sound card, a high speed Internet connection and, if possible, premises that make it possible to limit the interferences between the working environment and on-line learning. In other words, if the existing solutions cannot be reused and customised, the return on investment will be nil and the economic development of this type of learning will not take place.

The available e-learning tools must also be structured and labelled: the ideal being that portal sites allow the SME to "shop around" among solutions that are flexible and customised and the content of which is certified by higher education institutes and universities. The higher education institutes and universities without a doubt have a role to play as suppliers of e-learning courses, by building on what they have already developed, even if it means that it is customised for SME by the private sector. The development of consultancy and other "learning services" constitutes a real market opportunity for developers of e-learning solutions in order to "heighten the awareness" of e-learning needs within SMEs.

As was the case for e-commerce, the certification of the contents and the interoperability of the solutions are two indispensable conditions for the large-scale dissemination of e-learning within companies. Furthermore, e-learning constitutes a technological evolution that makes it possible to learn at the same pace and according to the same processes as the ongoing economic and social digitisation.

The answer is for the educative community, the organisers of training courses and the developers of software solutions to pool their actions, create synergies and make their offer legible/operational from the point of view of the SMEs. Otherwise, we run the risk of coming up against indifference caused by ignorance.

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Annex 1.

Traditional learning	E-learning advantages	E-learning dangers
Focused on content.	Focused on the learner.	The learner must be proactive to get the most out of an e-learning course or runs the risk of failing. The feeling of isolation is also one of the dangers.
Book-based resources dominate training supports. These resources cannot be updated as quickly as digital resources.	The (multimedia) resources on the Internet are infinite and quickly updated. Furthermore, they are available 24 hours a day.	The use of these technological resources calls for transversal skills (use of a multimedia PC and of a Windows environment, use of the information search engines on the Internet, criticism of the sources of information).
Unicity of the form of the pedagogical content.	Diversity of the form of the content thanks to the possibilities offered by multimedia. A very realistic simulation without negative consequence becomes possible.	The learner must have a minimum amount of equipment (new generation PC, sound card, connection to Internet with sound, a sufficient speed to manage video).
The cost of developing courses is low but their quality depends on the motivation of the teacher to document them and update them.	The course resources can be easily updated by mobilising the resources of the Net but the modularisation and the formatting of the content for the Web is much more demanding than paper content.	The average development time of an on-line university course is 12 months and calls for the intervention of a multidisciplinary team composed of the teacher, the Web designer and of the e-learning specialist.
Unicity of the roles of the training actors determined by unidirectional exchanges: knowledge is dispensed by the teacher and the pupil must receive and appropriate this knowledge.	Diversity of the roles of the training actors, the coach is not a traditional teacher, he accompanies but does not necessarily transmit. Furthermore, it is possible, in the case of communities of practices, for the learner to become the holder of the knowledge and to transmit this knowledge to the other members of the community.	The transformation of the teacher into tutor or coach is a transition that is often difficult to negotiate as the value of a teacher was to date calculated according to the quantity of knowledge that he held rather than the performances of his learners.
Linear course duration. The subject is treated from A to Z within a given time scale.	E-learning is modular and discontinuous. The e-learning modules are as short as possible in view of the importance of the involvement of the learner in his own success.	The learner must manage his time and insert the learning time into his timetable. There is a risk of abandoning the course. The coaching and blended learning are 2 precious assets to avoid the disinvestment of the learner with regard to the e-learning course, which calls for self-discipline and self-motivation.

CINEMA AND SCIENCE (CISCI) – A NEW INNOVATIVE ON-LINE EDUCATIONAL ENVIRONMENT

Heinz Oberhummer, Vienna University of Technology, Austria and the CISCI-consortium[1]

Introduction

Cinema and Science (CISCI) is an educational project promoting science in schools. It is part of the NUCLEUS-cluster funded under the *European Science Teaching Initiative* of the European Commission's Sixth Framework *Science* and *Society* programme. NUCLEUS is a cluster of EU-projects comprising the following projects: CISCI, ESTI, PENCIL, SCIENCEDUC and VOLVOX.[2] The CISCI-project is a partnership between universities, research organisations and SMEs having an extensive and complementary expertise in education, outreach, marketing and ICT. The CISCI-consortium consists of institutions in 8 different European countries and the USA under the co-ordination of the Vienna University of Technology. The official launch of the website http://www.cisci.net with contents in 6 different European languages is planned at the end of 2006.

Objectives of CISCI

In a few years, especially in Europe, we will have an alarming shortage of scientists in basic research and innovation. Although, science is very popular today – as long as we talk about movies, TV-programmes and popular books. But when it comes to choosing what to study, only few prospective students choose to study science or take up a science career. So, science is a subject which is declining and at best stagnating in the popularity among the young generation. It is obvious that there is a strong interest in our society to act against this trend. The project Cinema and Science (CISCI) supported by the European Commission is an innovative educational project going to do just that.

CISCI will combine the two most popular media among youngsters, namely movies and the Internet, aiming to stimulate interest in science while dispelling widely-spread misconceptions that arise from pseudo-science. CISCI is setting up a free database with video clips and movie scenes taken from documentaries and popular movies that serve to illustrate scientific concepts and analysing their scientific content from the point of view of different subjects taught at school, like for example physics, chemistry, life sciences and mathematics. On a web-based platform, CISCI will provide this new innovative classroom resource for school teachers and their pupils.

The main purpose of CISCI is to enhance the attractiveness of science teaching in schools across Europe complementing formal curricula. The primary target groups are European school teachers and their pupils. As a secondary target, also the general public is addressed. CISCI will use an innovative approach with the following strategic objectives:

- To raise the interest and attractiveness of science in the young generation and support the study and career choices of young people in the direction of science through movies.
- To take movies as a vehicle to present scientific concepts and laws to pupils.
- To provide teaching staff with a broad range of downloadable support materials to facilitate the preparation of lesson plans/curriculum support and allow teaching professionals to collaborate productively via the Internet and to share experience as well as comment/judge the usefulness of the film resources.

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[1] Vienna University of Technology, Austria; R&R.com, Germany; Miksike, Estonia; Behacker & Partner, Austria; Center for Visual Animation, Slovenia; Univerity of Milano, Italy; University of Latvia, Latvia; Accociation Biotrin, Czech Republic; AcrossLimits, Malta; Joint Institute of Nuclear Astrophysics, USA

[2] NUCLEUS: http://www.xplora.org/ww/en/pub/xplora/nucleus_home.htm

- To help pupils to learn to distinguish between pseudo-science, sciences presented in popular movies and scientific laws and ideas, to think critically about science information presented in popular movies, and help them to learn where the borderline between verified and untested scientific assertions is.
- To overcome gender-stereotyped representations of science and scientists and encourage especially female students to engage with scientific career.
- To engage with professional bodies who have a vested interest in the promotion of scientific study to fulfil vacancies in industries, e.g. engineering, pharmaceutical, etc., and provide science careers based advice to students.

It is well-documented that most people have very little understanding of science and are in fact often unable to distinguish between science and pseudo-science. The entertainment industry and especially the film industry is partially the reason and a significant source of the public's misunderstanding about scientific achievements and facts, because of their faulty presentation of science. Many blockbusters include often elements that are related to or science fiction or pseudo-scientific fantasies. Just because of these elements films and especially blockbusters are very popular in the public and especially the young generation. The relevance of this behaviour with respect to the attitudes of science is a double-edged sword. On the positive side it can raise the interest and attractiveness of science, on the negative side it may lead to serious misunderstandings and faulty knowledge of science.

CISCI will not only concentrate on movies that are scientifically sound, but will rather present and discuss also movies that perpetuate the incorrect understanding of science in a critical manner. CISCI does not want to highlight bad-movie science in films, since it is clear that science shown in films is often a mixture between reality and fantasy. Rather the borders between science and fiction will be discussed to give an answer to what extend science shown in a specific movie scene corresponds to reality and what is fantasy. In other words we want to answer the question that is often raised and discussed by visitors after watching a movie: "Can this really be true?" or "What is science and what is fiction?".

CISCI survey

In order to find out the wishes of our target group, namely school teachers and their pupils, we carried out a teachers' survey in all countries of the CICI-partners. The main results of this survey can be summarised as follows:

- The acceptance of such a teaching/learning aid as CISCI is very high and the concept meets exactly the demands of science teachers.
- There are no technical restrictions for the web-based service because the technical equipment of the schools is sufficient.
- Nearly 50% of the target group already have experience with such teaching aid and are very open to use the CISCI-services.
- Since there are already some experiences (50%) on one hand and on the other hand there are teachers or schools which by now do not take advantage of such an aid (50%) there are a lot of opportunities for CISCI.
- It is interesting that teachers would also prefer to use documentaries and are not only focussed on popular movies.

Content unit

The core element of CISCI is the content unit. The CISCI-platform will comprise at least 160 content units taken from scientific subjects like physics, life sciences, chemistry and mathematics. Furthermore, more specific subjects like history of science and gender aspects will be addressed by specific content units. The content unit is based on a scene shown on a video clip or a movie scene with a length of up to 3 minutes. The information found on a content unit is as follows:

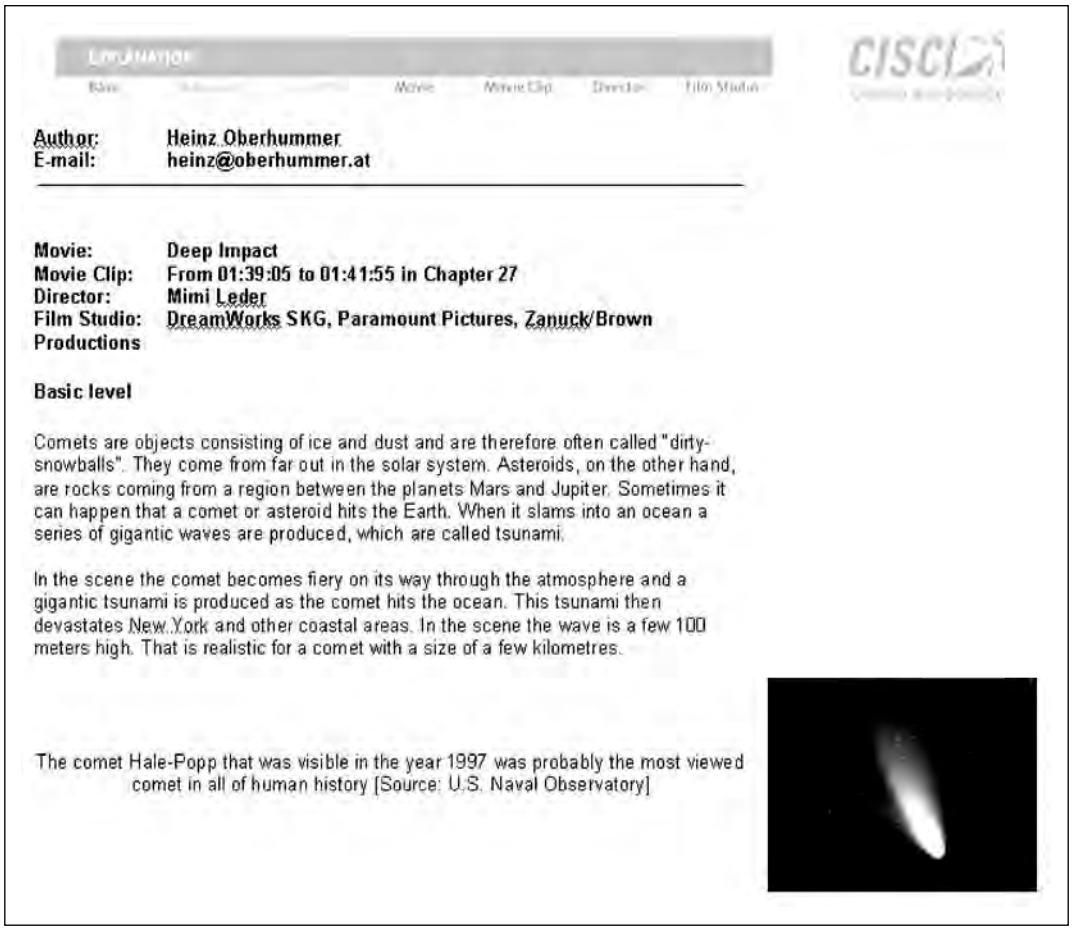
General information about documentary, popular movie or video clip collection:

- Discussed scientific subject and topic: The subjects are classified according to the different subjects relevant for the school curricula like physics. The topic is then a subdivision of a subject, like the topic gravitation belonging to physics.
- Information about the video clip collection, documentary or popular movie: In these fields the title, year, producer and director of the video clip collection, documentary or popular movie can be found.
- Description and website: These two fields describe the contents of the documentary, popular movie or video clip collection together with a link to the corresponding website, when available.
- Link to trailer site and corresponding DVD: A link to the trailer site and/or the corresponding DVD of the video clip collection, documentary or popular movie is established whenever available.

Information and explanation of the considered video clip or movie scene and the related science (see, for instance, Figure 1):

- Video clip or scene on a DVD: When CISCI has obtained a licence for providing the video clip on the CISCI-website it can be downloaded form the CISCI-website. Another alternative is to present the time interval of the considered scene on the corresponding DVD.
- Author and editor of content unit: The author(s) and editor of the corresponding content unit with their e-mail addresses.
- Title and description of scene: A suggestive title as well as a short description of the scene is included.
- Scientific keywords: At most three scientific keywords related the science discussed in the content unit is presented.
- Basic (10+) explanation: This field contains the science-related information of the clip and is targeted at pupils older than 10 years. It will help the teacher in preparing an interesting and exciting lesson for 10-14 year old pupils.
- Advanced (14+) explanation: This field contains the science-related explanation of the clip and is targeted at pupils older than 14 years. It will help the teacher in preparing an interesting and exciting lesson for 14-19 year old pupils.
- Background information for teachers: This field gives scientific and didactical background information related to the considered scenes for the teachers.

One of the difficulties in CISCI is obtaining the intellectual property rights for providing movie clips on-line. CISCI has obtained the rights for many documentaries and films. However, it is a “mission impossible” to obtain the rights for movie scenes of popular films and especially blockbusters. However, we found a way to circumvent this problem. In the content units a link is given to a trailer site as well as the time interval of the considered scene on the respective DVD. The DVD can then be obtained by the teachers either by renting or purchasing it and the corresponding scene can then be shown by the teachers in the classroom.



Author: Heinz Oberhummer
E-mail: heinz@oberhummer.at

Movie: Deep Impact
Movie Clip: From 01:39:05 to 01:41:55 in Chapter 27
Director: Mimi Leder
Film Studio: DreamWorks SKG, Paramount Pictures, Zanuck/Brown Productions

Basic level

Comets are objects consisting of ice and dust and are therefore often called "dirty-snowballs". They come from far out in the solar system. Asteroids, on the other hand, are rocks coming from a region between the planets Mars and Jupiter. Sometimes it can happen that a comet or asteroid hits the Earth. When it slams into an ocean a series of gigantic waves are produced, which are called tsunami.

In the scene the comet becomes fiery on its way through the atmosphere and a gigantic tsunami is produced as the comet hits the ocean. This tsunami then devastates New York and other coastal areas. In the scene the wave is a few 100 meters high. That is realistic for a comet with a size of a few kilometres.

The comet Hale-Popp that was visible in the year 1997 was probably the most viewed comet in all of human history [Source: U.S. Naval Observatory]

Figure1. Part of a content unit of CISCI

CISCI in the classroom

CISCI is a combination of two involving, exciting and high-impact media, namely movies and Internet. Moving pictures of any kind are cool, involving, and inspiring for the young generation. Movies create trends, and have a broader impact on young people than any other media. CISCI addresses pupils with the help of teachers as science mediators and provides them with video and movie scenes related to (pseudo-)science as “anchor” for their lesson in the classroom. These anchors as part of a school lesson can enhance the interest in scientific subjects significantly among pupils. This combination of presenting a video or movie scene in the classroom with a discussion of the (pseudo-)science can be much more interesting for pupils than just a traditional lesson. Also it is more rewarding from the didactical point to show just in the classroom a scene as an “anchor” than presenting the whole movie to the pupils. Our experience has shown that moving pictures can create significantly more interest and excitement among pupils than just traditional teaching.

Many educational on-line offers for schools hardly reach the classroom, because the demanded skills are too complicated and tedious for teachers for using them. Sometimes in schools the technical infrastructure is not sufficient enough in the classroom itself to use e-learning offers. For CISCI it is neither essential to have a computer class nor to have an Internet connection in the classroom. The only thing that one needs in the classroom is a PC or laptop with a connected video projector, which is available in most schools. A teacher using CISCI can select in the lesson preparation a video clip or movie scene from a DVD to be shown in the classroom. The teacher has then the benefit that he can prepare and present a really interesting and exciting lesson by using the ready science-related information given in the respective content unit on the CISCI-site.

A great variability of at least 160 content units related to video or movie scenes up to a length of 3 minutes from documentaries, blockbusters and video clip collections will be available on the

CISCI-website. Each content unit describes and discusses the (pseudo)-scientific content of the related video or movie scene. These accompanying explanations and background information of each content unit will help the teacher in preparing a truly interesting lesson.

Dissemination

In order to attract visitors to a start-up educational website it is by far not enough to launch the website. Rather it is necessary employ an extensive dissemination strategy including a whole variety of different dissemination activities and events to attract the target groups to the website. CISCI is promoted and disseminated through educational portals and websites, presentations at national and European workshops and conferences, promotion material as well as events related to "Cinema and Science". Specific dissemination activities with respect to CISCI are:

- A DVD with a project tour about CISCI including pilot content units has been produced by the CISCI-consortium.[3]
- Numerous events related to CISCI as spin-offs and complementary activities are taking place promoting the CISCI-project. For instance, events like "Science in Film" in Austria,4 "Vedere la Scienza" in Italy5 and "Physics & Film Series" in USA6 attract hundreds to thousands of visitors.
- A TV-spot bout is in production that will be shown on different European TV-stations. This video will provide information about the CISCI-project in an attractive and illuminating way. On a concrete example the TV-spots shows how movies can awake the natural curiosity among pupils and how the CISCI-project can take advantage of this.
- Science on Stage International Festivals[7]: The Science on Stage programme offers European science teachers the chance to exchange successful and innovative teaching methods and materials. CISCI has run a workshop at the International Science Teaching Festivals "Science on Stage 2005" at CERN, Geneva, Switzerland showcasing the best of today's science education.
- Science in School[8]: Science in School is a quarterly journal for teachers, scientists and all stakeholders in European science teaching. In its very first issue Science in School in March 2006 CISCI will be featured.
- Educational Portal xplora – European gateway to science education[9]: This portal is aimed at teachers, pupils, scientists, science communicators and science educators.

The last three activities take place through collaborations within the NUCLEUS-cluster funded under the *European Science Teaching Initiative* of the European Commission's Sixth Framework *Science and Society* programme.

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[3] Cinema and Science – The complete project tour on DVD: Vienna University of Technology, 2006

[4] Science in Film: http://www.scienceinfilm.net

[5] Vedere la Scienza: http://www.brera.unimi.it/film/

[6] Physics and Film Series: http://www.jinaweb.org/outreach/filmseries/filmseries.html

[7] Science on Stage – A Programme for European Science Teachers: http://www.scienceonstage.net/main/intropage.asp

[8] Science in School – Journal for teachers, scientists and all stakeholders in European science teaching: http://www.scienceinschool.org/

[9] xplora – European Science Education Gateway: http://www.xplora.org

Summary

Science in films (CISCI) has a unique selling position in the educational sector, because it combines the most popular media of the young generation, namely moving pictures and the Internet. The project Cinema and Science (CISCI) makes science teaching more interesting by providing teachers with simple-to-use, just-in-time, well-prepared lessons with movie scenes and video clips as “anchor” for the classroom.

Acknowledgement

Cinema and Science is supported by the European Commission in its Sixth Framework *Science and Society* programme during the period 1.2.2005 – 31.1.2007.

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LEARNING OBJECTS FOR EDUCATION WITH AUGMENTED REALITY

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Abstract

To fill the gap of next-generation user interfaces for mathematics and geometry education Construct3D is presented, a three-dimensional dynamic geometry construction tool that can be used in high school and university education. This system uses Augmented Reality (AR) to provide a natural setting for face-to-face collaboration of teachers and students. The main advantage of using AR is that students actually see three dimensional objects which they until now had to calculate and construct with traditional (mostly pen and paper) methods (Figure 1). By working directly in 3D space, complex spatial problems and spatial relationships may be comprehended better and faster than with traditional methods. This paper summarizes the development of learning objects and content specifically designed for teaching dynamic 3D geometry in Augmented Reality. It concentrates on pedagogical findings while working with teachers and students in more than 500 teaching lessons.

Introduction

Spatial abilities present an important component of human intelligence. Many studies have shown that spatial abilities can be improved by well-designed trainings [1, 2]. Geometry education has proven as one powerful means of improving these skills [3]; recently, a number of training studies have shown the usefulness of virtual reality (VR) in training spatial ability [4, 5]. Augmented Reality [6] is a variation of Virtual Reality (VR). VR technology completely immerses a user inside a synthetic environment. While immersed, the user cannot see the surrounding real world. In contrast, AR allows the user to see the real world, with virtual objects superimposed upon or composited with the real world. Therefore, AR supplements reality, rather than completely replacing it. Ideally, it would appear to the user that the virtual and real objects coexist in the same space. In terms of used technology, AR can be said to require the following three characteristics (1) combines real and virtual (2) interactive in real time (3) registered in 3D.

According to pedagogical theories [7], collaboration is a fundamental social process that supports learners' development of capabilities. In a collaborative AR environment multiple users may access a shared space populated by virtual objects, while remaining grounded in the real world. This approach is particularly powerful for educational purposes when users are co-located and can use natural means of communication (speech, gestures, etc.), but can also be mixed successfully with immersive VR [8] or remote collaboration [9]. Supporting natural collaboration in the mathematics domain opens new possibilities to the educational process.

Figure 1. Students are working with Construct3D in 3D space. Left: The image shows how users perceive the virtual world and objects. Right: Views of spectators watching engaged students from outside the virtual world.

Construct3D

Software Design

Construct3D [10] is based on the Studierstube Augmented Reality system [11]. It supports generation of and operation on these basic geometric object types: points (either freely positioned in space or fixed on curves and surfaces), lines, planes, circles, ellipses, cuboids, spheres, cylinders, cones, B-Spline curves with an unlimited number of control points and variable degree, interpolated B-Spline curves, NURBS surfaces up to 8x8 control points and variable degree, interpolated NURBS surfaces and surfaces of revolution (rotational sweep surfaces). Regarding geometric operations we implemented Boolean operations (intersection, union, difference); intersections between all types of 2D and 3D objects resulting in intersection points and curves; planar slicing of objects; rotational sweep around an axis and many more. Translations, rotations and mirroring of objects are supported as well.

At its start Construct3D initializes a 3D window and the user interface. The menu system is mapped to a hand-held tracked panel called the personal interaction panel (PIP) [12]. The PIP allows the straightforward integration of conventional 2D interface elements like buttons, sliders, dials, etc. as well as novel 3D interaction widgets (Figure 2 Right). Passive haptic feedback from the physical props guides the user when interacting with the PIP, while the overlaid graphics allow the props to be used as multi-functional tools. All construction steps are carried out via direct manipulation in 3D using a stylus tracked with six degrees of freedom. In order to generate a new point the user clicks with his pen exactly at the location in 3D space where the point should appear. Users can easily switch between point mode (for setting new points) and selection mode (for selecting 3D objects).

A fundamental property of dynamic geometry software is that dynamic behavior of a construction can be explored by interactively moving individual defining elements such as corner points of a rigid body. For example: moving a point lying on a sphere results in the change of the sphere's radius. It can be seen what parts of a construction change and which remain the same. The histories of constructions as well as dependencies between geometric objects are maintained. Experiencing what happens under movement allows better insight into a particular construction and geometry in general.

Collaborative, Educational Augmented Reality Setups

The standard setup used for Construct3D supports two collaborating users wearing stereoscopic see-through head mounted displays (Sony Glasstron HMDs) providing a shared virtual space. The users interact with the system using pen and pad props (Figure 2 Left). Both users see the same virtual objects as well as each others' pens and menu systems which allows a student or teacher to help the other user, if necessary. The big advantage of this setup is that it allows users to actively "walk around" geometric objects which are fixed in space. Excited students sometimes lie down on the floor to view objects from below or step on a chair to look down from above. This is a unique feature of an HMD setup which cannot be provided by monitor or projection screen based hardware configurations.

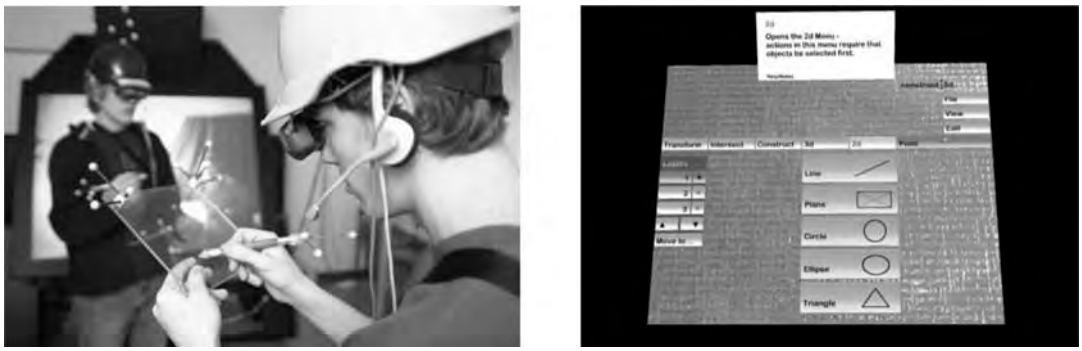

Figure 2. Left: Two students collaborate in our standard lab setup, wearing an HMD, holding a wireless pen and panel (PIP). All devices are optically tracked
Right: The menu system which is display on the panel

Pedagogical Aspects

Pedagogic Theory

Constructivist theory provides a valid and reliable basis for a theory of learning in virtual environments [13, 14]. As constructivism underlines, learning takes place when students can build conceptual models that are both consistent with what they already understand and with the new content. In order to ensure successful adaptation of old knowledge to new experience, flexible learning direction should be provided [15]. One possibility is to integrate known types of information and educational supports other than the 3D representation (such as audio and text annotations, images, etc.). Another possibility is to carefully define specific tasks to the users/students through interaction with the teacher. We implemented support of different learning modes in virtual environments from teacher-supported to autodidactic learning (layer scheme described in [10]). Finally, VR environments can be tailored to individual learning and performance styles.

The core commitment of a constructivist position is that knowledge is not transmitted directly from one knower to another but is actively built up by the learner. Learning is considered to be an active process in which learners "construct" their own knowledge by testing ideas and approaches based on their prior knowledge and experience, applying these to a new situation, and integrating the new knowledge gained with pre-existing intellectual constructs. This is supported through relevant, engaging learning activities, which involve problem-solving and critical thinking.

We used activity theory [16] as a conceptual framework to design constructivist learning tasks. All e-learning content is highly dynamic and specifically targeted to the features of Construct3D. All examples represent real-life problems, encourage experimentation and the evaluation design actively involves learners. They are in accordance with the geometry curriculum of grade 12.

Teaching Experiences

In questionnaires and discussions teachers described three main strengths of Construct3D: (1) The ability to construct dynamic 3D geometry and nearly haptic interaction with geometric objects. (2) Students can walk around geometric objects, building an active relationship between body and object. (3) The application's strength to visualize abstract problems.

In order to teach specific learning content, teachers usually pick the learning medium which is best suited for teaching the content. Since we know Construct3D's strengths, it should mainly be integrated in geometry education for teaching content which requires 3D dynamic geometry or requires the visualization of abstract problems (as shown in the learning objects below). In addition these are exactly those areas that are hardly covered by other educational applications.

Construct3D has specific strengths and allows teaching principles by using 3D dynamic geometry that are hard or impossible to teach by any other means in traditional geometry education. Tasks that are well suited for Construct3D might be impossible to do in traditional courses and those ideal for paper&pencil work might be impractical to do in Construct3D. Because each medium is different, different content should be used to utilise the strengths of each.

The advantages of working in an immersive AR setup are manifold. Users see their own body and hand as well as the effects of their actions while working. The construction process physically involves students and resembles handcraft more than traditional computer operation. A spatial relationship between the user's body and the geometric object in 3D space is established. We believe these are key factors in the potential success of using AR for teaching geometry.

We developed Construct3D to a point where it can be productively used for educational purposes. Due to a wide range of features useful content which utilizes dynamic functionality is easy to produce for teachers and students in a very short time. Our tool allows novel ways of teaching. Since development of our application is ongoing, we will see how teaching with this medium will change. Time will show how teachers will adapt content to the advanced features provided by our tool. Dynamic 3D construction and visualization capabilities are its fundamental strengths. Construct3D enables teaching of new dynamic geometric content that is too difficult or impossible to draw with pencil on paper or with existing CAD programs.

Learning Objects

To illustrate the type of geometric examples and learning tasks that are ideal for teaching geometry with Construct3D we list actual educational tasks and learning objects that were previously used or will be used in evaluations. Students of age 16-18 who have geometry classes in high school work collaboratively with a teacher and another student in an HMD based setup as described above. Beforehand the problem description and a screenshot of the given elements that they will face later in the virtual world are given to the students. Web links are presented with additional information about the task; images are given in order to help to understand and translate the problem.

Flight Route

The task is to construct the shortest flight route from Vienna to Sydney, which in ideal case is an orthodrome. The given virtual scene in Construct3D (Figure 3.) shows a model of earth (with texture) to help pupils find the correct places on earth and to immerse them further into the problem.

Figure 3. Left: Vienna is marked on the globe. Right: Two students are collaborating to solve the problem

Exploring the Shape of a Sunsail

Looking closer at a sunsail, raises the question of the geometric background of its shape. This task provides the possibility of perceiving a Hyperbolic Paraboloid (HP) in all its aspects: the construction, the generating lines, and how the surface gains its name.

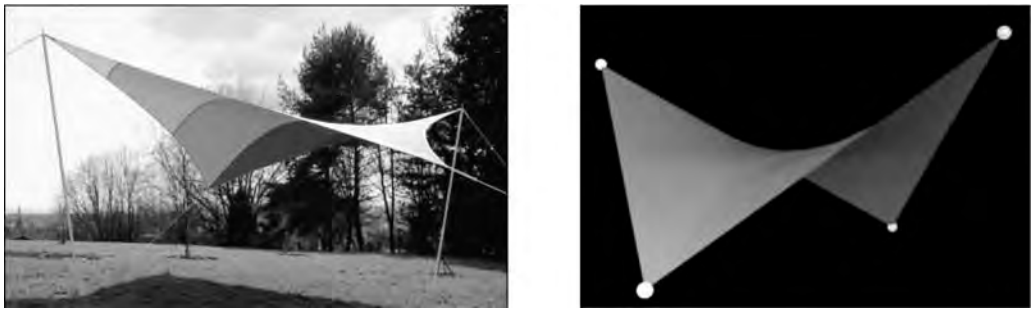

Figure 4. Left: A hyperbolic paraboloid in a real environment. Image courtesy of http://www.ceno-tec.de/ind07erd.htm. Right: A HP-surface constructed in Construct3D

The hyperbolic paraboloid, as a particular ruled surface, is generated in Construct3D as a bilinear Bezier patch (Figure 4 Right). Our purpose in examining bilinear patches is to examine and explain in a simple case how de Casteljau's algorithm works for surfaces. In addition the HP can be generated as a translational surface by moving a hyperboloid along a paraboloid (or the other way round). The students will learn and investigate this fact by dynamic movement of a plane intersecting the HP in a paraboloid or hyperboloid. This task discloses the mystery of how the surface gains its name.

Surfaces of Revolution

Surfaces of rotational symmetry are omnipresent in everyday life. This should be an incitement to learn more about their structure. In this task the perpendicular axis of a surface of revolution is given.

Students have to rotate an arbitrary B-Spline curve around this axis. The result is a surface of revolution Φ (Figure 5). Construct3D provides the facility to modify the original B-Spline curve dynamically, which results in the modification of the surface of revolution in real time, too. This is a unique feature of Construct3D. The next step in construction is to pick an arbitrary point P on the surface of revolution Φ. P can be moved on the surface.

The tangential plane ε to Φ is spanned by a tangent to the meridian curve in an arbitrary point P and the tangent to the circle of latitude through P. When students now move P along the surface, the tangential plane ε, fixed in P moves, too. This enables the students to study the touching property of the tangential plane, and the intersection of Φ with ε.

An important topic in this task is the location of the surface normal in P, which is constructed as the surface normal to the tangential plane. Students are thrilled watching the surface normal intersect the axis of rotation while moving around P. This experience can not be replaced by constructing a surface of revolution with any CAD program.

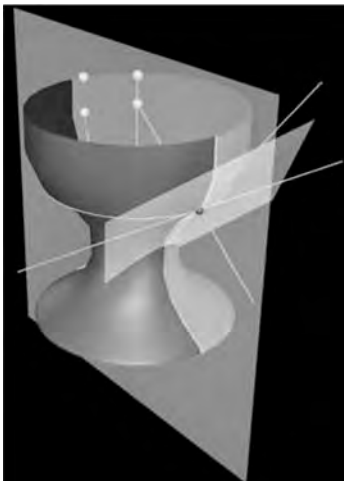

Figure 5. Surface of Revolution

Wheels of an Airplane

This problem deals with wheels of an airplane which are rotated into a shell in the hull of the airplane after its take off. A wheel in its initial and final position is given. Students have to construct the axis of rotation and the angle of rotation that rotates the wheel from its original position into the final position in the hull.

Center of Gravity of a Tetrahedron

Given is a regular tetrahedron by its vertices and edges. The construction of the center of gravity in a triangle is known. Motivated by depictive representations of the tetrahedron in Bottrop (http://www.tetraeder.de/) students have to analyse if such a center of gravity also exists in a regular tetrahedron (Figure 6). Then they have to manipulate the platonic body dynamically to see what happens with the center of gravity in the arbitrary case.

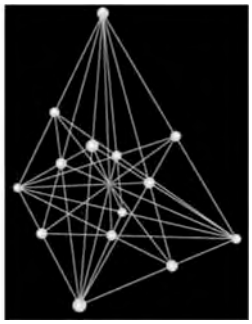

Figure 6. Left: The Bottrop Tetrahedron (Image by Torsten Znotka)
Right: The center of gravity of a tetrahedron

Future Work

Mid- to long-term plans are to extend the number of users (which is now limited to two) for being able to teach larger groups of students. We're developing a low cost optical tracking system to minimize the expenses for tracking, aiming at the integration of Construct3D and the concept of teaching geometry with Augmented Reality in high school and university education. In parallel we are collaborating with Austrian schools and external partners such as the Institute of Geometry at Vienna University of Technology.

Acknowledgements

We thank all participants of evaluations as well as other teachers and students for testing and giving useful feedback. Part of this research was funded by the Austrian Science Fund (FWF) contract P16803, by the EU IST project Lab@Future (IST-2001-34204) and by the Austrian Ministry of Education, Science and Culture e-Learning Initiative.

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"WISSENSRAUM ARCHITEKTUR" – A CONSTRUCTIVIST MODEL OF LEARNING FOR ARCHITECTURAL EDUCATION AT ANHALT UNIVERSITY OF APPLIED SCIENCES

Stephan Pinkau and Thomas Gerke, Anhalt University of Applied Sciences, Germany

1. Idea and Conception

The study of architecture is by nature highly interdisciplinary. Design, structure, technology, ecology and economics must all be considered in the process of planning and building. Therefore it is important to encourage an integrated approach in terms of education and to create a interdisciplinary network of learning contents. Wissensraum Architektur is a contribution to this idea. Wissensraum Architektur is an internet-based system for teaching and learning at the Department of Architecture and Civil Engineering at Anhalt University of Applied Sciences in Dessau. The basis of Wissensraum is a pool of media elements and multimedia-based components to which authors from different fields contribute. The authoring system allows instructors to create, by simple means, digital learning modules. Due to the modular structure, modular elements and sequences in varying relations and by different authors can be reused and restructured. A knowledge map visualizes relationships among the different learning content. In this way, a virtual campus in Dessau is created step by step.

The didactical concept of Wissensraum supports Constructivist models of learning. Users can use the database for research and can create their own way of learning concerning particular themes. The availability via Internet makes it possible to work from any location at any time.

2. Structural Design of Wissensraum Architektur

The structural concept of Wissensraum Architektur is orientated on the SCORM[1] model. There are three levels of presentation which differ in complexity of content: media elements, learning cards, and learning units.

Media Elements

Are the smallest components of Wissensraum, e.g. text, images, interactive applications (Flash-, Java-based), video or audio files. For input, there is an entry-mask containing the necessary options for metadata. Data is stored in high resolution, according to the principle of multi-channel-publishing. All versions that are needed for different presentation requirements, e.g. screen-display in different sizes (thumbnails/enlargements), printouts, etc. are automatically generated from the original file by the (software) system.

Learning Cards

Texts, images and animations are composed by an author into learning cards. They are the smallest instructional elements of the system and deal with the topic described in the title. Learning cards can, through "associated media elements" (images, plans, animation, etc.), which are displayed on the bottom of the card, be further expanded to illustrate the respective theme. Learning cards consist of a heading with the name of the author, and a toolbar, an infoframe and a content-frame. The info-frame shows the specific field and category of the contents that the card belongs to. It also shows all the learning modules containing this card. The history-function makes it possible to easily return to the cards visited before. The entirety of the learning cards makes up a multimedia-based "Architektur LehrLexikon" which is meant to be an encyclopedia for teaching architecture. An extensive search

[1] Sharable Content Object Reference Model

function can be used for enquiries. Contents can be stored in a personal folder. The thematic environment of the displayed learning content and its relations to other learning cards are visualized in a knowledge map.

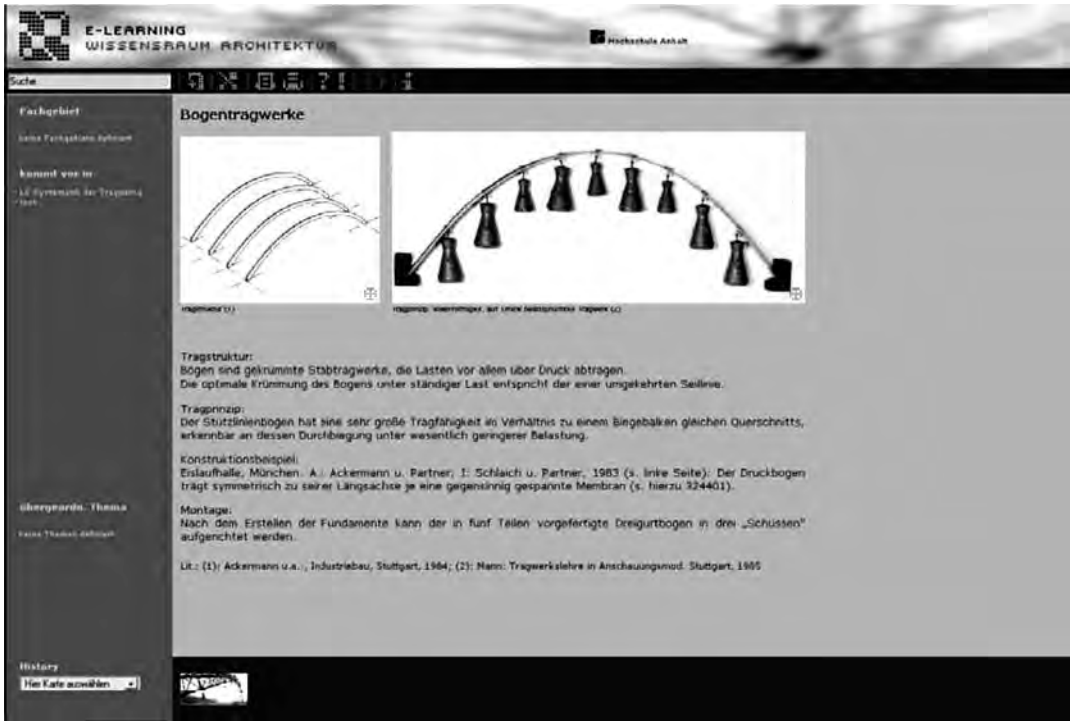

Figure 1. Learning card “Bogentragwerke” (arch structure) with associated media elements

The content of the different learning cards can be exported to Learning Management Systems (learning platforms) in order to create courses. The course administration and management are provided by the learning platform.

Learning Units

To present extensive topics or to give explanations in greater depth, learning cards can be organized into learning units. The learning units consist of an introductory page which describes the content and intent of the unit, and about 5-10 pages of content. While in many cases simply ordering the cards one after another is inadequate and too general to create a learning unit, the cards are supplemented by related texts through means of the authoring tool which acts as the common thread throughout all relevant texts. Authors have the opportunity to use the essential elements of the cards to bring in what they see as necessary in relation to the topic they want to teach. As there is a fixed general layout, format mismatch among the cards of different authors is avoided. Learners are guided by a navigation bar, which is automatically created by the authoring system. To create learning units, the authoring system provides an editor. The sequence of the cards can be changed at any time, and it is easy to take out or add cards.

Knowledge Map

Correlations between the related learning cards stored in the database are visualized in a knowledge map. Different icons symbolize general learning content, buildings and persons. In this network, the title of the cards is displayed. The graphic presentation is more descriptive as a textual display and clarifies the relation between content objects. It is possible to select certain aspects of the network by using filters.

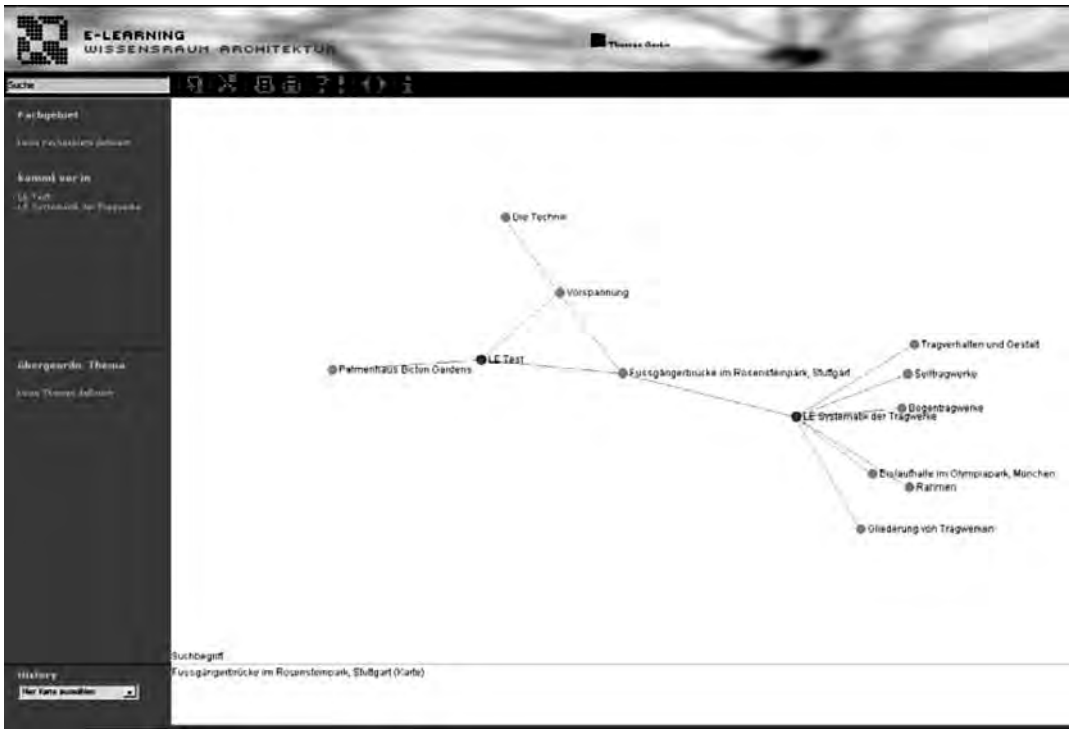

Figure 2. Knowledge Map

The knowledge map is dynamic and navigable. The current item is displayed in the center of the screen. By selecting another term, which can also be entered by the search function, the center of the network moves. A double click on the title opens the contents of the learning card.

3. Technical Realization

System Architecture

Technically, Wissensraum Architektur is based on a modified content management system[2] which is divided into an editorial server and a publishing server. The CMS uses open-source software and technologies. The content is drawn up in XML/XHTML and stored in a MySQL-database. The browser-based construction of the system makes it possible to carry out editorial work at any internet-PC without installing special software.

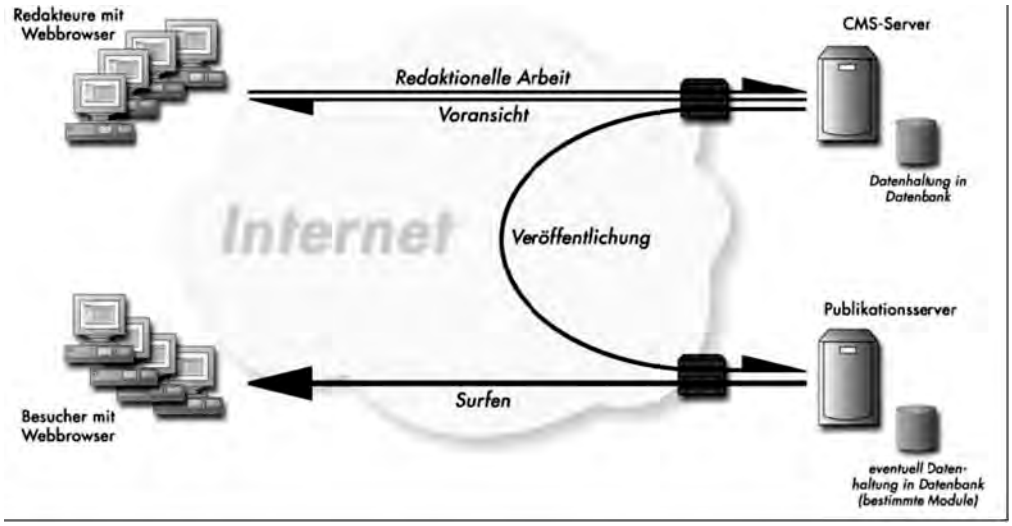

Figure 3. System architecture of KT-CMS (Source: Klute-Thiemann Informationstechnologie, Dortmund)

[2] ConMan CMS – Klute-Thiemann Informationstechnologie, Dortmund

When the creation of learning cards and learning units is finished, they have to be published. Data is transferred to the publication server and then provided as html-files.

Authoring System

The creation of content occurs online. Editorial work can be done via internet independent from place and time. The user interface of the authoring system is aligned to common design of software interfaces, and so is intuitively operable by the user.

For the layout of content, various templates are available. Stylesheets are used for formatting, so that there is a strict partition between content and form. For media elements or learning cards, authors can work with their own material or use data from the database. A file structure or a search function is used to find and select these elements.

Figure 4. User-interface of KT-CMS authoring-system, entry-mask for learning cards

The visualisation of the knowledge map is realized by using thinkmap SDK[3], a java-based software tool. Correlations between learning cards are determined by an editor.

4. Didactical Concept

Wissensraum Architektur is part of a Constructivist learning model in architectural education. Constructivist learning theory assumes that there is no objective reality. It is rather the learner him/herself, who creates his/her individual construct of reality and thereby generates cognition. The learner is part of the learning process. Especially in the design of a building, this becomes clear: the design process is not linear, but multi-level iterativ. The role of the teacher is to be a coach and tutor who shows the way to solve a problem and not an instructor, who asks for answers. Methods of an internet-based design-process by means of a “Digital Sketchbook” have been developed and evaluated in the IMLAB[4]) research project at Anhalt University of Applied Sciences in recent years. The self-determined approach of learning improves creativity and can be applied to other fields of

[3] Thinkmap Inc., New York, USA

[4] IMLAB – Interdisziplinäres modulares Lehrsystem für Architektur und Bauwesen, gefördert vom BmB+F im Programm “Neue Medien in der Bildung”, 2001-2003

architectural education. Constructivist learning environments should offer freedom to the user to create his/her own way of learning. The hypertext structure of learning cards and the contribution of different authors makes it possible to develop a differentiated view and to find a personal way of learning. The dynamic structure of the knowledge map stimulates the spirit of discovery and awakens curiosity. Wissensraum Architektur supports an explorative way of learning.

5. Target Group and Applications

Wissensraum Architektur purpose is not only meant to pursue technological goals, but is intended to contribute to sustainable appliance of new media in architectural education. First of all, the project is addressed to the teachers. Local data should be continuously integrated into a central repository of media elements, which can be used by all participating authors. The authoring environment makes it possible to easily create digital learning units. They can be published within Wissensraum Architektur or can be exported to learning platforms in order to create a course. Those learning in Wissensraum can work with the available learning units, independent from time constrictions and location. In accordance with the Constructivist approach, they can also use the database for their own research and self-determined learning. Presently, the project is addressed to teachers and students of the Department of Architecture and Civil Engineering at Anhalt University of Applied Sciences in Dessau. After finishing the test phase, is can be transferred to other departments and schools. Depending on the supplied content, the Wissensraum model can be used for undergraduate education as well as for graduate and post-graduate. Beyond this, the digital content is an important basis for a broad spectrum of e-learning possibilities such as virtual courses or blended-learning arrangements. The website for Wissensraum Architektur is: www.wissensraum-architektur.de

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UBIQUITOUS LEARNING – OR THE UBIQUITOUS ACCESS TO A DIGITAL LIBRARY

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Introduction

At the same time as the traditional library activity is being continuously digitalized, the ICT technology surrounding us in everyday life is becoming more and more like a digital kind of library. Such as the old school library, this new kind of library serves as a means of providing the user with the ability to search for information and at the same time providing a place to meet; in short, it could serve as a bearer of human experience.

In this paper I will present this new kind of library as a place for learning: it could, by its quality of ubiquity and convergence[1], offer new possibilities of appropriating the world around us, that is, improved possibilities for relating experiences to each other, for getting hold of different perspectives, and thus new conditions for finding the type of information the library traditionally provided. The mobile phone converging different functions and techniques will serve as an example.

The mobile phone as a digital library

The latest mobile phone technology becomes more and more common as a means of (almost) face-to-face dialogue and as a tool for web browsing, e-mail service, music listening, photography, video recording, etc. This new technology, converging different kinds of functions or techniques, could be seen as a digital library, a place for search for information, a place for culture and recreation – a place for ubiquitous learning.

The Swedish folk library

The Swedish folk library activity has its point of departure in the free and voluntary popular education movement (see for example Mogren, 2005a). The task of the folk libraries comprises education or learning, and information as well as culture and recreation (NE, 2005). Nowadays, the library activity is being continuously changed: to meet the new conditions of the information society, the library activities are being more and more digitalized and new virtual or digital services[2] are being introduced.

Today, we have access to a great amount of digital devices or artefacts, which could serve as a means of education or learning, a source for information and, as well, as an arena for culture and recreation. Thus, they could offer much of the services that the libraries traditionally deliver. Maybe the meaning of the traditional library for the visitors will become more and more a matter of aesthetics and of tactile experiences?

A place

The traditional library is of course a room, in the sense of the library building, but it is also a place: a place for search for information, a place for storing different kinds of information and human experience and a place to meet.

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[1] That is, the quality of converging different kinds of techniques or technical solutions.

[2] The Virtual Library and Ask the Library for example: Ask the Library is a digital reference service consisting of librarians who give answers to all sorts of question via e-mail and chat. The Virtual Library allows the user access to licensed databases and recommends free but hard to find electronic resources, in order to help the user to find the unspecified, and sometimes hard to interpret, web contents, retrieved by the search tool. (Stockholm Public Library, 2005)

I would like to introduce also the ubiquitous technology – and more specifically the mobile phone – as a place by analogy with the traditional library as a place:

Meurling (2000) discusses the concepts of room – place: she describes room as something physically defined and place as defined by human activity and identity. With her terminology we could understand the traditional library as both a room and a place: it is of course a room in the sense of the physical room, the building. But it is also a place: a place for different kinds of search for information, a place for culture and recreation, a place for meetings and for the exchange of experiences. According to this logic we could also define the ubiquitous ICT technology, including the mobile phone, as a place: a place for different kinds of search for information, a place for culture and recreation, a place for meetings and for the exchange of experiences.

The mobile phone converging different media – A digital library

The mobile phone converging different media – that is the kind of mobile phone technology that offers a great amount of functions and services, the models that could be a computer as well as a phone, which could serve as a camera, a video camera, an mp3-player, a radio, etc. – could be defined as a place, as seen above, and could also be seen as a digital library.

A place for search for information

The traditional libraries have always provided the user with the ability to search for information, by means of different encyclopaedias for instance, via literature, magazines and, of course, by the help of the librarians, who can guide the visitors through the jungle of different media. In recent years, the Swedish folk libraries have also provided its visitors with the ability to brows for information on the Internet.

The mobile phone could also serve as a place for search for information: the latest models of mobile phones can, similar to the traditional library, provide the user with the ability to browse on the Internet (to search for information via search engines such as Google for instance), via on-line newspapers and magazines, etc. In contrast to its traditional predecessor, this (digital) library offers a ubiquitous access to these abilities: the user or the visitor is able to use these services wherever and whenever. To send an e-mail or an sms to a friend, to phone or to use the video calling service could, of course, also be a way of getting hold of information.

A place for culture and recreation

One of the main tasks of the Swedish folk libraries is to provide its visitors with the access to culture and recreation: different media, such as literature (fiction and non-fiction), magazines, video films and different kinds of sound media (LPs, CDs, etc.) could evidently serve as providers of, or tools for, both culture and recreation.

The mobile phone could also, in a similar way, provide for – or serve as a place for – culture and recreation: the user could listen to talking books and music (using the mp3-player), reading literature (by using the phone as a hand-held computer), listen to the radio, reading the net edition of the daily news, etc. And the access is, on the hole, ubiquitous (Pod radio[3], for instance, offers a spatial as well as a temporal deliberation: we are not limited to the schedule of the radio broadcast, and we do not have to sit in front of the computer, such as when listening to web radio).

A place for meetings and for the exchange of experiences

The traditional library is a place for meetings and for the exchange of experiences: the Swedish folk libraries usually offer a wide range of social events, such as readings by authors, lectures, and book circles.

Phoning, text messaging and video calls are, of course, services that make also the mobile phone a place for meetings and for the exchange of experiences, for meaning construction.

[3] Pod radio, or pod casting, is a method of publishing audio programs via the Internet, allowing users to download audio (usually mp3's) onto portable players or personal computers. (Wikipedia, 2005)

The library – a place for learning

The library activity has always been a place for learning; the Swedish folk library, for instance, has its point of departure in the free and voluntary popular education movement, a movement meant to support life long learning, learning in all phases of life. I look upon the ubiquitous technology, or the mobile phone technology – a digital library according to my argumentation above – as a library with potentials for enhancing learning. It could be a place for ubiquitous learning.

Ubiquitous learning – Everyday learning

Ubiquitous learning, such as described in the project documentation of *Chiron – Referring ubiquitous learning*[4], refers to personalized life-long learning on-demand for all, anywhere, anytime, achieved by means and tools of e-learning – a "next generation e-learning".

The term implies, as I see it, that the digital is a part of everyday life – a place, by analogy with the traditional library – and a place for everyday learning:

> *Everyday learning could be understood as learning in informal settings which emerges in the everyday life in a seemingly arbitrary way, when we are moving between the different rooms, or places, of life. Typical for the notion of everyday learning is that it often goes on without our thinking of or reflecting upon it (Illeris, 1999).*

Learning – a matter of activity and of identifying offers and challenges

The way we learn should not be understood as a result of efficient transmission of information, it should instead be seen as a process of activity, of construction or as the process of identifying offers of meaning and uncover challenges in the environment.

Man should be regarded as an acting subject, as a constructor of her/his reality or knowledge (Berger and Luckmann, 1966): Piaget (1968) defines knowledge as essentially active: to know is to assimilate reality into systems of transformations – to transform reality – in order to understand how a certain state is brought about. According to him, knowledge should therefore not be seen as a passive copy of reality, he argues that knowing an object does not mean to copy it; it means acting upon it, constructing systems of transformations that can be carried out on or with the specific object. He describes that notion, that of knowledge as a passive copy of reality, as based on a vicious circle:

> *[...] in order to make a copy we have to know the model that we are copying, but according to this theory of knowledge the only way to know the model is by copying it, until we are caught in a circle, unable ever to know whether our copy of the model is like the model or not.*

We could also understand learning as the process of identifying offers of meaning and uncover and accept challenges in the environment and in different settings: the perceptual psychologist J. J. Gibson defined the concept of affordance as an action possibility to an individual available in the environment (Ho & McGrenere, 2000). According to Qvarsell (1989) an affordance can be understood as the aspect of the environment that offers meaning and argues for meaning construction.

The concept of developmental task (Qvarsell, 2000) refers to cultural challenges identified by the individual in different contexts and in different phases of life. They should not be regarded as psychological phenomena: they are found in the space between the individual and her/his environment.

[4] http://semioweb.mshparis.fr/chiron

Learning and ICT

Since learning is active and since we learn through identifying offers and challenges in our environment, the relation between man and her/his artefacts[5] becomes a matter of appropriation: We appropriate, or take possession of, technology – the medium is not the message[6], such as claimed by McLuhan (1964, 2000) – we appropriate technology for our meaning construction (Mogren, 2005b), and, maybe, for learning or knowledge construction. In that way, we could perceive technology as affordances – offers of meaning, a request for action – or as developmental tasks – cultural challenges in everyday life.

Convergence, a phenomenon enhancing learning?

Everyday learning takes place in many different settings and with a variety of devices, artefacts and phenomena that can enhance learning. The convergence could – by its quality of giving the user the possibility to move between different settings and combine different techniques – offer new possibilities of appropriating the world around us, that is, improved possibilities for relating experiences to each other, for getting hold of different perspectives:

Man is active, as seen above, and a producer of her/his own reality (such as described by Berger & Luckmann, 1966). Further more, and in accordance to Piaget (1968), s/he gets to know objects by acting upon them; learning is not a process of copying reality, it is a process of activity. Learning could also, as seen above, be looked upon as the process of identifying offers of meaning and uncover challenges in different settings.

The convergence of techniques – offering the possibility to move between different settings – implies, as I see it, an invitation to activity and could deliver a numerous amount of objects to act upon and offer a great amount of challenges and offers of meaning to identify and could thus be regarded as a phenomenon enhancing learning.

Conclusion

In this paper I have argued that the ubiquitous ICT technology – and more specifically the mobile phone – could be seen as a place, as a digital library, since it could, like the traditional library, serve as a means of providing the user with the ability to search for information and at the same time providing a place to meet, a place for the exchange of experiences and a place for recreation and culture.

I have introduced this new kind of library as a place for learning: by its quality of ubiquity and by its quality of converging different technical solutions – thus offering us the possibility to move between different settings – it could provide us with improved possibilities for relating experiences to each other and for getting hold of different perspectives.

This new technology could, in short, provide us with a ubiquitous access to a digital library, thus serving as a place for ubiquitous learning.

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[6] McLuhan (1964, 2000) claimed that the medium is the message, arguing that the message of every new technology is the change it brings to human action. Every new transfer of information not only transports the message but also translates it and transforms the receiver as well as the message itself.

[5] Löfberg (1994) defines artefacts as "things" produced by human beings, either individually or collectively in a particular society or culture. These "things" can of course be of physical character, but also of less tangible nature such as norms, values and organisational forms, on condition that they are the result of concrete human action and as long as they remain in the individual's possession over time. Furthermore he looks upon artefacts as things we perceive as parts of our life-contexts, separated from our individual selves.

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THE ESMOS PROJECT AND AN SMS PILOT STUDY WITH INTERNATIONAL EXCHANGE STUDENTS

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Introduction

ESMOS is a project financially supported by the SOCRATES/Minerva European Commission initiative, which aims to enhance student mobility through online support. The project is coordinated by the University of Salford (UK). The project partners are the University of Calabria (Italy), Czestochowa University (Poland), Vytautas Magnus University (Lithuania), D. Tsenov Academy of Economics (Bulgaria) and FH JOANNEUM University of Applied Sciences (Austria).

Within the ESMOS partnership there are different levels of internationalisation at each university. Some partners have more experience of international mobility activities; others are beginning to build up knowledge in student exchange and placements. There are also differences in the number of students at the universities and in the number of outgoing students.

In the first stage of the ESMOS project all partners have researched the current level of support for placement and exchange students at each university and have written institutional reports on the basis of their findings. The reports have been summarised into a final network report, which has then been used as a basis for further discussion with all stakeholders in order to analyse the needs of all actors involved in placements and exchanges.

The objectives of the Needs Analysis were to explore the needs of both target groups involved in student mobility: students involved in international work placement or studies abroad as well as staff at home universities who support the students (including staff at offices for international relations or exchange officers, departmental coordinators, institute tutors, etc).

The results obtained from this Needs Analysis are being used for the development of case studies that embed the application of Virtual Learning Environments (VLEs) in student exchange and international work placement programmes. One of the case studies which are being carried out by the University of Salford is a trial of the use of SMS messaging as a way to communicate efficiently with students who are away from the university on an international work placement. Through the needs analysis it has been recognised that e-mail is vital for student exchange.

E-mail is fast, reliable and able to transport digital documents from one side of the globe to another within seconds. Moreover, it is cheap and widely available. For these reasons e-mails are involved in all phases of student mobility processes. All of the interviewed persons emphasized the importance of this means of communication and student mobility processes are accompanied by a constant stream of e-mails. However, it has also been recognised that there is a strong need for an “added” mode of communication from the staff at the International Office at Salford to students who are away on placement. It cannot always be guaranteed that students will access their university e-mail on a daily basis when out of the country, and important reminders such as financial and administrative deadlines can be overlooked.

Mobile phones are now an integral part of student culture in the UK, and SMS messaging is a more personal form of communication which if delivered is guaranteed to be read. Therefore it was felt that SMS messaging would be an ideal mode of contact for mobility students, and a joint project has been established at the University of Salford between the Learning Technologies Centre (LTC) and the School of Computing, Science and Engineering (CSE) to fund an MSc project to implement a campus-wide SMS solution (Griffiths et al, 2005). As BlackBoard is the university’s VLE it is the preferred system within which to integrate this functionality.

This paper reports on the development and trial of BlackBoard SMS as a means for contacting students who are out of the country on an international work placement. The study is a collaboration between ESMOS, and the International Office and the Learning Technologies Centre at the University of Salford.

BlackBoard SMS

BlackBoard SMS is a continuation of previous research at the University of Salford involving an MSc project that allowed an academic to contact students via SMS message (Griffiths & Hmer, 2004). As part of this project a scenario was contrived in which a cohort of students (n=47) were sent both an e-mail and an SMS advising them that the academic would be arriving late for lecture shortly before it was due to begin.

The results, from the 44 students who responded to a questionnaire, were that of the 14 (31.8%) students who had registered their mobile phone details 12 (85.7%) successfully received the advisory via SMS. From the remainder of the cohort 3 (6.8%) students received the advisory via e-mail, and a further 10 (22.7%) students received the advisory from a friend – presumably the SMS one (Griffiths & Hmer, 2004). Afterwards all but 5 (11.4%) of the students said that they would consider registering for an SMS service. Due to the generally positive feedback from the students the BlackBoard SMS project was established.

There are numerous advantages to integrating SMS functionality into BlackBoard, the most significant being that as the university VLE, BlackBoard plays a central role in delivering learning resources to students and is used by many of university's academic staff. Therefore integrating an SMS service into a familiar web-based environment such as BlackBoard ensures that it is both intuitive to use, and convenient for staff as they do not need to open a separate application.

Within BlackBoard itself the key concepts are those of courses, instructors, teaching assistants and students. Importing student data and course materials into a VLE is technically straight-forward, particularly as student details can be automatically populated from the university's student records system. Once a course has been created the instructor can place students into groups and upload learning resources. There are also tools available to assist in managing the course. Examples include a digital drop-box where students can submit their work, and communication tools such as discussion boards and e-mail. BlackBoard SMS fits into the latter category and allows an instructor to send and receive SMS messages.

In any project it is preferable not to reinvent the wheel, and to the authors' knowledge there are currently two "Building Blocks" (i.e. plug-ins) available that provide SMS functionality to BlackBoard. *alphaTXT* is freely available to educational establishments and allows SMS messages to be "broadcast" to all staff and students. Its primary use is in potential disaster and emergency situations such as when hurricanes Katrina (Wikipedia, 2005a) and Rita (Wikipedia, 2005b) struck the USA in 2005 (ClearTxt, 2005).

The limitation of *alphaTXT* is that it can only send broadcast messages, and so schools who require greater flexibility can purchase a more sophisticated version called *clearTXT*. This is more tightly integrated into BlackBoard and allows SMS messages to be sent to individual courses. It also allows automatic messages to be sent when the instructor uses the BlackBoard Announcement or Gradebook tools, and revenue can be generated by allowing businesses to contact students on an opt-in basis (ClearTXT, 2005).

Despite these existing products the university is developing its own Building Block to deliver SMS functionality through the MSc project. The key advantage of this approach is that knowledge of Building Block development is retained within the university and can be used in future projects. In addition the university encourages joint projects between departments as a way of sharing knowledge and strengthening working relationships. The findings from the BlackBoard SMS trials can also be shared among the ESMOS partnership and disseminated to European Universities participating in Socrates ERASMUS and Leonardo da Vinci mobility programmes.

This paper reports on the development and trial of BlackBoard SMS as a means for contacting students who are out of the country on an international work placement. The study is a collaboration between ESMOS, and the International Office and the Learning Technologies Centre at the University of Salford.

Development

In order to implement additional functionality within BlackBoard a developer must first write a Building Block using either Java or .NET. This is then uploaded to the BlackBoard server where the permissions requested by the developer are checked by the System Administrator before it is activated. Upon activation a Building Block can access the BlackBoard database (depending on the permissions) through the Application Programming Interfaces (APIs) as shown in Figure 1.

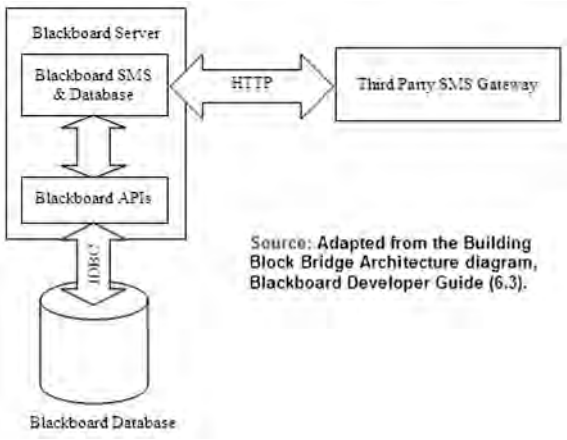

Figure 1. Building Block Bridge Architecture Diagram

The front-end of BlackBoard SMS is written in Java Server Pages (JSPs) which use JavaBeans to access student and course information. The interface is near-identical to BlackBoard's in-built e-mail tool in that it allows the instructor to select the recipients and compose an SMS message. This is then processed by a Servlet which retrieves the mobile numbers and sends the data to a 3rd party SMS Gateway for delivery to the recipient(s). Delivery reports and return messages from the students are then received and stored in a database where they can be retrieved on demand by the instructor.

Preliminary Results

Several departments have expressed an interest in trialling BlackBoard SMS by integrating it into their business practices to reduce operating costs, increase the speed of communication and to simply contact students in ways that were previously not possible. For example in some cases the Student Assistance Office wishes to send SMS messages to students instead of letters, which would result in a 75% cost saving. The International Office is employing BlackBoard SMS to streamline communication with students who are away on Erasmus exchanges and Leonardo placements. The use of 2-way SMS messages will allow them to ask a question and to expect a response within a matter of minutes.

At the time of writing one message has been sent by the International Office to 20 placement students (Figure 2) with a delivery success rate of 80% (16 students). The reason for the relatively high non-delivery rate was due to operator error in the first instance with the omission of a dialling code, in the second instance a student had provided a land-line number so the message had to be forwarded to an e-mail address. The third non-delivery occurred on a UK mobile, but the student later supplied a non-UK number and the message was re-sent and received. The final non-delivery appeared to be a network problem which was resolved after the SMS supplier was contacted and intervened on our behalf.

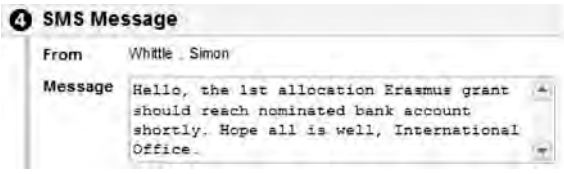

Figure 2. International Office SMS Message

An e-mail questionnaire was later sent to students (except the individual with the landline) in order to gain their opinions and to make improvements to the service based upon their feedback. Six (31.6%) students replied to the questionnaire the following day and another 1 (5.3%) replied 7 days later. As over half (63.2%) of the students had not replied more than 2 weeks after the questionnaire had been sent an SMS reminder was sent asking those students who had not replied to complete the questionnaire (Figure 3). This resulted in a further 5 (26.5%) responses the following day and another 1 two days later.

Although not all of the students had responded at the time of writing there are some interesting viewpoints that are worth sharing. There were 7 questions in total, all of which were free-text responses. The first question asked whether students were satisfied with the content of the SMS message (Figure 2), to which all responses were positive except one where there was some confusion as to who had written the SMS as it had not been signed by a named person, as would usually be the case in any e-mail correspondence.

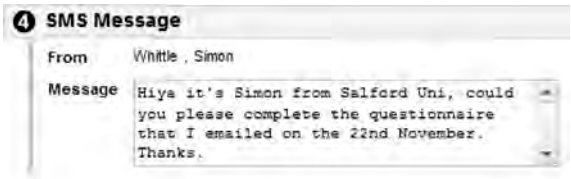

Figure 3. SMS Reminder Message

When asked if they knew that had they replied to the SMS message then their response would have been received by the International Office three quarters of the students indicated that they had not known. Students had not been told about this functionality as it had been assumed that as SMS is a 2-way medium they were all familiar with the concept and so did not need to be reminded. This is an interesting oversight which led one student (and probably others) to assume that the SMS message was from an automated service where it was not possible to reply, although some correctly pointed out that there was no need to reply in this case.

For the third question students were asked for their opinion on having a 2-way SMS conversation with the International Office, to which several students responded saying that they thought the idea was a little strange as SMS is a very personal form of communication. This has echoes of Longmate & Baber (2002) where it was shown that e-mail or face-to-face contact are considered to be the normal method of communication with staff by students, and so the idea of staff communicating via SMS would go against this norm. However after completing the questionnaire one student sent a question via SMS and so this needs to be followed-up to see if the reply met expectations. Also in response to the SMS reminder another student sent an SMS saying that he had a technical difficulty completing the questionnaire, to which the solution was promptly sent and we received his questionnaire the following day.

Several students said that the expense of sending SMS messages from abroad meant that the idea would be quite costly, but then another suggested that the cost would be cheaper than calling home. Some thought that it was convenient as they could not access their e-mails, and several students indicated that they would prefer a phone call if there were ever a problem. Harley (2005) suggests that SMS should encourage face-to-face meetings where possible, but due to the international nature of this trial this could instead be adapted to state that where appropriate SMS should prompt for further telephone or e-mail contact.

In the fourth question students were asked to state the differences in receiving an e-mail or an SMS from the university. The majority of the students said that SMS messages are quicker to receive, however this is misleading as in reality an SMS is likely to arrive just as quickly as an e-mail, but the difference is that an SMS is likely to be more effective at alerting the recipient to its arrival. Others pointed out that an SMS can contain only a short amount of information compared to e-mail and some said that as they regularly check their e-mails there would not be much difference unless the message was urgent.

Asked for their preferred method of communication with the International Office the general consensus was that for short reminders, time dependent or important messages then SMS would work well, but for longer messages e-mail should be used. Some students asked for both e-mail and SMS, while others asked for just e-mail. At present the International Office can send an e-mail using either a traditional e-mail client or the in-built e-mail tool within BlackBoard, but not from within BlackBoard SMS. Although e-mail functionality could be added without too much difficulty there is some reluctance on the part of the developer to implement this as there would be no return receipts received from the e-mails. This is due to the way in which BlackBoard is configured and so a traditional e-mail client would be a more robust solution, however if the demand were there then this could be implemented for staff convenience.

All but one of the students said that they would recommend the SMS service to a friend, with the other stating that "perhaps" s/he would recommend it to a friend as "…it wasn't especially dramatic as I actually knew I'd received my grant and it was just a test message". Finally students were given an opportunity to provide additional comment or opinion on the trial so far. One student asked that staff keep using normal English and not to start using shorthand "like the kids do", and another asked for the message author to be labelled more clearly. Another student stated that the service was not offering anything that e-mail could not, but then went on to say that s/he had good access to e-mail. Lastly one student highlighted the use of the SMS reminder as an effective use of the service.

Conclusions

This preliminary study of the use of SMS messaging by the International Office at the University of Salford has highlighted some of the technical issues and cultural complexities of integrating mobile technologies into staff-student communications at a HE institution. On the technical side there needs to be valid telephone numbers used at all times, but as has been shown this is open to human error which can lead to technical failure. As 2 (10%) of the messages did not arrive for unknown technical reasons there is still an element of uncertainty as to whether a message will be delivered. From the perspective of institutional culture, some students found the idea of 2-way SMS rather strange as it is more personal than e-mail and is not considered the normal mode of communication between staff and students.

However, one of the students involved in this trial had no hesitations about replying via SMS while another sent a query about the questionnaire to the International office via SMS, which was responded to immediately. It was found that the use of 2-way SMS is largely a matter of personal preference as it has not been integrated into the communication culture of staff or students at the university.

On the whole, it was felt that SMS messaging is good for short reminders, time dependent or important messages while e-mail should be used for longer messages. From the point of view of staff from the International Office, it has added value in that it enables them to contact the majority of students promptly to inform them of grant payments and important administrative and financial deadlines. Students are more likely to read urgent messages when sent via SMS, whereas e-mail is not necessarily read by all students on a regular basis – especially when they are abroad on a work placement. In this respect, the SMS trial has shown positive benefits for both staff and students.

From an international perspective, the trial has given weight to the use of SMS as an additional means of contacting mobility students during the phase abroad, as was suggested by the ESMOS Needs Analysis. It is important to note that SMS is best used as a complement to pre-existing modes of communication rather than as a replacement, and on this basis the International Office at the University of Salford expects to further incorporate SMS messaging into their business practices during the next academic year.

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TECHNOLOGY ENHANCED LEARNING WITH INTERACTIVE MULTIMEDIA ENVIRONMENT FOR MUSIC EDUTAINMENT

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Introduction

This paper presents a brief introduction to a European Commission supported project called i-Maestro, and concentrates on one of the new developments of the project related to the use of multimedia annotation, with particular focus on the use of 3D motion data and symbolic music representation.

I-MAESTRO EC IST Project

European music educational institutions need to increase their efficiency while reducing costs, in order to be more attractive and effective and to provide wider access. The i-Maestro project is supported by the European Commission under the IST Sixth Framework Programme to develop interactive multimedia environment for technology enhanced music education. The project aims to explore novel solutions for music training in both theory and performance, building on recent innovations resulting from the development of computer and information technologies, by exploiting new pedagogical paradigms with cooperative and interactive self-learning environments, gestural interfaces, and augmented instruments, with computer-assisted tuition in classrooms to offer technology-enhanced environments for ear- and practical-training, creativity-, analysis-, and theory-training, ensemble playing, composition, etc.

Music performance is not simply playing the right note at the right time. The i-Maestro project is studying and exploring many aspects of music making in order to produce methods and tools for music education with innovative pedagogical paradigms, taking into account key factors such as expressivity, interactivity, gesture controllability and cooperative-work among participants.

The main technical objectives of the projects include: basic research and development on new solutions and enabling technologies to support traditional pedagogical paradigms for music training; novel pedagogical paradigms, such as cooperative-working, self-learning and class-studying, with particular focus on Symbolic Training and Practice Training paradigms for string instruments exploring interactive, gesture-based, and creative tools; and a framework for technology-enhanced music educational models and tools to support the creation of flexible and personalisable e-learning courses to improve accessibility to the musical knowledge.

Multimedia Annotation for Music Learning and Teaching, and Practicing

In the interactively refined loop of teaching, learning and practising circle of music instrumental education (i-Maestro is currently focusing on strings instruments), annotation plays an important part, and this paper particularly concentrates on this aspect of the multimedia annotation feature being developed within the i-Maestro overall architecture.

In this case, multimedia annotation includes all forms of typical graphical annotation, such as bowing markings (by a teacher during a lesson, or by any player for memorizing etc), and other symbolic markings. Additionally, i-Maestro is exploring and integrating audio-visual materials to the music notation in order to provide further support to the learning cycle.

With the multimedia-annotation, a user can digitally record a piece of multimedia recording that relates to any part (a specific note, bar, phrase, ...or the whole piece) of the music score in symbolic music representation. The multimedia-annotation can be text (note, description, etc.), audio, video, gesture and/or sensor data (if the user has the appropriate setup), or a web-link to some other materials or references (e.g. reference to a musicological analysis of the music). They can also be a combination of two or more of these digital elements. Hence the user can add multimedia-annotation to provide additional information to any particular segment of the music score. For the interaction with the music score with conventional GUI (with mouse and keyboard) we are also exploring alternative control interfaces such as touch screen technology, gesture recognition of finger or bow, etc., to expand the range of possibilities, enhance the ease of use, and further facilitate the user by means of technological enhancement and advancement.

It can be very useful for a teacher to use the multimedia-annotation feature to provide instructions, guidance, demonstration, and/or further information to the student, to bring home the multimedia-enhanced i-Maestro exercise. The whole exercise is a digital object which contents the score and the annotations. It can be distributed over the network (e.g., WWW, P2P, etc.) and also with all the commonly available storage media, e.g. DVD, CD, flash memory, and others.

In addition to the usage (playback) of these recorded multimedia annotations, a student can also record and annotate any part of the score with their playing, e.g. video (of the playing), sensor, gesture, text (e.g. could be a question or a note), audio, etc. This is again packed and saved as a digital i-Maestro object which can be sent (over the Internet or using any digital storage media, as mentioned above) to the teacher for feedback or other purposes. In this way, i-Maestro can support and enhance the iterative cycle of learning, bringing the teacher and the student closer virtually, without physical limitations.

Symbolic Music Representation (SMR)

In order to support the above mentioned functionalities, it is of course necessary to represent the music involved in a symbolic representation that is machine readable to allow machine processing, rendering and to offer multimedia interaction to all the users.

Music notation editing for professional publishing and visualisation is one of the most traditional (see Sibelius http://www.sibelius.com, Coda http://www.finalemusic.com/, Capella, etc.). Music publishing requires the production of high quality music scores. In recent years, we have observed the emergence of several XML compliant mark-up languages for music modelling, among them: MNML (Musical Notation Markup Language), MusicML, MML (Music Markup Language), MusicXML, WEDELMUSIC, CAPXML, etc. Most of them are mainly focused on modelling music elements to preserve and interchange them among other applications. Only a few of the above mentioned formats are capable to cope with the needs of the innovative emerging interactive multimedia music applications. They are mainly based on proprietary and incompatible technologies in which the music content is recreated for each product, and for which the information exchange between products is difficult and strongly limited to the notational part.

With the spread of computer technology into the artistic fields, new application scenarios for computer-based applications of symbolic music representation have been identified by several activities. Music score annotation with multimedia for educational purpose is one of them, see solutions proposed by IMUTUS, MUSICALIS, Freehands, Yamaha tools, WEDELMUSIC or in theatres such as OPENDRAMA. Cooperative music editing in orchestras and music schools, as with project MOODS. Thus, a new concept of multimedia interactive music is growing, thanks to the several innovative products and supported R&D projects of the European Commission, like the ones mentioned above and the MUSICNETWORK centre of excellence (http://www.interactivemusicnetwork.org) All these applications are taking advantage of the multimedia integration and of distribution via Internet, satellite data broadcast, etc., to reach a large number of users and the mass market.

The MPEG symbolic representations of music is a logical structure based on symbolic elements that represent audiovisual events, the relationship between those events, and aspects of rendering those events. There are many symbolic representations of music including different styles.

The integration of Symbolic Music Representation, SMR, in a multimedia framework with technologies that range from video, audio, interactivity, will enable the development of a huge number of completely new applications like those mentioned earlier.

MPEG SMR will enable the synchronisation of symbolic music elements with audio-visual events that are represented and rendered using existing MPEG technology. The breadth of MPEG standards for multimedia representation, coding, and playback, when integrated with SMR will provide content interoperability and an efficient high quality, peer reviewed, standardized toolset for developers of these products.

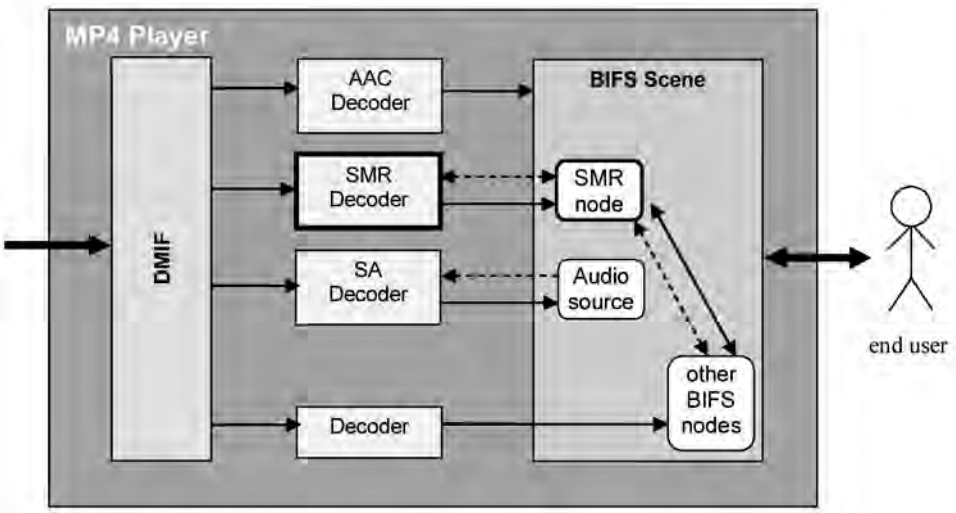

Figure 1. SMR in an MPEG-4 Player

Musical Gesture: Practice and Creative Interfaces

Musical gesture is perhaps a very much misused term with a wide range of implications. For this particular section, by musical gesture, we simply mean the physical motion of playing an instrument.

Currently, posture and gesture support for training and learning is supported by using images and/or video. However, this is generally not effective due to the inherent limitation of 2D perspective views of the media.

Playing an instrument is physical and requires careful coaching and training on the way a player position himself/herself with the aim to provide the most economical output with least physical effort. In many ways, this can be studied with respect to sport sciences to enhance performance and to reduce self inflicted injuries.

In this context, the i-Maestro framework is developing several related software modules for posture and gesture support with 3D motion capture systems. With these modules, a teacher can set up (either by recording or using from a predefined gesture library of motion data) certain posture and gesture 3D graphics to support a particular training or specify exercise. It is recommended that this is done during a lesson when the teacher can access the student's physicality and capabilities.

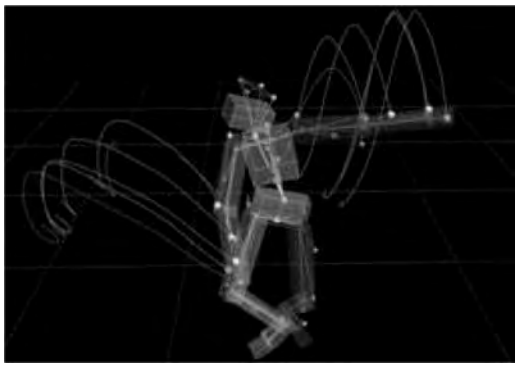

Figure 2. Visualisation of a 3D motion data sequence

When practising, using the above mentioned software modules, a student can view the posture and gesture sequences (3D rendering of the recorded motion data, see Figure 2) as prepared by the teacher, selecting viewpoints and studying the recording without the limitations of a normal 2D video. A student can also make use of the i-Maestro systems to capture and study their own posture and gesture, or to compare them with some selected models. Since posture and gesture of musical performance contributes to various nature of communication and expression aspects, the i-Maestro posture and gesture support tools also aim to analyse the inter-communications of two players (in a chamber scenario) to understand performance gesture for synchronisation (start, stop, tempo, etc.).

Based on the gesture analysis, creative interfaces can be created by utilising several i-Maestro tools to provide gesture controlled performance for motivating music learning at early stages and also to support casual interests. Gesture mapping using these technologies can be adopted to map different input for multimedia controls providing accessibilities to all.

Conclusion

This paper discussed the i-Maestro project and presented its basic aims and objectives. With the brief introduction, the paper focused on the discussion of a particular design feature to offer supporting tools for music teachers and students on multimedia annotation. It discussed the scenario and usage, together with the necessary technological requirements and state-of-the-art development, including the MPEG SMR.

i-Maestro utilises and improves the current standards related to music education. The project is exploring a unified educational model integrating theory and practice to maximise efficiency, motivation and interests in the learning processes and to contribute to the (i) deployment and improvement of ISO MPEG-SMR (Symbolic Music Representation) to support music education, (ii) the implementation of music notation/representation into MPEG-4, (iii) production of guidelines on how the music tuition courseware can be implemented in standard tools and models for distance learning.

The outcomes will be validated through a set of tools and methodologies including (i) tools and methods for music courseware production; (ii) interactive and creative tools for instrumental training in different environments such as classrooms and cooperative work, on different devices such as PC and Tablet-PC; and (iii) assessment and pedagogical models for music training.

The project includes demonstration and validation activities, which will be conducted by major European institutions such as Accademia Nazionale di Santa Cecilia (Rome), the Fundación Albéniz (Madrid) and IRCAM (Paris). The final results of the project will be incorporated in various products and services that will be made available to the public and to educational establishments.

The research and development of the i-Maestro project is on-going between 2005 and 2008. More information on the overall project and participations to the project activities, are available online at the project web portal www.i-maestro.net and www.i-maestro.org.

Acknowledgements

The research is supported in part by the European Commission under Contract IST-026883 I-MAESTRO. The authors would like to acknowledge the EC IST FP6 for the partial funding of the i-Maestro project (www.i-maestro.org or www.i-maestro.net), and to express gratitude to all i-Maestro project partners and participants, for their interests, contributions and collaborations.

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NOVEL MEANS IN TEACHING MUSIC FROM A DISTANCE

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Abstract

Despite the advantages of multimedia in creating meaningful and engaging learning, teaching academic music courses from a distance has some unique limitations, mainly due to the lack of direct interaction between the student and the teacher, the need to combine several learning sources simultaneously and the lack of tools to create integration between them. In order to overcome some of these limitations, novel instructional technologies can be implemented in the learning process. The present paper describes how a course Internet site is used in the teaching of the "Opera" course at the Open University of Israel. The advantages of integrating instructional technologies into music distance learning courses are discussed.

Introduction

The Open University of Israel (OUI) offers its students 11 academic courses in music appreciation, music history and music repertoire. All are distance courses, based mainly on the traditional model of distance teaching at the OUI, e.g., learning from the printed course books, 6-13 face-to-face tutorials per semester, and assignments that are mailed to an instructor who corrects and grades them. The music courses were accompanied by a set of analog cassette recordings of musical selections (currently replaced by compact discs) and in some courses also by video programs and video-taped performances. However, over many years of teaching it became clear to the academic instruction staff that teaching topics in music from a distance involves major difficulties and limitations, and the common model of distance teaching is inadequate for many music courses. The main difficulty stems from the fact that music instruction requires a high degree of interaction between the student, the teacher and the learning material, while traditional distance teaching enables only a limited degree of interaction and feedback. Moreover, the linear structure of a printed music course lacks the essential synchronization between the various components of music instruction, such as reading music, musical demonstrations and aural explanations. The student, whose knowledge of music theory may be limited, needs to read the text, locate the musical sample on the audio tape or the CD player, follow the musical score, and in the case of operas, also read the translation of the libretto from the screen while listening attentively to the music. When these different learning materials are provided in two or more separate components, following all of them at one time can be confusing, and the student often loses the logical track that links them. These limitations raise the question of whether teaching academic courses in music from a distance is at all possible (Isaacson, 2001).

The intensive integration of multimedia and the Internet into distance learning courses in recent years has provided new options in music education (Brandon, 1999; Clifford, 1999; Isaacson, 2001, Sharon, 2005), although many of the Internet components in a music course require a fast and broad-band Internet connection. There is a growing evidence for the effect of "real-time learning", that takes place when learning occurs by using simultaneously different media resources (Eshet & Chaiut, in press; Eshet in press). This issue is illustrated by the approach and design discussed in the present paper.

An Internet site for facilitating the distance learning of music

At the OUI, Internet sites have been constructed for all academic courses offered by the university. The sites serve as the main communication links between students and tutors, and offer learning and enrichment materials, as well as assistance in learning. In the teaching of music from a distance, the Internet site is especially useful for students with only a limited musical background. Presented here is the Internet site of the "Opera" course (Figure 1), a course for which previous musical knowledge is not a requirement. The site includes the following components:

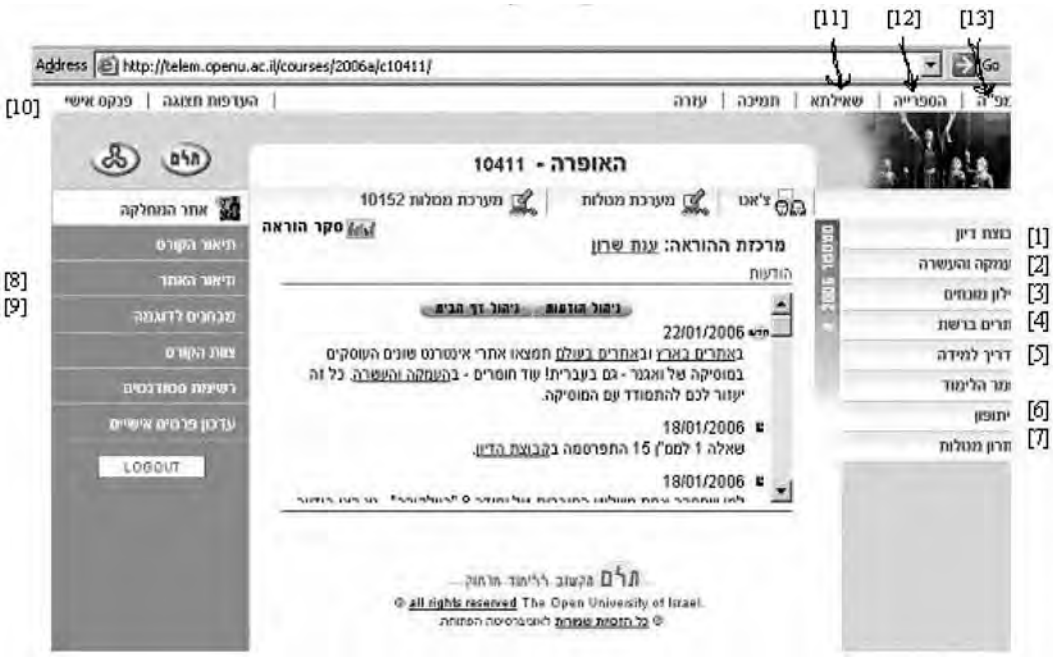

Figure 1. Home Page of the “Opera” course

- A notice board, used by the tutor and/or course coordinator for sending announcements to the students rapidly and economically (located in the center of the course Home Page).
- Discussion group (“Forum” [1]), in which the students can discuss, with each other and/or with the tutor or course coordinator, various study topics, ask questions and receive clarifications about the written study materials or about their homework assignments, recommend Internet sites, recordings, interesting events or articles, share lesson summaries and so on.
- Support and additional study materials for enrichment [2]. These pages include links to a music glossary, music notes, recordings and illustrations (Figure 2).

Figure 2. Enrichment page, including links to the glossary, music notes and recordings

The enrichment materials also include instructional video films produced by the OUI, presented by an actor. These films show original performances of selected scenes from the operas discussed. Each film is divided into titled sections that allow the students to navigate within it according to the specific topic under discussion (Figure 3).

Figure 3. A frame from the instructional video film

- An interactive hyperlinked glossary of musical terms [3], which includes audio samples and selections of musical works that exemplify the term defined. Each musical term used within a particular definition is linked to its specific definition (Figure 4).

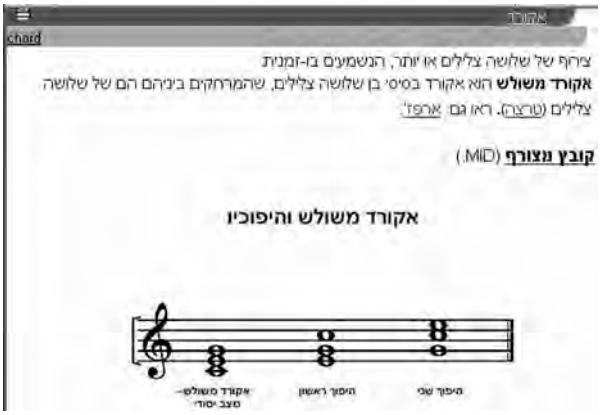

Figure 4: A definition of musical term in the Internet site's interactive hyperlinked glossary, which includes audio (midi) sample of the notes used in the definition

- Links to various Internet sites [4] that deal with the study subject, and that broaden its scope or provide visual elaborations not included in the course study materials. These links are gradually presented during the semester, in accordance with the topic being studied.
- A study guide [5], which directs the students, stage by stage, in how to contend with the different components of the study materials, how to make their learning process efficient, and how to cope with the assignments and with preparing for the final examinations.
- Some of the assignments in the "Opera" course are *shared assignments*, using special software developed by the Holon Academic Institute of Technology, Israel [6]. Here the students can compare their answers to those of other students, comment on the answers of others and gather all the information for preparing for the final examination (Figure 5).

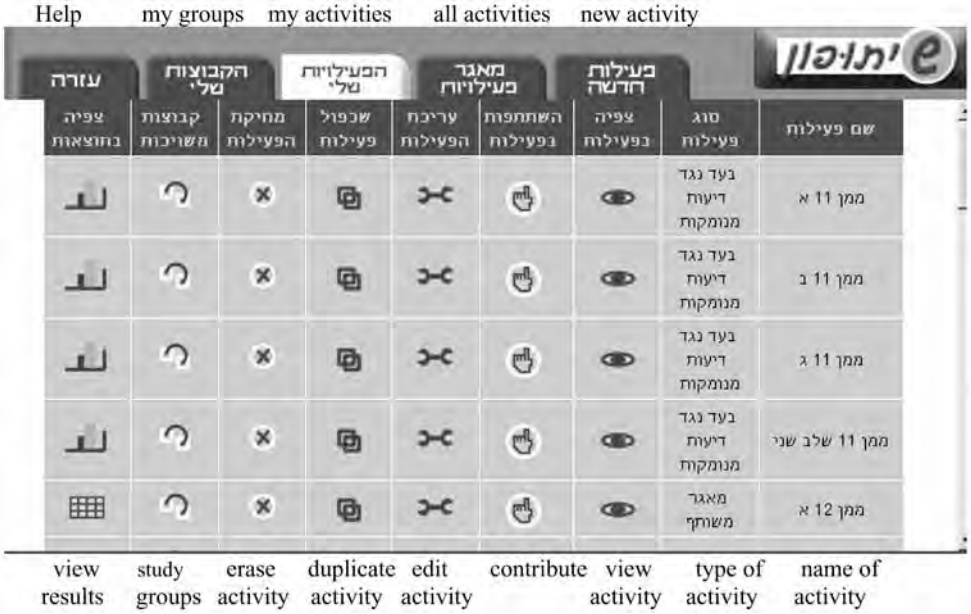

Figure 5. The “Shared Assignment” software (tutor’s view)

- The students receive authoritative answers to the assignments from the course coordinator after the final due-date [7].
- A detailed guide help the students navigate through all the course site’s pages [8].
- Exemplary examinations are presented, assisting the students to prepare for the final exams [9].
- The students may use a *personal notebook* [10], where they can write notes for personal use, save materials from the course site and keep them for preparing for the examination. The personal notebook accompanies the students throughout their studies at OUI in all their courses.
- Other links on the course Home Page enable the students to receive announcements from the OUI administration [11], connect to the library Internet site [12] and view the calendar of the course activities [13].
- The students can both submit their assignments and receive them back with the tutor’s comments through the course Internet site [ ]. Not only does this speed up the process of remitting and the receiving the corrected assignments back from the tutors, it also provides for a copy of the assignment to remain with the tutor for future reference. Grades are transmitted automatically and directly to the administration.
- With the spread of the chat-room culture, an increasing number of students use the chat-room of the course site [ ].

Students’ use of the course Internet site

The following statistics show the students’ entries to the course Internet site during the month of March 2005 (the first month of the semester) and the month of June 2005 (the last month of the semester, during which they prepare for the final examinations). There were 18 students in the course group at the time.

Overall statistics report for March 2005

(Figures in parentheses refer to the 7-day period ending on 31-Mar-2005 at 24:00).

Successful requests: 6,079 (1,482)
Average successful requests per day: 196 (211)
Successful requests for pages: 6,026 (1,457)
Average successful requests for pages per day: 194 (208)

Failed requests: 178 (89)
Redirected requests: 141 (23)
Distinct files requested: 82 (57)
Distinct hosts served: 939 (257)
Corrupt logfile lines: 2
Unwanted logfile entries: 1,341
Data transferred: 260.83 megabytes (56.83 megabytes)
Average data transferred per day: 8.42 megabytes (8.12 megabytes)

The following report lists the activity in each week. Each unit (■) represents 60 requests or part thereof:

week beg.:	reqs:	pages:	%pages:
27/Feb/05:	608:	608:	10.09%:
6/Mar/05:	1246:	1231:	20.43%:
13/Mar/05:	1311:	1311:	21.76%:
20/Mar/05:	1671:	1658:	27.51%:
27/Mar/05:	1243:	1218:	20.21%:

Overall statistics report for June 2005

(Figures in parentheses refer to the 7-day period ending on 30-Jun-2005 at 24:00).

Successful requests: 7,995 (2,545)
Average successful requests per day: 267 (363)
Successful requests for pages: 7,441 (2,350)
Average successful requests for pages per day: 248 (335)
Failed requests: 99 (25)
Redirected requests: 387 (245)
Distinct files requested: 59 (48)
Distinct hosts served: 945 (274)
Corrupt logfile lines: 3
Unwanted logfile entries: 3,471
Data transferred: 285.96 megabytes (100.78 megabytes)
Average data transferred per day: 9.55 megabytes (14.40 megabytes)

The following report lists the activity in each week. Each unit (■) represents 80 requests or part thereof:

week beg.:	reqs:	pages:	%pages:
29/May/05:	886:	830:	11.15%:
5/Jun/05:	2343:	2235:	30.04%:
12/Jun/05:	1438:	1324:	17.79%:
19/Jun/05:	1173:	1043:	14.02%:
26/Jun/05:	2155:	2009:	27.00%:

With the spread of the Forums culture, an increasing number of students use the course Forum frequently. The Forum of the spring semester of 2005 contained 8 web pages, with more than 400 messages.

This extensive use of the course Internet site shows that it answers a real need for the students and provides an intensive help in the learning process.

The URL of the current “Opera” home page is:

http://telem.openu.ac.il/courses/2006a/c10411/ (The semester code changes every 6 months). Most of the pages on the site can be accessed only with the user’s password, which is given to the students of that semester only. However, the glossary of musical terms is open to all.

With the generous support of the *Chais Research Center, The Open University of Israel.*

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CAN WE "SEE" THE SOUND? NEW AND CREATIVE SOLUTIONS IN MUSIC AND PHYSICS EDUCATION THROUGH HANDS-ON AND ICT-BASED ACTIVITIES[1]

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Introduction

Information and Communication Technology (ICT) is one of the key factors in knowledge creation and may also offer links between different factors of the knowledge creation process (Jäkälä & Berki, 2005). Nowadays ICT could provide pupils the means to set free their creative potential and imagination because it offers them new interactive tools to capture, edit and combine sounds and express themselves through improvisation and computer-based compositions (Nilsson & Folkestad, 2005). The modern digital technology also offers educators a chance to bridge the gap between music *in school* and *music outside school* (e.g. Mawuena Kwami, 2001, Hargreaves & Marshall, 2003) for an effective Music Education curriculum (Spetsiotis & Kampylis, 2005).

Nowadays, an ordinary personal computer with the suitable software and hardware could be transformed to a powerful and cost-effective system for digital recording, editing and playing back of sound and music. ICT in general can provide pupils and educators with tools, which were available only in expensive and specialized studios a few years ago. The computer-based recording, editing and combining of sounds offer new learning opportunities in the teaching of Physics, Mathematics and Music and liberate pupils' creativity (Kampylis, 2005).

These kinds of issues are inherently multidisciplinary. One needs to understand, in addition to educational subjects, their psychological dimensions, information systems concepts, usability theories and social aspects. Here, we outline a research approach which can, perhaps, best been classified under cognitive science. In this approach we search for concrete solutions to the music and physics education as well as a way of combining different types of knowledge in the whole. This means that we have to meet some and solve a number of important foundational problems (Saaariluoma, 1997).

In concrete, this work presents new, integrated solutions enabled by ICT in Greek primary schools in fifth and sixth grades (10-12 years old) in learning and understanding concepts from Music, Physics and Mathematics education. We present the experience gained from primary school projects with classroom-made sound devices together with ICT-based activities in capturing, recording, manipulating and refining sounds using appropriate software and hardware. Moreover, this presentation will demonstrate that in primary schools, starting from the building of a simple sound device, educators and pupils can design and realize cross-disciplinary projects that help pupils gain a deeper understanding of shared knowledge concepts and principles that are found in Physics, Music and ICT. In our research context we explore the following questions:

- In terms of skills, what is social and what is individual?
- What happens in children's understanding when they visualize the sound?
- What do they think when they "see" the sound?

We need here to understand the development of human skills as a consequence of systematic training (Ericsson and Lehman, 1996, Krampe and Ericsson, 1996, Saariluoma, 1995). We have also understood how multimodal information enhances skill development and creativity. It is also necessary to combine this knowledge with modern ICT-teaching technologies, e-learning environments and educational principles.

[1] This research work is supported by the Greek State Scholarships Foundation.

From hands-on to ICT activities: creative ways to teach sound properties

The project

During the academic year 2000-2001 we implemented a twelve hours inter-disciplinary project called "Can we 'see' the sound?" in the 5th grade in the 13th Primary School of Piraeus, Greece. During the academic year 2004-2005 we implemented a similar project for the 6th grade in the 2nd Primary School of Nea Philadelphia, Greece. In these projects we tried to put into practice some of the basic psychological principles, coming from diverse areas of psychology such as pupils' active involvement and social participation through meaningful activities that help students to share and transfer knowledge (Vosniadou, 2001). Our research and learning objective so far has been to enhance pupils' motivation to think, understand, learn, and conceptualize. We have been trying to give them the means and the opportunity to construct their own creations through hands-on and ICT-based activities, because we strongly believe that pupils should not spend their whole energy and time to study the work of others but they should have energy and time to create, explore and question.

The projects put side by side activities that embody conceptual structures shared by Music, Physics, Mathematics and ICT. Abstract concepts such as periodicity, units, patterns, sound-waves, frequency and intensity became more specific and are visualized through the construction of hand-made sound devices from trashy materials such as oscillographs (Figure 1) and kazoos (Kampylis & Spetsiotis, 2000, Kampylis & Berki, 2005). For instance, Figure 1 demonstrates how the pupils were able to "see" sound waves, using a classroom-made "oscillograph". In that way, simple but functional sound devices worked as raw materials for a deeper exploration and understanding of concepts such as sound waves and as stimuli for further investigations using ICT, which is called upon to play a special role as mediator. Pupils moved across action in real world (hands-on activities) and action in virtual world (ICT-based activities), invoked *different sensory modalities and multiple representations* (see e.g. Bamberger, 2000).

Figure 1. A classroom-made "oscillograph" from the 5th Grade of 13th Primary School of Piraeus

New technologies

Pupils used the School IT Laboratories to explore sound waves in particular and sound properties in general through ICT, having the opportunity to use:

- Network of multimedia PCs with soundcards, speakers and ISDN connection to the Internet
- Classroom-based PA system, 8 channel mixer and a unidirectional dynamic microphone
- Music software (audio editing: CoolEdit 2000, sequencing: Sonar 2, notation: Finale 2000)
- MIDI keyboard
- Stereo tape recorder
- CD & DVD players and writers
- Digital projector

Firstly, pupils searched the Internet to find web sites with relevant data, information and applications. A large proportion of Internet-based information relates directly or indirectly to sound and music in general: sounds, sound-effects, scores, lyrics, songs, software, articles, instructions, lessons, applications, games, videos, simulations and so on. Four of the web sites we used are the following:

- Exploratorium: Applications of science concepts, their on-line exhibits, videos and further questions, http://www.exploratorium.edu/music/index.html
- HyperPhysics: Mathematical and scientific background of the properties of sound http://hyperphysics.phy-astr.gsu.edu/hbase/hph.html
- The physics of sound: Concepts of physics and their graphical representations http://library.thinkquest.org/19537/Physics5.html
- The Virtual Museum of Music Inventions: Images and sounds of pupils' music inventions http://www.musicinventions.org

Secondly, pupils explored sounds through music software which allowed them to record, edit, manage and combine sounds. During the digital processing pupils had the opportunity to *change* every parameter and characteristic of the sound (e.g. pitch, intensity, timbre, velocity) and hear the outcome in *real time*. In addition they could simultaneously observe waveforms, diagrams, graphs and symbolic representations of sounds (Figure 2). This is very important; many great pedagogues such as Z. Kodaly, J. Dalcroze and M. Montessori have emphasized the importance of *multi-sensory* approach to music education for all pupils. Music software (e.g. CoolEdit Pro, Finale 2000 and Sonar 2) offer instant transformations of symbols to sound and sound to symbols; these graphical representations enhanced visibility and conceptualizations of sound properties.

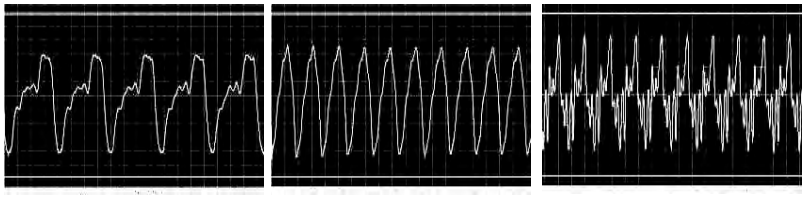

Figure 2. Images of sound-waves from Cool Edit Pro software: C (piano), C' (piano), C' (violin)

Representation, perception and understanding of sound properties

According to C. Seashore (1938) "[…] what is conveyed from the musician to the listener as music is conveyed on sound waves […] The sound waves are measurable, and there are only four variables which have musical significance: *frequency, intensity, duration,* and *form.* The infinite variety of musical sounds can be reduced to these four variables and measured in terms of them. The psychological equivalents (or correlates) of these characteristics of sound are *pitch, loudness, time*, and *timbre*. Rhythm, harmony, volume, and tone quality are compounds of these; thought, feeling, action, memory, and imagination are in terms of these. We thus obtain a basic classification of all musical phenomena and give each its place in the family tree with its four large branches: the *tonal*, the *dynamic*, the *temporal*, and the *qualitative*".[2]

The sound waves and their variables frequency, intensity, duration, and form (see images of Figure 2) are fundamental concepts in Physics Education and the characteristics of sound (pitch, loudness, time, and timbre) are fundamental concepts for Music Education for fifth and sixth grade in the Greek primary school education. We believe that ICT provides the appropriate mean to capture, change, refine and combine sounds (DfEE-QCA, 1999) instantly, cost-effectively and in a multi-sensory way.

One of the core problems here is the development of multimodal representation. How and why visually presented materials may help in conceptualizing music? We have very little understanding on these issues today though we have information about how motor movements develop and are linked with musical skills (Krampe & Ericsson, 1996). The key issue is to understand what kind of conceptual change is induced by multimodal presentations of musical information (Vosniadou, 2001).

Using creatively hands-on and ICT-based activities to enrich perception of sound properties

Our primary aim has been to develop the creative potential of pupils through meaningful and motivational activities. We think that it is not sufficient to limit the learning process in simple forms of

[2] The italics in the text was the initiative of the present paper authors

interaction in developing skills. We want to ask how we can be liberated in e-learning activities from the relatively passive motor processes in interaction with keyboard and screen into holistic and more realistic modes of learning. We believe that this should raise motivation and make the teaching results more permanent. The second point is to activate interaction between pupils through ICT-based (e-learning) actions.

The role of hands-on activities

Looking for creative ways to demonstrate sound properties in Music and Physics Education, we have noticed that a combination of hands-on and ICT-based activities has been the most fruitful method. According to M. Wartofsky (as cited in McDonald *et al.*, 2005) the two fundamental forms of human activity are the *making of things* and *social interaction*, especially in their integration. The making of things is essentially related to the production and use of tools. Hands-on activities such as the construction of classroom-made sound devices and musical instruments through trashy materials set pupils' creative potential free. The team work and the development of interpersonal intelligence in addition to a cross-disciplinary approach to knowledge, and the connection with other curriculum subjects enhanced creative thinking. Pupils learned how to use simple tools and obtained practical skills such as nailing, rasping, and cutting. They assimilated new knowledge through the design and creation of a complete and useful "product" in a cost-effective way (Kampylis & Berki, 2005). Pupils learn effectively when they participate in inventive and meaningful projects; when their artistic learning is the result of their artistic production; when there is an exchange among the various forms of knowing. (e.g. Gardner, 1990)

The role of ICT-based activities

ICT acted also as a tool and as a distinctive medium for exploring sounds. For example, pupils used ICT to record, edit and manage sounds (analogical and digital). ICT strongly influenced the creative process and enabled pupils to transform, manipulate, compose and exchange sounds in many ways. For instance, pupils created repetitive sound patterns and structures (e.g. loops) through sequencing software (Sonar 2) and on-line applications[3] as a base for their improvisations and creative expressions. By using ICT in classroom, we did not try just to insert a new tool to old practices; on the contrary, a *new educational culture* emerged rather than a new educational technology (Papert, 1997).

It is our firm belief that through an integrated and balanced approach of hands-on and ICT-based activities, pupils enhance their social and individual (cognitive) skills, and express/construct their musical identities. This combination can be a powerful means to include themselves in the learning activities (see e.g. Berki 2005), and this can determine skills, confidence and achievement. More specifically, we have observed that through hands-on and ICT-based activities pupils:

- Participate, act, create, think, design and implement. Pupils are not passive receivers!
- Work in groups co-operatively and communicate with others
- Access, select, interpret, manage and present data and information
- Be creative and do things by trial-and-error
- Gain confidence to be self-organized, independent learners
- Recognise patterns, relationships and symbols through different representations
- Hypothesise, predict and model
- Evaluate, review and modify their work
- Implement cross-disciplinary approach to knowledge and connect creatively many subjects
- Express themselves and learn with fun (edutainment)

[3] For instance Dot mixer application in Exploratorium – Science of Music
http://www.exploratorium.edu/music/exhibits/dotmixer/index.html

Discussion – From information and knowledge society towards a music skills society

Through our past and ongoing work in primary schools we want to support the need for multidisciplinary curricula in primary education. Enhanced ICT and new digital forms can provide the learning technology to facilitate critical thinking through suitably-designed constructivist activities. The new technology has an important role in ensuring that the foremost focus in music education is on *music making*, involving the acquisition of musical knowledge and understanding, skills and attitudes through practice (Mawuena Kwami, 2001). ICT makes most effective contribution when it is integrated with hands-on activities and other resources in a playful, non-deterministic approach; it is the means, not an end in itself! We believe that it should be used in the classroom when it enables the pupils to do something impossible by other means or to do it more effectively, easily, or instantly; in our case it was utilized to distinguish and compare among human-made acoustic sounds and sounds produced electronically.

Minsky (1981) in his work of "Sonata as Teaching Machine" asks: "What is the difference between merely knowing (or remembering, or memorizing) and understanding?" He continues arguing that in order to understand something, we must know what it means, but, for a thing or idea to seem meaningful, it happens only when we have many different ways to represent it within different perspectives and different associations. "Then we can turn it around in our minds, so to speak: however it seems at the moment, we can see it another way and we never come to a full stop. In other words, we can 'think' about it. If there were only one way to represent this thing or idea, we would not call this representation thinking" (Minsky, 1981).

One of the ultimate challenges from user psychological point of view in e-learning is to design such ways of interaction during teaching contacts, which do not essentially change the performance. In teaching music one must create interaction environments, which allow pupils to act unlimitedly with the ICT environment in ways that are characteristic to music. This means free motor movements, natural forms of social interaction, effective conceptualizations and multimodal development of skills. Human, and in particular e-learning, technologies can be sophisticated tools, considered as collaborative and communicative *pupilware* to create a music skills society that could assist in expressing and creating our musical identities. Individual and social inclusion through ICT-mediated musical activities can then be realized, and that alone could advance knowledge and information society. Similarly, in ancient Greece's educational curriculum, Music, Sports and Mathematics were the only subjects taught, with Music being a multidisciplinary subject integrating any other subject in the curriculum.

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ERMIONE – AN E-LEARNING RESOURCE MANAGEMENT SERVICE FOR CONSTRUCTING INTEROPERABLE NETWORKS IN THE EUROPEAN CULTURAL HERITAGE DOMAIN

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1. Introduction

Cultural heritage is defined, according to the United Nations Educational, Scientific and Cultural Organization (UNESCO), as 'our legacy from the past, what we live with today, and what we pass on to future generations' [1]. According to the most important international treaty in this area, named the 'Convention concerning the Protection of the World Cultural and Natural Heritage' [2] adopted by the UNESCO General Conference (Paris, 16th October 1972), cultural heritage includes monuments (architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science), groups of buildings (because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value) and sites (works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view). Subsequently, the concept of cultural heritage has been broadened and includes also the 'intangible cultural heritage'. According to UNESCO this is defined as 'the practices, representations, expressions, as well as the knowledge and skills, that communities, groups and in some cases individuals, recognise as part of their cultural heritage' (manifested *inter alia* in the following domains: oral traditions and expressions, including language as a vehicle of the intangible cultural heritage; performing arts; social practices, rituals and festive events; knowledge and practices concerning nature and the universe; traditional craftsmanship) [3].

The importance of protecting and safeguarding cultural heritage in all its forms, tangible and intangible, has been widely recognised. Especially for Europe, its rich cultural heritage is of critical importance. For this reason, the European Union regards the protection and management of European cultural heritage as a highly significant issue, both as a vehicle of cultural identity and as a factor in economic development; the European cultural heritage section at the official web-site of the European Union stresses that 'How much people know about cultural heritage depends both on what is done to promote it and also on the capacity of Europeans to become familiar with and appreciate their own culture and these of the other EU Member States' [4]. In 1974, the European Parliament adopted an initial resolution, concerning the need for Community action in the cultural sphere, with special emphasis on the protection of cultural heritage. Since 1993, the Treaty establishing the European Community has provided a legal basis, specifically for activities concerning the preservation and enhancement of cultural heritage. Article 151 of the Treaty stipulates that the Community must support and supplement action by the Member States in order to conserve and safeguard cultural heritage of European significance. In this direction, the action initially taken by the Community was mainly focused on supporting the restoration of 'built heritage', such as the Acropolis in Athens and the Chiado historic centre in Lisbon. However, subsequently the Community enriched its spectrum of activities in this area, and took actions with regard to 'movable and immovable heritage (museums, collections, libraries and archives); archaeological and architectural heritage; natural heritage (landscapes and sites of natural interest); linguistic and gastronomic heritage, and traditional occupations' [4].

Information and Communication Technologies (ICTs) offer tremendous capabilities for improving all the functions of cultural heritage management, such as collections management, scholarly study, restoration and preservation, dissemination to the widest possible audiences, etc. According to the 'DigiCult Report' of the Directorate-General for the Information Society of the European Union [5] the digitisation of cultural heritage resources create new opportunities for reaching much wider audiences (e.g. much wider than the people residing in or visiting the place where a specific museum or archaeological site is located), and also for offering them enhanced and attractive interactive cultural heritage services and products.

In the same report, it is also concluded that the most important application area for such digital cultural heritage services and products will be for education purposes, even though significant demand is expected for recreation purposes as well; however, it is also stressed that in order to produce highly valuable services for these audiences at reasonable costs, extensive co-operation and co-ordination will be required between cultural heritage institutions; the participation of both bigger and smaller cultural heritage institutions will be of critical importance.

In these directions, an attempt to contribute is the eRMIONE (e-Learning Resource Management Service for InterOperability Networks in the European Cultural Heritage Domain) project (www.ermione-edu.org), which is described in this paper. Initially the background and objectives of this project are outlined. Then, the platform's functional and technical architecture are described and finally the methodology of the project is briefly analysed, followed by the conclusions.

2. Background and Objectives

Most cultural heritage institutions (museums, galleries, libraries, archives, etc.) are facing rapid and significant transformations, due to the development of new highly sophisticated ICTs. At the same time, this transformation is also affected by a re-examination of their role in modern societies and an increase of demands and expectations of all the users concerned. Cultural heritage institutions are transformed gradually into 'hybrid institutions', having to manage both 'real' (material) and digital cultural heritage resources, the latter usually including both digitisations of their 'real' resources and 'born digital' resources (which have been created from the beginning in digital form); also, based on the above resources, they have to offer high quality, 'traditional' and digital cultural heritage services and products. However, the supply of such products and services (by numerous museums, galleries, libraries, archives, etc., geographically dispersed) and the demand for them (by numerous cultural and educational organizations and also by individual consumers) are highly fragmented. Moreover, the development of highly valuable digital cultural heritage content and courses necessitates the formation of partnerships and networks from digital cultural institutions (e.g. many galleries from several countries with paintings of the same artist), educational organizations, commercial promotion companies, ICT companies, etc.

Electronic marketplaces, according to the extensive relevant literature (e.g. [6], [7], [8]), can improve significantly the functioning and the efficiency of markets, characterized by high levels of supply fragmentation and demand; moreover, electronic marketplaces can also support the collaboration among their participants for the design, production and delivery of new products and services. Such an approach can be very useful in the European cultural heritage sector, especially if it is combined with effective e-learning capabilities, which according to the relevant literature (e.g. [9], [10], [11], [12]), have significant advantages: improved quality of education (e.g. through increased use of multimedia educational content including images, audio, video, etc.), easy and low cost modification, educational content update, increased 'learner centricity' and personalization capabilities, reaching wider audiences, cost reductions, alleviation of capacity constraints, etc.

In this direction, eRMIONE project, which is implemented as part of the eTEN Program of the European Union (with a total duration of 18 months), aims at the initial development (up to the level of a number of pilots) and the market validation of an eRM (e-learning Resource Management) service. The platform is based on an electronic environment (http://ermione.eurodyn.com) supporting the collaborative development and delivery of complex digital content and e-courses, concerning the European cultural heritage. The consortium was formed by educational institutions (e.g. Universities), commercial promotion companies, ICT companies, etc., from all over Europe. eRMIONE aims at creating an 'electronic-one-stop-shop' for learners, teachers and researchers in need of cultural heritage resources (content and e-courses); in particular, eRMIONE aims at providing the learners, teachers and researchers a wide range of electronic content and training courses, coming from cultural and education actors from all over Europe. It will allow teachers to build courses concerning European cultural heritage, by using content and e-learning modules from multiple cultural institutions and to create and operate virtual classes with students from all over Europe; these mixed studying groups will be able to follow multicultural education programmes, share their experiences and enhance their knowledge about the European cultural heritage. It will offer the learners a valuable opportunity to follow virtual classrooms consisting of students coming from all over Europe, and to access to high quality courses, contents and virtual classrooms under a European dimension and without limitation of time, place and pace.

The higher education sector is expected to be one of the most active users of this service. A 'technology provider' company will be responsible for the technical administration of the electronic environment that will support this service. Also, commercial companies will be responsible for promoting and selling this service. The whole business model of this eRM service that will be developed and market validated in the eRMIONE project, is shown in Figure 1.

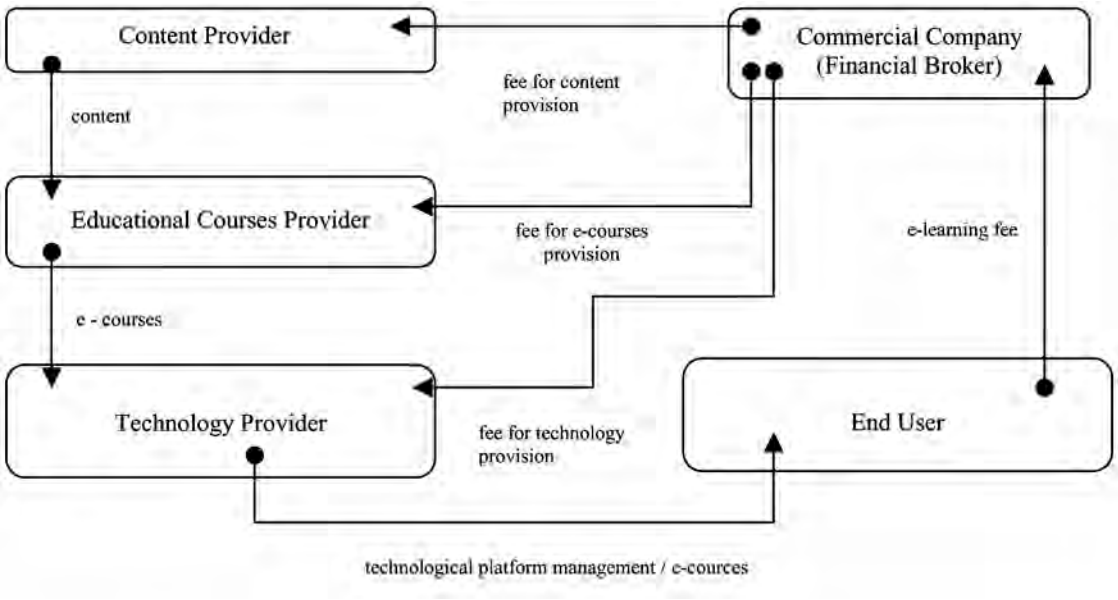

Figure 1. Business model of the eRM service of eRMIONE project

For achieving the above objectives, eRMIONE consortium actually consists of prestigious content providers, higher educational institutions and technical and commercial service enablers. In particular, the content providers are: Fratelli Alinari (www.alinari.it), possessing the oldest photographic archive in the world, Tilde (www.tilde.lv), an innovative digital archive provider based in Latvia and NDAP, the Head Office of the State Archives of Poland (www.archiwa.gov.pl) that will bring to eRMIONE project their valuable collections of records and documents. Also, two higher education institutions will create, manage and share electronic training courses addressing cultural heritage matters: University of the Aegean (www.aegean.gr) that will provide its experience in the areas of cultural informatics and e-learning, and Katholieke Universiteit Leuven (www.kuleuven.ac.be) that will provide its relevant expertise in intercultural learning and research processes. Also, there are three service enablers in order to define the business strategy, to set-up the pilot service and to ensure that all components are properly put in place: Fondazione IARD (www.fondazioneiard.org) as project coordinator, European Dynamics (www.eurodyn.com), as technology provider and technical administrator of the electronic environment (IT platform) and Atos Origin (www.atosorigin.es) that will bring its expertise in the areas of market studies and business development.

3. Functional Architecture

In Figure 2 below, the functional architecture of the electronic environment of the project is shown. It has a hierarchical structure. At the highest level of this hierarchy we can see the 'Site level', which is only accessible by 'platform administrators', who will set up the 'communities' (each community can be considered as a virtual university, offering a number of courses), as well as connections to particular (existing) user directories. The 'Community level', which is the second level in the hierarchy, will be accessible by the 'community administrators', who will be responsible for connecting courses to each community and for securing the services to them. The basic platform item, the course, is located at the third level, which is the 'Courses level'; this level includes eight basic services, which support the collaborative development and delivery of complex digital content and e-courses: web content manager, documents manager, courses manager, group manager, search engine, calendar, forum and e-mail. This third level is accessible by all users of the platforms (such as 'course coordinators' (tutors) and 'course attendants' (students)), all with different access rights.

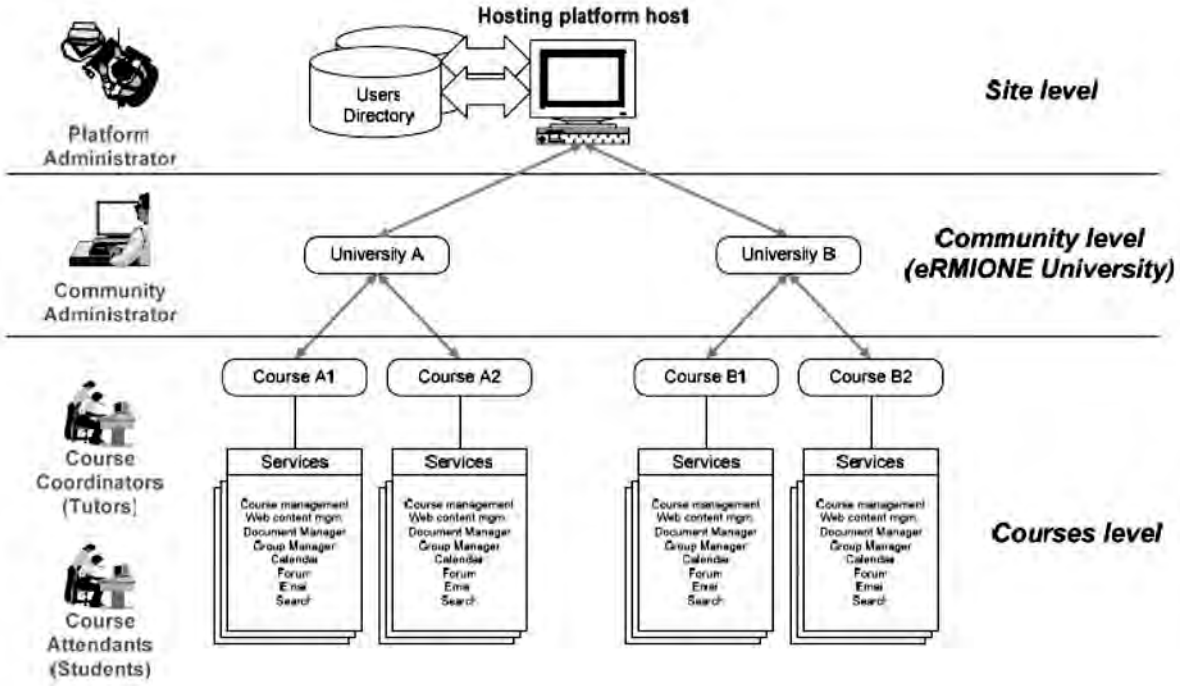

Figure 2. eRMIONE functional architecture

The above functional organization of the platform and its services, in combination with its technical architecture described in the next section, offers enhanced scalability and extensibility. This flexible and hierarchical organisation enables also the definition of clear roles for each system user and an easier implementation of the security module.

4. Technical Architecture

In Figure 3 we can see the technical architecture of the electronic environment of the project. It is three-tier architecture, based on J2EE and following the J2EE standards and suggestions. Concerning the 'client tier', it can be accessed through several client types, such as standard web browser, desktop applications, personal digital assistants (PDA), mobile devices and third party systems exchanging content in standardized ways. In the market validation phase of the project web browsers and mobile devices (using SMS) will be used as clients; however, depending on the market needs, other mobile devices will be enabled in the initial deployment phase. In the 'middle tier' Servlets and JSPs are responsible for collecting the user input and presenting the system response. The controller servlet on the other hand is a special type of servlet and connects the presentation tier with the business logic tier. The web services module gives the eRMIONE platform an additional dimension for interconnecting its services and content to other external systems and applications. For presentation purposes, several service methods (user login, list of available courses, list of available universities and list of course members) are available. Other platform methods can also be made accessible via this way. Furthermore, the architecture also supports several connections to possible back-ends (LDAP, file system, database, etc.) as shown in Figure 3.

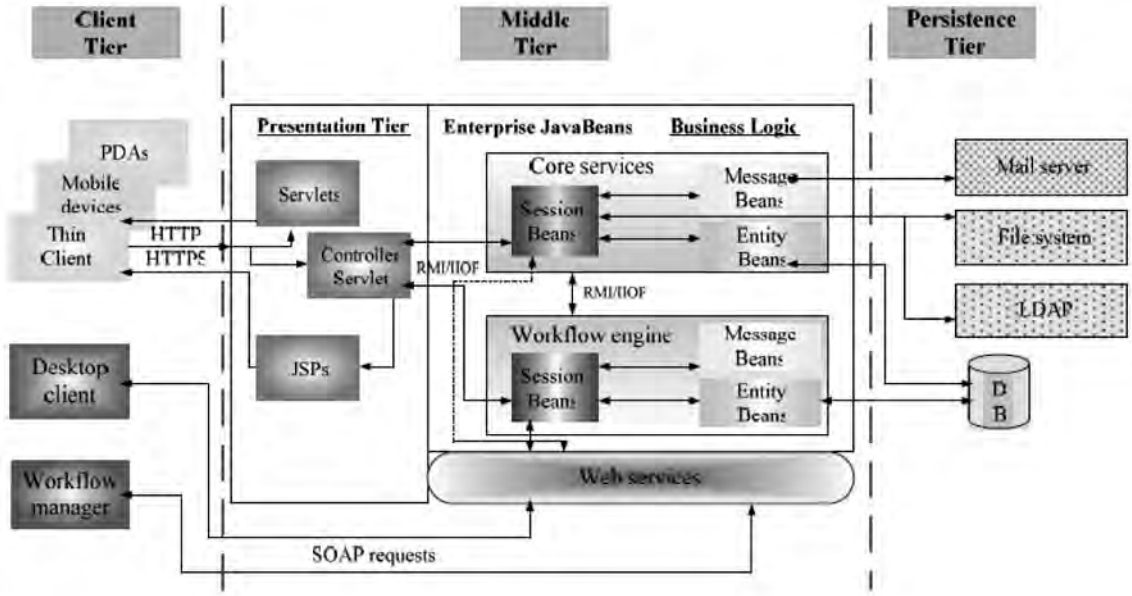

Figure 3. eRMIONE 3-tier technical architecture

The design and development of the above eRMIONE platform was based on reusing Open Source Software (OSS) components; it was decided to proceed to a homogenous platform solution rather than a combination of technologies and platforms. In this direction the following OSS tools have been used for the creation of this platform: the Basic Collaborative Platform (BCP) which has been developed by European Dynamics, JBOSS J2EE application server, Tomcat web container, MySQL RDBMS, Jakarta Struts Apache foundation (powerful Web application framework), Jakarta Lucene Apache foundation (powerful full text search mechanism), Jakarta Log4J user activities and system events logging mechanism, Netscape LDAP JDK (LDAP server connectors), a set of Jakarta XML frameworks (Xerces, Xalan Xerces and Xpath), Axis web services platform and Jakarta Ant building and distribution tool. The platform can run on a big number of RDBMSs (e.g. Oracle, MS SQLServer, etc.) and application servers (e.g. BEA Weblogic, IBM WebSphere, Oracle Application Server).

5. Methodology

As mentioned in section 2, the main objective of the eRMIONE project is the initial development and the market validation of an eRM (e-learning Resource Management) service, which is going to support the creation and operation of interoperable networks in the European cultural heritage domain in order to create the foundations for the full scale deployment of this service at a pan-European level. The main focus of the project is to validate in 'real-life' conditions the business model of this service, which has been described in the previous sections, to verify the market response, to assess to what extent this service meets users' needs, to identify possible business partners in all European countries and to investigate sources for financing the complete roll-out of the service in Europe. In order to accomplish the above objectives the following tasks will be carried out:

1. *Market analysis:* first, a preliminary version of the business plan will be developed, based on a market analysis in the participating countries (namely Italy, Belgium, Spain, Greece, Poland and Latvia); this preliminary version of the business plan will be then constantly updated and refined during the lifetime of the project and based on the results of the market validation phase.

2. *Validation of the service/business model through pilots:* a number of pilots will be set-up, which will include the development and delivery of e-courses in the area of cultural heritage by the two higher education institutions participating in the project, using digital content that will be provided by three content providers participating in the project. Then, the real market validation phase will start, with users accessing the service and providing feedback on their reactions and level of satisfaction.

3. *Evaluation and development of the final deployment and business plan:* finally all operational and market information that will be collected in the previous tasks will be analysed and evaluated in order to validate the whole business model of this service and the feasibility of its deployment in the market; for this purpose we are going to develop an integrated evaluation framework, based on the Technology Acceptance Model (TAM) [13], [14], and extended with variables measuring the extent of accomplishment of the educational objectives; based on the above conclusions the final deployment and business plan will be developed.

6. Conclusions

The eRMIONE project aims at the initial development and market validation of an eRM (e-learning Resource Management) service, which is based on an existing electronic environment, and supports the collaborative development and delivery of complex digital content and e-courses in the area of European cultural heritage. This service is expected to assist the formation of cultural heritage networks, consisting of cultural heritage institutions (e.g. museums, galleries, libraries, archives, etc.), educational institutions, commercial promotion companies, ICT companies, etc., from all over Europe IT, for the design, production and delivery of advanced digital cultural heritage products and services.

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E-PORTFOLIOS AS NEW LEARNING SPACES? PORTFOLIOS, PARADIGMS, AND PEDAGOGY

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The advent of new technologies often confuses societies. Presciently, and somewhat accurately, the communications guru Marshall McLuhan noted many years ago the tendency of enthusiastic adopters to unfairly elevate new technologies to God-like stature and then roundly condemn them when they failed to fulfill the expectations placed on them. Televisions in classrooms were touted to put teachers out of business; rockets were going to relocate our civilization to the moon; more recently, "Ginger", the Segway scooter, would revolutionize urban transportation.

In the educational world, Web-based computer conferencing – online or e-learning – first intrigued early adopters with its technological potential. Educational technologists and educational media devotees who spearheaded the literature raised capacity, delivery, and technology issues. As the field leveled to a generalized understanding of what online learning actually comprised – a Web-based platform, curriculum, good pedagogy and the creation of learning communities – educators refocused their concerns on how to teach well and how to best serve learners.

E-portfolios have generated much the same type of response. Do they indeed have the potential to "alter education at its very core", as Batson (2002, p. 4) suggests? This paper takes the position that while e-portfolios may provide an attractive and useful vehicle for the presentation of learners' knowledge or skills, they do not contribute to or alter the critical processes of "collection, selection, reflection and projection" that constitute meaningful portfolio work. Specifically, using as a backdrop the portfolio process at Canada's only distance and open university, Athabasca University, this paper will:

- Differentiate learning portfolios from other more generic portfolio genres;
- Describe the rigorous process that supports portfolio development as a learning activity at AU;
- Situate and describe the nature of e-portfolios as an educational tool.

Defining and differentiating portfolios: An overview

There are many types of portfolios. Generally, the rising interest in "portfolios as expression" can be understood as a reflection of our fascination with exploration of the self, perhaps one of many trends influenced by a combination, in the Western world, of the babyboomers' dominance of social facts and the recent emergence of a strongly technological society. Blogs, wikis, chatrooms, even cellphones – each innovative communication device has contributed to our ability, and in turn, our desire, to express ourselves in tangible and public ways.

Personal portfolios, like blogs, provide opportunities for their owners to manifest their aspirations, accomplishments, thoughts, queries and musings to the external world. Personal portfolios are increasingly viewed as necessary tools to capture the essence of self, in much the same way that artists demonstrate their worldview through creative portfolios. Many educational programs ask that their students create a portfolio during their period of study so that the portfolio can serve as a record of accomplishment, a snapshot of that particular experience – a statement of growth, maturity, participation, and citizenship. In some instances, these types of portfolios are initiated by educational institutions with the intention that young learners should continue to keep them current, thus allowing the document to serve as a "portfolio for life".

Similarly, many workplaces encourage employees to develop a performance portfolio. This type of portfolio highlights employees' skills and accomplishments and is used as evidence of promotion-worthiness. Applicants seeking new positions may take along a portfolio to demonstrate their suitability for the job. Immigrants seeking credentialization in their country of choice may depend on a performance portfolio to highlight their accomplishments as they seek entry into their chosen culture through education or the workplace.

Portfolio use, and PLAR, at Athabasca University

Athabasca University uses a learning portfolio as the primary method of implementing prior learning assessment and recognition (PLAR). The educational, or learning portfolio, that is described in this paper

> contains work that a learner has collected, reflected, selected, and presented to show growth and change over time …a critical component of an educational portfolio is the learner's reflection on the individual pieces of work (often called "artifacts") as well as an overall reflection on the story that the portfolio tells. (Barrett & Carney, 2005)

While the preparation of some types of portfolios may provide generic material for Athabasca's learning portfolio, most of Athabasca University's portfolio material must be assembled for the exact purpose of attaining credit at the institution. A part of the portfolio-building process requires applicants to research their program and the course outcomes that it comprises. From this rigorous structure that is defined by educational requirements comes a very targeted and precise document. More importantly, AU's portfolio first of all encourages reflective learning activity in its participants, and secondly, reveals evidence of that learning to the content experts who will eventually assess the portfolio.

Prior learning assessment and recognition is itself an arm of the larger umbrella term, *recognizing prior learning* (RPL). Under the aegis of the latter is contained, in addition to PLAR, the related (but different) processes of credit transfer and qualification recognition. Both of these processes involve recognizing formal learning that applicants have achieved elsewhere and are now seeking to bring forward, for credit, into their current studies, say, in this case, at Athabasca University. In most Canadian institutions, including Athabasca, these types of evaluations are conducted by trained evaluators who usually reside in the offices of the university's registrar.

PLAR, on the other hand, involves a process of assessment rather than equivalency or transfer. PLAR purports to allow learners to demonstrate the value and relevance of their prior experiential learning to the credential they are seeking. Their experiential learning may have occurred in any number of places. Most commonly, applicants draw upon valuable learning that has occurred over many years in their workplaces; but they might equally draw on learning that has occurred from experiences in their personal lives, from their travels, from occasions of self-study, from informal, happenstance learning, from volunteer experiences or from training workshops or seminars. PLAR applicants are encouraged and mentored in their efforts to mine all sources of experiential learning in order to bring forth detailed and thorough presentations of their learned skills and knowledge. The demonstrated skills and knowledge must fit into their program of study at AU in order to be applied to their program.

The skills and knowledge that applicants claim to have must also be triangulated in a number of ways. A lengthy and detailed personal narrative should outline learners' understanding of the value of their past learning while also showing the relationship of their past learning to current endeavors and to future plans. A resume, a goal statement, and an educational and career narrative also serve to locate and validate both learners' accomplishments and their understanding of their accomplishments. Finally, their learning claims are validated externally by letters of attestation that are written on their behalf by individuals who are legitimately able to confirm the accomplishments that have been described in the portfolio. These are usually supervisors and superiors from the workplace, although they may also be community referees or long-standing acquaintances who can in some verifiable way attest to the truth of the learning claims. "Documentors", or attestors, as they are called, may also contribute other tangible forms of evidence, as may the applicants themselves. These types of evidence might take the form of project reports, letters of commendation, performance appraisals, or samples of curriculum development, web site development, and so on.

Taken together, then, applicants' learning portfolios should speak quite directly and clearly to the skills and knowledge that they feel they can bring forward to their AU program of learning. Two important facts arise from the role of the portfolio within Athabasca University's strategies for learning. The first is that the learning portfolio developed for Athabasca will not likely be able to be used again in another situation. The second fact reflects the more important aspect of the learning portfolio – that constructing the portfolio is actually a learning activity. It should represent an evolution rather than a tally. It should be a construction, not a counting. The importance of these two facts is outlined below.

Portfolios as paradigmatic: Journey versus destination

"A portfolio whose purpose is to foster learning and document growth over time is based upon a constructivist model" (Barrett & Carney, 2005). In this view, which is also the writers' view, the portfolio process allows learners to begin at a point of their own choosing and to select and reflect upon learning that is important to them. Their learning challenge is to integrate that knowledge into the knowledge asked of them by the institution. Following this view, portfolio development would be analogized as a journey, complete with all the meandering, false starts, corners, surprises, and difficulties that any journey holds.

A more positivist view of the portfolio's role in learning understands the portfolio as an instrument or a conduit to accreditation at the educational institution for which it is designed. Using this reasoning, the portfolio would be analogous to a gate or a portal; in other words, the portfolio serves as a destination.

Following in the narrative tradition, a number of metaphors have been put forth to capture the portfolio's "power for learning" (Diez, 1994, p. 26). Some examples are portfolio as story, as laboratory, as poetry, as mirror, as map, as celebration, and of course as journey. These metaphorical descriptions of portfolios attempt to capture the constructivist nature of this particular paradigm by emphasizing the notions of reflection, re-visitation, re-storying, and learners' ownership of the final product.

The pedagogy of e-portfolios

The theories, contradictions, and arguments that surround discussions of paper portfolios appear to amplify in discussions of e-portfolios. I submit two reasons for this: one, the discussion of "things 'e'" is a discussion with higher stakes; it is therefore a more emotional exchange. Electronics are flashier, shinier, and generally cost more money than chalk or paper. Secondly, those advocating for "things 'e'" often tend to be early adopters and have assumed a pioneer stance. There is more to gain, and more to lose. As with the discussions of online pedagogies, however, the underlying game is the same (Kanuka & Conrad, 2003). Electronic or paper-based, the portfolio that Athabasca University wants to see in order to grant course credit to its learners must demonstrate the same kind of attentive detailing of university-level learning and must relate that learning to the portfolio applicant's program at AU.

Similarly, as with paper-based portfolios,

> the e-portfolio is (or should be) part of a student-owned, student-centred approach to learning which makes it possible for students to actively engage in their learning rather than just be the recipients of information. This is consistent with constructivist theory, which argues students actively construct their own knowledge rather than simply receive it from instructors, authors or other sources. (Tosh *et al.*, p. 90, citing Jonassen 1991)

There are some clear benefits to using e-portfolios. Wade, Abrami, and Schlater (2005) point out that e-portfolios permit a better system of cataloguing and organizing of materials and therefore provide assessors with a better illustration of the learner's growth and development. Multimedia materials can be more nimbly integrated; such integration in itself not only better displays learners' technology skills but provides opportunities to develop those skills. Using the concept of "one container access" (p. 35) makes learners' work more accessible. Electronic access to materials would theoretically span distances more easily and could contribute to a faster process overall, although mode of presentation constitutes only one factor, among many, in the complex assessment process.

There is no doubt that, especially in fields that value computer, technology, multimedia or design skills, learners' use of e-portfolios could provide not only a more engaging demonstration of skills but also a more technically correct demonstration of skills. However, Tosh *et al.*'s (2005) contention that e-portfolios offer opportunity for learner control and promote deep learning should be true of any good portfolio process and should be no less true of the traditional paper-based portfolio. Tosh's assumption, based on the adult education premise that learners engage more successfully when they have control (Ramsden, 2003), skirts the deeper cognitive issues of how learners connect, or feel ownership of, their learning. Do today's learners feel more connection to electronic portfolios? As shown by the controversy that has surrounded print-based journals and e-journals, some will; some won't.

E-portfolios and competing assessment paradigms

At Athabasca University, issues around paper-based and e-portfolios may play out most importantly in the competing discourse on assessment. Barrett (2005) refers to "high stakes" assessments as those resulting in credit allocation to applicants. "Low stakes" assessments, on the other hand, involve occasions of formative instruction or application. E-portfolios could provide order and a high degree of efficiency to high stakes assessment situations that value the presentation of standardized information in the demonstration of competencies (Abrami & Barrett, 2005).

Can e-portfolios fairly represent learners' high stakes assessments, however, when they must also serve as learning tools that value the journey of exploration and are intended to foster learners' growth? This model stresses the notion of "authentic" assessment where the assessment process is a part of the teaching and learning process and should serve to further engage the learner in his or her learning exploration. "Miller and Legg (1993) see portfolio assessment as" a specific form of authentic or performance assessment that attempts to measure higher order thinking skills including the ability to communicate clearly, to make judgements, and to demonstrate specific competencies (Abrami & Barrett, 2005, p. 5).

Ideally, advocates of learning portfolios, whether paper-based or electronic, should strive to support the concept of learners' "portfolio as story" while adhering to the rigors and accountability of high stakes assessment for the purpose of credit allocation. At Athabasca University, the introduction of another layer of technology in e-portfolio usage gives rise to new concerns for assessors, where they often tend to be older academic faculty. As is often the case, these assessors may be less comfortable using technology for assessment purposes. Will assessors searching for an individual's "story" feel less attuned to the applicant who submits an electronic portfolio? Likewise, if as Barrett (1999) suggests, "the e-portfolio draws on two bodies of literature, multimedia development (decide, design, develop, evaluate) and portfolio development (collection, selection, reflection, projection)", will an emphasis on design potentially lessen an assessor's attention to content?

Conclusion

"There is nothing so slippery as a thought […] the process of externalization is a process for stabilization. […] It gives students a chance to hold on to their thinking" (Eisner, 1998, p. 27). Using a constructivist, reflective paradigm to promote the strengths of portfolios as learning tools provides learners the opportunity to gather, order, and stabilize occasions of experiential learning that might otherwise elude them. When learners' experiential learning has been captured through the portfolio mechanism, content experts at Athabasca University can determine, through careful assessment, whether or not the demonstration of learning meets the criteria for awarding credit.

In his guide to living in our communications-rich world, Daniel Pink outlined six aptitudes that he feels will be essential for success, describing them as the abilities that have "always comprised part of what it means to be human" (p. 67). The aptitudes he lists – design, story (not just argument), symphony (not just focus), empathy (not just logic), play, and meaning (not just accumulation) – are the hallmarks of critical, insightful thinking. They are also the skills required for the production of a successful learning portfolio. The venue for learners' demonstration of learning may be paper-based or electronic. Although many factors can affect learners' choice of venue, the journey of discovery that precedes the product should not differ substantially. The role of e-portfolios in Athabasca's future, as with paper-based portfolios in the past, should serve to support the fundamental activity of students' learning through meaningful engagement with and critical reflection on their learning histories.

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FROM APPLICATION TO GRADUATION AND BEYOND: EXPLORING USER ENGAGEMENT IN THE E-PORTFOLIO PROCESS

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Introduction

The UK government has, through a series of white papers, placed e-learning at the centre of developing education and learning. In the white paper, 'Harnessing Technology' (2005) [1] there is a call for education institutions to supply personal web space to learners to enable them to build electronic portfolios of their achievements to facilitate the process of lifelong learning. This development builds on the earlier statement that *"Progress Files help make the outcomes, or results, of learning [...] more explicit, identify the achievements of learning, and support the concept that learning is a lifetime activity"* (Universities UK, 2003) [2].

The pedagogical benefits of portfolio and e-portfolio based learning have been well documented (Woodward 2000, Woodward and Nanlohy 2004) [3, 4]. The move from 'surface' to 'deep' learning (Gibbs 1992) [5] and the ability to reflect upon learning (Kolb 1984, Schon 1983, 1987 and Boud *et al*. 1985,1993) [6, 7, 8] are all explored facets of learner-centred (e)-portfolio building and all essential components in the development of lifelong learning practice.

The aim of this paper is to explore the implementation of e-portfolios within different educational and institutional contexts (Further Education, Higher Education and work), student's attitudes to e-portfolios; the benefits of using an e-tool for skills development; and the impact of the role of education supervisors/ mentors on the process of e-learning and the subsequent effects of this on learner engagement. If we are to promote lifelong learning and if we are to encourage users in the art of e-portfolio building and the process of reflective learning, their involvement in the process is paramount.

The Context

As part of the Enhancing Learner Progression (ELP) project [9] the University of Leeds developed an e-portfolio to prepare students for their application to medical school and has also, in conjunction with the Yorkshire Deanery and a local hospital, designed and launched an on-line version of the Curriculum for the Foundation Years in Postgraduate Education and Training. Another project 'Engaging Teachers in Students' Personal Development Planning and Recording of Progress' enabled the design and implementation of an e-PDP to be used within undergraduate geography and medicine courses. Personal Development Planning (PDP) by students meets resistance from students and faculty. The primary aim of this project was to facilitate participation of teachers into the process by working with them to incorporate relevant elements of their course materials, and thus enhance their abilities to encourage students to participate in recording achievements and setting goals. The different groups using progress file and e-portfolios are listed below:

Learners	Feedback required	evaluation stage	Aim	Number involved in evaluation
FE students	Yes Medical students	Formative	Preparation for HE	7/7
Medicine undergraduates	Yes Tutors	Formative	PDP	
Geography undergraduates	Yes Tutors	Formative	PDP	186/200
Nursing undergraduates	Yes Tutors	Formative	PDP/Assessments from placement	4/10
PRHOs	Yes Educational supervisors	Formative	Assessments/PDP	7/34

Three of the e-portfolios represent a journey of early medical training and skills development, from application to registration, and across 3 separate educational sectors. The e-portfolios also incorporate the 3 functions of portfolio usage and styles (Hartnell, Young & Morriss 1999, Greenberg 2004): Developmental, Assessment and Marketing [10, 11].

At the moment there is no feedback from the medical students using the undergraduate progress file but when this data is analysed we will be able to trace the development of lifelong learning skills in this field across eight years of training. The progress file being used by this group is in same format as the geography students, the professional skills to be developed are different.

Theoretically each of the e-portfolios enable users to match and evidence their skills and competences within professional guidelines, reflect upon their learning and prepare them for applications to courses, postgraduate training and jobs. Ultimately creating a sound basis for lifelong learning and the educational and practical challenges that lay ahead.

Design and Implementation

When designing an e-learning tool we should not assume that all users possess the required level of IT skills. The technology should not overshadow the learning outcomes of e-portfolio use (Woodward and Nanlohy 2004). We should also remember that the entire process is 'about people […] not technology.' (Dublin 2004, p. 294) [12]. If this is not taken into account then we are in danger of losing the faith and attention of those we are trying to engage.

Ease of Use

The use and design of the e-portfolio tool can also impact on the level of the usage. Two of the e-portfolios, FE and PRHO, were designed in isolation without input from user groups. All of users of the FE portfolio found the tool easy to use (n=7) but three out of this group had trouble finding the information they wanted. The majority of PRHOs (n=7) reported some problems with usage and, again, the majority of users (6) state that they have had trouble finding the section/information that they wanted. Only one respondent found the e-portfolio easy to use and only two of the responding group had used an e-portfolio before. The nursing portfolio which had been designed in conjunction with the department of Nursing offered different results. None of the users had trouble finding what they wanted. The largest number of problems resulted from the use of the e-portfolio itself, i.e. uploading files, making entries and granting permissions of access. One respondent stated that they had faced no difficulties at all. 87% (163) of the geography students agreed or strongly agreed that the Progress file was easy to use (n=186).

The supervisors and mentors have also faced difficulties in the use of the portfolio. Some of the supervisors of the PRHOs have yet to access the system and, after experiencing some frustration during the process, one commented that a 'paper version' may have been a better solution. The nursing supervisors

have had problems accessing the work of their students, mirroring the difficulties faced by the students in granting this access. Where the educators have been involved in the design of the e-tool, nursing and geography e-portfolio, percentages of usage amongst the student body have been higher, all of the nurses who agreed to participate in the use of the Progress File have been using it, likewise, none of the nursing or geography students have had trouble finding information.

Technology

The results of the FE and PRHO case studies starkly revealed issues of technology. Of the four colleges who signed up to the initial pilot, by September only two remained. There were difficulties with caching in two of these institutions leading to other students/trainees being able to view others work. This has also been in an issue with the PRHO sector. This had a large impact on the confidence placed in the system particularly when there is reflection and formal assessment involved throughout the project duration. There were no problems with this aspect of technology with the nursing e-portfolio which although primarily used within the university, is also used remotely within hospitals.

Students within the colleges were subsequently not encouraged to use the e-portfolio tool by tutors, careers professionals, etc. and no student usage was noted. Where the training and e-portfolio implementation had been successful students were able to make entries with confidence and staff within the two remaining institutions provided on going encouragement.

The geography e-portfolio was launched to all students through a lecture based session and all were aware of the tool.

Training on the use of the e-tools is an important aspect of a successful launch and five of the FE users and 3 of the PRHO users found the training aspect of the launch to have been adequate.

The trainee doctor group had received very little 'hands on' training on the use of the e-tool and their educational supervisors, none. This impacted on the initial phase of the project where only three out of the group (34) were using the portfolio regularly. A further training session resulted in more of the group accessing the area and at the moment, six months into the launch, eighteen out of a possible thirty-four are using the e-portfolio tool. Despite experiencing some problems navigating through the areas of the FE tool all of the seven respondents completed the e-learning exercise. Does this suggest that if the final outcome of the process is of benefit to users they will continue and work through issues rather than let them hinder their progress? Within the context of Lifelong Learning it appears that users are not against the concept of e-learning or e-portfolios but it is the practicalities of usage that hinder development. IT training needs to be thoroughly integrated in curricula at all stages of education and, for some, learning on the use of e-learning tools needs to be thoroughly scaffolded in the initial phases of use. Initial engagement by learners and their educational supporters appears to be a key issue in the success of e-learning.

Relevance

The relevance of the e-learning process is also key to the engagement process. The use of the e-tool needs to not only appeal to the learners but also to those supplying feedback or those supporting the learners in the process.

When developing the e-PDP progress file tutors were engaged in the process of designing the new e-Portfolio from the onset. Individual meetings were arranged with tutors to get their thoughts on how it should work and how their course materials could be included.

The FE Students found the e-learning exercise to be relevant when they were taken through exercises relating directly to the courses they wanted to apply for. The users noted that the 'Skills' section was the most useful aspect of using the e-portfolio. Relating their own skills to the skills needed to be successful in their chosen careers. The nursing students feel that the sections relating to the assessment of their own competence to be of the greatest use. The majority (2) citing the 'Reflection and Skills' section as the most useful. The PRHOs rated the PDP section of the e-portfolio to be the most useful.

The majority of geography students initially found the tool to be useful and 55% (104) felt that it was a useful tool to help them think about the skills they needed to continue to work on. Only 16% (31) found it of no use at all. The students are making the link between skills development and job application with many of the respondents stating:

"The career development section was helpful in creating a CV for job application."

"I can see that in the future when compiling a more up to date CV or job application it would be useful as a record of what I have done. Especially the key skills section."

Even though the users of the e-portfolio all have different goals: the FE students, a place at university on their desired course; the nurses, medical and geography students, passing their degree and gaining employment; and the PRHOs-registration. All of the users of the portfolio are finding the sections that require some form of self assessment to be the most useful and relevant.

Feedback

The advantages of the assessment and feedback properties of the process have been widely noted (Hartnell-Young & Morriss 1999). The feedback process validates the learning of the user but without regular and constructive feedback the use of the e-portfolio declines.

The users of the college e-portfolios listed mentor feedback as one of the most important aspects of using the e-portfolio. When asked directly what was the most useful aspect of using the e-portfolio the following results were noted:

"Mentor feedback on personal statement. All advice and comments were useful as they have written one before and been successful."

"Personal statement and feedback."

The students valued the support they were given by the mentors and the help the e-portfolio provided in putting together their personal statements. The students also stated that having access to mentor support increased their confidence and awareness of the issues and procedures during the application process.

So far only one of the geography tutors is aware of their students using the Progress File (n=6) and no feedback has taken place. The nurse users are receiving regular feedback on their clinical reports which are uploaded to the portfolio and the PRHO users are receiving feedback at summative points suggesting that they receive feedback on a more informal and regular basis. They work with their educational supervisors, therefore using the e-tool remotely is not common place.

Where occurrences of feedback are high learner usage increases and is more regular but this also relates to the context in which the e-tool is deployed.

Reflective Learning

It has been put forward that the learning process of adults utilises internalised reflection. (J. Piaget in Kolb 1984). This is an important aspect in lifelong learning and equally important in the writing of CV's and application forms. Super's (1979) [13] developmental career theory expounds the view that adult career development occurs through life and is an on-going process. By experiencing jobs and careers and being able to reflect and evaluate our performance and satisfaction in each of these situations, as adults, we are able to crystallise and stabilise our career paths.

Reflection is also vitality important within the health and medical fields and its role in medical training is explored further in 'Tomorrows Doctors' (2003) [14].

People, however, need to learn how to approach and make the best out of the 'reflection' process. Does the use of e-portfolios enable users to reflect and move through the learning and career development cycles mentioned above?

A large number of the PRHOs who responded, (6) have been using the 'Reflective Practice section of the e-portfolio and all of the PRHOs have accessed the PDP section but only 1 PRHO claims that the use of the e-portfolio has helped them to improve their skills of reflection. Conversely the nurses are using and finding useful the reflection section in equal amounts (2). Amongst the geography students 24% (45) thought it would be no use at all in helping them to think about their strengths but all of the students thought it would be of some use in helping them to think about their achievements to date.

It would appear from the formative results that the nurses and geography students, both undergraduate groups, are finding the e-portfolio useful as a tool for reflection. The PRHOs are within a work-based environment and this may have led to the differences in the results. These differences in opinion need to be analysed in greater depth for the summative evaluation.

Reflection within the college portfolio is not explicit but the work contained within the e-portfolio culminated with a personal statement for entrance to university This involves looking back on the exercises already completed. Has the use of the e-portfolio enabled these students to start thinking about the process in order to prepare them for the future?

When asked what they understood about the word 'reflection' the following points were noted:

"Looking back, addressing any issues, e.g. weakness and highlighting the positive and strengths. By reflection one should be able to appreciate what they are doing well and what needs improving and one should do this by looking back at an event or task and by setting targets for the future."

"Reflection is to look back and think about past actions which you feel have an importance, you consider your actions, reactions and how you could have improved upon that situation."

An understanding of the process of reflection provides a good basis for the learning and work challenges that lay ahead.

Ownership

When questioned about the ownership of their respective portfolios, none of the PRHO e-portfolio users felt that they 'owned' their portfolios.

Has this hindered the type of entry the users place in their portfolios? Users do have the option of keeping reflective entries private but to be able to fully use the e-portfolio as a reflective tool supervisors do need to be allowed some access to the entries. This enables them to discuss thoughts and so facilitate learning. One clinical supervisor recently stated that there should be no private sections for reflection as he would like to know exactly what his trainee was thinking. 'This is the only way they can learn!'

When the FE users were asked the same question four stated that they felt that the university owned the portfolio with only two students feeling a sense of ownership over its contents. This portfolio and learning process was informally assessed with advice provision the desired outcome. There was no grading or professional competence to measure. The student nurses who are within a developmental skills-learning arena felt that they owned the contents of their e-portfolio. Does this result again reflect the context in which the e-tool is deployed? Learners within an education setting, completing an e-portfolio targeted to their specific learning goals.

Snadden and Thomas (2003) [15] noticed they same effect in their survey of paper-based portfolios. Trainees were less likely to reveal any reflective thoughts within a tool designed for assessment purposes. We need to examine ways to overcome this issue if we wish to encourage a sense of ownership over learning. Is it the mere physical differences between paper and technology that act as a barrier to ownership or are there other factors present?

Conclusion

There are clear trends emerging within this formative evaluation. Students are noticing the reflective qualities of using e-portfolios within a learning environment, however, this view changes when graduates enter the work place. This attitude needs to be explored in more depth.

The key factor in getting students to engage with PDP and e-portfolios is the engagement of the tutors and educational supporters. It has been shown that where tutors are behind the process, students are far more likely to take it seriously: *"learner feedback regarding engagement with PDP processes has repeatedly indicated that learners value dialogue with tutors, and are more likely to engage in PDP processes if embedded alongside tutor support"* [16]. In order to engage tutors, they must be involved with the process from day one. Their voices must be heard in every aspect from design through to implementation. If they have some level of ownership they are far more likely to champion the cause than if they are simply asked to as a matter of departmental policy. They are closer to the students/PRHOs and so have a better idea of what will work and what is needed. They know from their own past experience, certainly with respect to their own modules and experiences, which areas students struggle with most, or which areas students need to develop most. For a portfolio to work it needs to be relevant, both to students and tutors.

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E-PORTFOLIO BENEFITS FOR THE LABOR MARKET A CASE STUDY

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1. Context

This paper explores the potential of electronic learning portfolios, 'ePortfolios', for the staff recruitment processes of medium sized enterprises. The IMS Global Learning Consortium defines ePortfolio as follows [3]: *"ePortfolios are collections of personal information about a learner that represent accomplishments, goals, experiences, and other personalized records that a learner can present to schools, employers, or other entities. Typical uses of ePortfolios go beyond the traditional concept of a transcript to include applying for jobs, designing personalized learning, and tracking career planning."*

Currently a variety of ePortfolio Systems is emerging and their application is starting to provide new insights. While there are many projects and initiatives concerning ePortfolio-concepts and systems for academic and educational purposes, little attention has been paid to the potential of ePortfolios for changing processes on the labor market. The intention of this paper is to give a first impression of problems and specific questions to ePortfolios which arises from an analysis of a typical recruitment process for a medium-sized enterprise. We will discuss what impact the use of an ePortfolio, or more specifically of an assessment portfolio, could have on this process. This augments ongoing work at the University of Nottingham's RIPPL project in collaboration with large companies in the UK.

2. Introduction

The company under consideration is "KEVAG", a medium-sized subsidiary of RWE Holding. KEVAG has approximately 700 employees and provides energy and public transport services in the region of Koblenz in Germany. Because KEVAG has more than 200,000 customers, all IT-Systems are highly automated and there is a high need for very skilled employees in every department.The recruitment of appropriate personnel is crucial for the satisfaction of company's customers. And it is an essential factor for the economic success of the company itself.

The basis of our analysis of the process of recruitment is an interview with the manager of the human resources department of the company. The resulting process description has been compared with the theoretical model in [2]. The information needs of the recruiting process have been matched with the potential of ePortfolios. For this match, the IMS ePortfolio Specification Information Model [1] was used. Finally, suggested changes to the recruiting process have been derived, based on ePortfolio usage, and discussed again with the human resources department.

3. The Current Recruiting Process

Our analysis showed that the recruitment process at KEVAG is typical for a medium-sized company using highly automated IT Systems, employing many well educated and specialised staff and relying to a large extent on the general labor market. The company implements the process of personnel recruitment as described by Hans Jung [2]. This process consists of the following phases:

- Phase I: Definition of requirements and selection criteria for applications
- Phase II: Preselection of applications by assessing application data
- Phase III: Preselection of applications by assessing the applicant
- Phase IV: Employment Decision
- Phase V: Information of the board of directors and of the staff representatives
- Phase VI: Employment

- Phase VII: Trial period and vocational adjustment (orientation)
- Phase VIII: Evaluation

The next sections show the information required in the specific stages of this process. Since the phases IV to VII do not contribute specific information needs, they are left out in these considerations. The following subsections explain how the phases of the process of personnel recruitment according to Jung are implemented within the KEVAG Company and which of the non-technical information in ePortfolios is of importance in the specific phases.

3.1 Phase I: Definition of requirements and criteria of selection for the application

The outcome of this phase is a *profile of requirements*, which defines the main criteria a new employee has to meet. This profile of requirements is created by the manager of the organizational unit to which the position is assigned. The profile of requirements includes the required position data:

Required Position Data	Description	Potentially Relevant Part of IMS ePortfolio
Skill requirements	e.g. 2 yrs. experience in sales of spare parts for cars	Competency
Educational requirements	e.g. Bachelors Degree in Business Administration	Qcl
Special certificate requirements	e.g. certificates of health for canteen kitchens	Qcl
Formal job requirements	e.g. willingness to travel, to do on-call duty, to work overtime	Competency
Nice-To-Have requirements	e.g. special experience or abilities	Qcl, Competency, Transcript

The criteria in the profile of requirements are given as a check list which an application has to pass in order to be considered for the position, the *required position data check list*. Some checks are defined by the standard process of Hans Jung. Others are defined individually at the time of the vacancy of the position. The standardized checks are described in the next section. The information produced in this section is stored in text documents.

3.2 Phase II: Preselection of applications by assessing the application

In this phase, the application itself is under consideration. Because all applications are currently paper-based, they all need to be assessed manually. To keep track of the applications, the demographic data of the applicant are entered into a computer-system and defined checks (see below) are made. After this time-consuming task, the applications have to be assessed a second time, a process in which the defined criteria from section 3.1 are checked manually.

Required Documents	Description	Potentially Relevant Part of IMS ePortfolio
Letter of application	The intention and motivation of the applicant	Goal, interest
Resume	The development of the applicant	Transcript
Diplomas	Level and type of the degree	Qcl
Job references	e.g. references of other companies, trainings on the job, internships	Affiliation, qcl, competency
Course certificates	Certificates of courses which the applicant has done	Qcl
Photo of the applicant	Photo which shows the applicant	Identification
Personnel questionnaire	Specific company-related questions	Goal, interest, affiliation
Demographic data database	Demographic data of the applicant (entered into database manually)	Identification

The following checks have to be made in the assessment process, as mentioned in the previous section:

Application Checks	Description	Potentially Relevant Part of IMS ePortfolio
Integrity check	All formally required documents have been enclosed	Relationship
Consistency check	All referenced information in the application has been enclosed	Relationship

The information gathered here is not stored outside the scope of the process, except for storing of demographic information for application tracking purposes and for the applications that are finally accepted.

3.3 Phase III: Preselection of applications by assessing the applicant

At this point, applicants are invited to be assessed by interview. The information gathered during this assessment is always individual and relates directly to the personality of the candidate. Additionally, clarifying questions are asked which came up during the assessment process of the candidate's application.

Interview Data	Description	Potentially Relevant Part of IMS ePortfolio
Personal Questions	List of questions which came up during the application assessment	Identification, goal, qcl, activity, transcript, interest, competency, affiliation, relationship, product, reflexion
Candidate Interview Rating	Information about how the candidate was rated during the interview	Activity, reflexion

The information gathered here is stored by the human resources department in paper form in the personal folder of the applicant.

3.4 Phase VIII: Evaluation

After the positive decision to employ an applicant and after a period of trial and vocational adjustment (phases IV – VII), the candidate's work for the company is evaluated. For this purpose, the candidate is rated again and he or she is again interviewed. In this process, the candidate's data are completely revised. This means that all data from the previously passed process are required again. Additionally, the candidates' personal experience at her position is taken into account. The information gathered here is not stored outside of the scope of the process.

Evaluation Information	Description	Potentially Relevant Part of IMS ePortfolio
Results of work	The results which the applicant has produced	Competency, product
Candidate Senior Rating	Information about how the candidate is rated by his senior	Activity, reflexion, product
Candidate Experience	The personal experience the candidate has made	Goal, activity, reflexion

3.5 Evaluation of the current recruiting process

The current process is not computer supported, though it is supported by a database for tracking the applications running through the company. Because there is no specific computer-based system to handle the details of application data in a structured way, as enabled by ePortfolios, some specific ways of information processing have to be followed:

Required Position Data	Type of Processing
Skill requirements	Gathered by consulting required position data check list and assessing the complete application with it
Educational requirements	Gathered by consulting required position data check list and assessing the complete application with it
Special certificate requirements	Gathered by consulting required position data check list and assessing the complete application with it
Formal job requirements	Gathered by consulting required position data check list and assessing the complete application with it
Nice-To-Have requirements	Gathered by consulting required position data check list and assessing the complete application with it

Required Documents	Type of Processing
Letter of application	Assessed manually
Resume	Assessed manually
Diplomas	Assessed manually
Job references	Assessed manually
Course certificates	Assessed manually
Photo of the applicant	Assessed manually
Personnel questionnaire	Assessed manually
Demographic data database	Data entered manually

Application Checks	
Integrity check	Manually by checking whether all documents are present
Consistency check	Manually by checking whether evidence is enclosed

Interview Data	
Personal Questions	Manually by reading the application and taking notes
Candidate Rating	Manually by taking notes during the interview

Evaluation Information	
Results of work	Manually by asking co-workers and the senior
Candidate Rating	Manually by taking notes
Candidate Experience	Manually, taking notes not enforced

Additional Significance	
Redundancy of information	Information is enclosed more than once (e.g. demographic data)
Fragmentation of information	All requirements must be drawn from the application manually

4. Chances for Improvements

The use of an ePortfolio would have significant impact on the ways information is handled throughout the whole process. Imagine, the company offering the position would have its own ePortfolio System. It would then present an interface allowing an applicant to send a specific compilation of information in form of an assessment ePortfolio. The company could offer its personnel questionnaire and all required position data, leaving it up to the applicant to match his information to the required fields in the application. Possibly, this could change the recruitment process as follows:

Required Position Data	Type of Processing
Skill requirements	Matched by the applicant using the Assessment ePortfolio-System
Educational requirements	Matched by the applicant using the Assessment ePortfolio-System
Special certificate requirements	Matched by the applicant using the Assessment ePortfolio-System
Formal job requirements	Matched by the applicant using the Assessment ePortfolio-System
Nice-To-Have requirements	Matched by the applicant using the Assessment ePortfolio-System
Referred IMS eP spec. sections	Competency, qcl, transcript

Required Documents	Type of Processing
Letter of application	Assessed by the receiver of the Assessment ePortfolio
Resume	Obsolete due to auto-generation by the Assessment ePortfolio
Diplomas	Automatic qualification level matching, assessed only when needed
Job references	Assessed only if needed
Course certificates	Automatic qualification level matching, assessed only when needed
Photo of the applicant	Assessed manually
Personnel questionnaire	Assessed manually
Demographic data database	Obsolete due to the online application process
Referred IMS eP spec. sections	Goal, interest, transcript, qcl, affiliation, competency, identification

Application Checks	
Integrity check	Portfolio System checks automatically if all documents are enclosed
Consistency check	Portfolio System checks automatically if all evidence is enclosed
Referred IMS eP spec. sections	Relationship

Interview Data	
Personal Questions	Created using the Assessment ePortfolio
Candidate Interview Rating	Still Manually
Referred IMS eP spec. sections	Identification, goal, qcl, activity, transcript, interest, competency, affiliation, relationship, product, reflexion, affiliation

Evaluation Information	
Results of work	Automatically by consulting Development ePortfolio
Candidate Senior Rating	Use of Information entered into the Reflection ePortfolio
Candidate Experience	Use of Information entered into the Reflection ePortfolio
Referred IMS eP spec. sections	Competency, activity, goal, product, reflexion, affiliation

Additional Significance	
Redundancy of information	ePortfolio-System needs every information only once
Fragmentation of information	Due to different ePortfolio types, all information can be presented properly without fragmentation

Evidently, there is no part in the standard application process, which cannot be at least supported by an ePortfolio. It is very encouraging to note that potentially every section of information required in the standard process of personnel recruitment, is already included in the IMS ePortfolio Specification, though there are some sections of the IMS ePortfolio Specification, which are not needed in the use case considered in this document (e.g. Assertion, Other, Participation).

The list of possible benefits is long. The most significant benefit would surely be the huge amount of time saved, since the applicant already needs to match their ePortfolio Information to the requirements of the position and every piece of supplied information could be processed automatically due to the storage in the applicant's assessment ePortfolio. If the applicant already has a personal ePortfolio, placing an application could also be simplified by transferring data from the personal ePortfolio to the application portfolio.

At the moment, companies like KEVAG cannot individually reply to all applications they receive, mainly because of the huge manual effort that would be required. However, if an ePortfolio-System is in use, the point of failure of the applicant could be communicated to the applicant in a number of cases, allowing the rejected applicant to learn at which point they failed. This could help the individual to find weaknesses in their skills profile and help in discovering ways to improve. Also the company can learn from the applicants because it becomes visible which set of skills applicants typically have. It could also happen that an applicant might not be the most suitable for the specific job they were applying for, but may be better suited for another position. By having a system helping a company to identify this, the company could offer another, more suitable job to a well-suited applicant. Also, by only using electronic as well as printed media, the range of potential sources for good personnel could be increased dramatically since the system could be configured to automatically create pools of talented applicants.

5. Future Prospects and Open Questions

Even when there are specific standards, helping to implement working ePortfolio solutions, like IMS LIP or EPIXspec, ePortfolio interoperability is still an issue. As already mentioned, using an ePortfolio system for a standard process of personnel recruitment can dramatically change the way data is handled and processed. However for this opportunity to be realised, all participants need to have an ePortfolio, and the systems and data involved need to be compatible – clearly an issue of interoperability which is still a problem.

The considerations above confirmed the suitability of the ePortfolio specification to support the recruiting process in a (medium sized) company. In order to achieve the required interoperability, it is essential that the relevant information is encoded in the same way at the level of the whole labour market, for example on a European scale. This would benefit from a continuous monitoring of actual use of portfolios, leading to recommendations for unifying ePortfolio usage. Either political organizations may perform this role or vendors of ePortfolio tools may benefit from providing this as part of their customer support. Also independent trusted organisations may enter the business of offering support and safe storage for personal data.

Since the complete process of recruitment will need to change, large organizations might not see the full benefit of such a technology immediately. What impact such a technology has on the recruitment processes of large companies needs to be evaluated, as compared to medium size companies like KEVAG for example. This could be much more complicated due to technical and organizational matters. Another open question is, which impact ePortfolio-Systems could have on the management of human resources and knowledge within companies. The whole area of interoperability of ePortfolio with other systems, like knowledge resource planning or human resource planning, will be quite challenging.

This paper has concentrated on the needs of a relevant *consumer* of ePortfolio information. This has to be augmented by an exploration of the processes of *production* of this information. Much of this production will happen as a by-product during learning processes. However, the analysis above shows that ultimately many sources will be involved, for example the learner/applicant has to actively provide information on their interests and objectives. The learning and working experience during the initial phase after being recruited has also been found relevant. The analysis of learning processes in order to support the collection of ePortfolio information relevant for recruiting activities emerges as an objective of future research. After all, an integrated view of the complete lifecycle of information related to the process of lifelong learning is high on the research agenda. This paper is just one step towards that objective.

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PPDP AND E-PORTFOLIO, INSTRUMENTS FOR LIFE-LONG LEARNING: WHEN, WHAT & HOW IN REGULAR EDUCATION?

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Introduction

The use of the digital portfolio as an instrument for life-long learning is generally accepted. The digital portfolio gains a maximum profit if owners develop and maintain a Personal and Professional Development Plan (PPDP). Even in higher education these tools become very popular. Experiments show, however, that writing and learning from a PPDP are specific learning activities. Without any support the developed PPDP's of students are very abstract, and as a consequence lesser effective. As the same for the digital portfolio, also the effectiveness of the PPDP increases as these tools are used for a longer period in education.

So the questions to be answered are: when to introduce, what to teach about, and how to tutor students in regular education with the main goal to increase efficiency and effectiveness of PPDP and digital portfolio as instruments for life-long learning.

The answers to these questions are generated out of an experiment with 87 teachers and students at the Katholieke Hogeschool Limburg (KHLim).

Only if PPDP and digital portfolio have directly generated learning profits for students, a chance to start to develop e-competences for life-long learning can be guaranteed.

The digital portfolio and PPDP

Portfolio

Since the academic year 1999-2000, all last year teachers and students at the KHLim have their portfolio. Students' apprenticeships are assessed with their portfolio (D'Haese, 2005, p. 139). Problems experienced with the 'paper' portfolio are:

- Minimal interactivity between students and their supervisors.
- Assessment seems to evolve into a product evaluation (evaluation of the portfolio as a product).
- Students are competing to have the most extensive map or even maps, neglecting the quality of the content of the portfolio.

These portfolios have very little impact on one of the original main goals of the use of portfolio, namely to help students to get insights into their own learning track (Driessen, 2002, p. 15). The way the portfolio could serve as an instrument for life-long learning (after students regular education) was doubted.

Digital portfolio

To solve these problems, the digital portfolio (D'Haese, 2005, p. 140; Van Tartwijk, 2003, pt 1.4) was introduced. Together with this introduction, the portfolio-domain was extended from the apprenticeship to the whole domain of learning, thus also at university in several branches, and also even in other non-school related items (e.g. sports, youth movements, culture and music activities, etc.). To help and motivate students, the digital portfolio was implemented in the universities' electronic learning environment. To avoid students get lost in a structured-less system, a combination between fixed and flexible structure was offered. Students' learning path was already implemented as the fixed structure. Next to it and from this level students got the freedom to organize their own digital portfolio.

Figure 1. E-portfolio as part of the ELO

PPDP

Together with the introduction of the digital portfolio, students were asked to write a PPDP. The goal of using a PPDP is *'by reflecting systematically on experience at an individual level students may link theory with practice at the wider social level. Students might consider the process of personal and professional development planning as a tool for illuminating the interplay between reflection and experience at the individual level and for linking theory with practice at a wider social level'* (Hudson, 2003). This general explanation about what a PPDP is, which goals it can serve and how to maintain it, were apparently not sufficient enough for students. Even an important question about the time to introduce arose: obviously first year students wrote down higher qualitative elements than last year students. The same conclusion as with the introduction of the digital portfolio could be made: (digital) portfolio and PPDP have lesser value if they are introduced in the middle or at the end of an education program.

Learn to write and to maintain a useful PPDP for lifelong learning

Students had a lot of difficulties with writing goals. The formulated goals were too broad, not realistic, and therefore less usable for the appropriate learning. Students learned to formulate goals in terms of the SMARTI-model (Buckingham, 2004). SMARTI stands for Specific, Measurable, Achievable, Realistic, Timely, and Inspirational. After lecturers and tutors had worked out very concrete examples of possible goals and activities for the PPDP, students became familiar with this 'technique'. Once started with this process, a permanent way of tutoring seems to be necessary. It seems that learning from and through this process is so new for students, that they – even when they agreed on the surplus value – still have to be motivated to maintain this process. Too much learning in higher education is still the synonym of studying courses, according to students' perception of learning.

To change this perception, a longer period of 'practical' use is necessary. This leads to the question when PPDP and e-portfolio can be introduced in education?

When to introduce PPDP and e-portfolio?

From the goal that PPDP and e-portfolio will be instruments for life-long learning and have to be learned to use in regular education (Arets, 2002), it seems wise to introduce these instruments when students or pupils are confronted with the first choices they have to make in their learning program in combination with the introduction of the basic skills of ICT. In Belgium secondary education starts at the age of 12 years and at that time first ICT-skills (internet, e-mail, word-processing) are introduced in the program. Although basic computer-skills are already introduced in primary education, functional use of ICT is reserved for secondary education. Meanwhile a lot of secondary education schools have access to an electronic learning environment. The introduction of these instruments could possibly offer a solution to a great problem in youngsters learning track, namely the wrong choices in study-programs, with the result of a lot of 'lost' years between 12 and 18 years.

Critics, that this age is too young, can be invalidated by the fact that once started without experimental learning it is very difficult to change to learn. The experience gained that even starting with students in

higher education raises a 'culture shock' for students. Learning in secondary education is also part of lifelong learning.

If introducing these instruments at secondary education is accepted, a major consequence for using life-long learning instruments with teachers and students in higher education is that they have not only to write, maintain and learn from their own PPDP and e-portfolio, but also have to teach others to learn from these instruments. Having broad e-learning competences in a kind of sufficient integrated ICT- and pedagogical skills in relation to life-long learning, will be teachers' basic competences for the future.

What to teach about PPDP and e-portfolio?

It was a mistake to think that explaining the value of a portfolio will lead to an effective and efficient use of the instrument. Therefore a manual was created with 3 parts:

- Part 1: Technical aspects of the e-portfolio. Main goals were to teach students to login in the e-portfolio and to explain the structure of the portfolio. A choice was made to offer students a combination between a fixed and flexible structure.
- Part 2: Pedagogical aspects of the e-portfolio. Students were explained how to fill in an e-portfolio and write a PPDP. The focus was to explain students what documents and files are relevant for learning through an e-portfolio and which documents and files are simply additional materials. To teach this, students were obliged to write down in the e-portfolio for realizing which competence they uploaded that specific document or file. And in the case there were already published elements in that specific part of their e-portfolio, they had to write down in what way the new added element(s) contributed to the (better) realization of the competence, it was published for. In the PPDP students were asked to relate their formulated SMARTI-goals to 'proven' elements in the portfolio.
- Part 3: Learning from my e-portfolio. Students are used to work and learn in a static environment: one course after another. Formulating learning opportunities through a learning period does not occur voluntarily. If they are asked to publish documents in an e-portfolio, they will do. Trying to learn from one's own learning (and failure) results is difficult. To solve this problem, students were obliged to formulate and write down in their PPDP what their learning opportunities and failures were, where, in what documents this was proven, and what they intended to do in a new situation with the same possibilities and how they would prove their new learning outcomes in their e-portfolio. For some students this was experienced as 'difficult'. Therefore specific examples were worked out in concrete cases. After students had studied and talked about these cases, they were able to adapt these examples into their own learning.

This taught us that obtaining strong learning results from using e-portfolio starts with an intensive formation, not only on what a portfolio is and can have as goals, but especially on how these – for students also – new ways of learning can serve students' learning process. It is experienced as a difficulty, that lecturers and tutors do not have references from their own formation in higher education, years ago (Peters, 2000).

How to coach students?

This question has several parts to formulate an answer to. First of all, is it necessary that every lecturer of a student learning program has to take part in tutoring students? If the answer is no, this can have the consequence that knowledge-evolution in specific learning contents will not be followed up. If the answer is yes, time investment for lecturers will expand seriously. A solution was worked out in that sence that students enrolled their lecturers as tutors, but would ask specific support when they needed it. New experience, compared to the previous situation with the paper-portfolios, was the opportunity for students to add co-students as their coaches. Although not expected, all students added at least one or even two students as their coaches as well as their lecturers. From a socio-constructivistic view on learning this has to be strongly recommended. However first results of the experiment show that useful and to-the-point feedback from peers does not occur spontaneously. Again the same lesson can be drawn as earlier with the development of the PPDP and the e-portfolio in that sense that tutoring one-another as students is a specific learning, didactic activity, that has to be learned. Projects as the approved Comenius 2.1-project *Digifolio, Digital Portfolio, as a strategy for teachers professional development,*

are necessary to teach teachers/lecturers to use these instruments for their own learning and with a hoped consequence to help teachers to integrate these new approaches in their own education practice. Even specific formations as the Master of Science in e-learning-formation at Sheffield Hallam University can contribute to change teachers/lecturers attitude towards life-long learning in general, and using e-portfolio and PPDP in particular.

A second question that arose was whether to organise tutoring online or offline. Can this be organized only online or face-to-face tutoring sessions are also necessary, and how often do these have to be organized? Main goal is the efficiency and effectiveness of students learning. This has a consequence that the choice (online versus offline) of how to be tutored is the students' choice, taking into consideration that as well as for students, also and for coaches, online and offline tutoring will have as well advantages as disadvantages. Online tutoring has as main advantage that it can be done anytime, anywhere. Offline tutoring offers more possibilities for e.g. non-verbal communication and in-depth discussions. The choice between offline or online tutoring or a combination of both is for the moment to be decided by the student.

Thirdly how often do students have to be tutored? On demand or on a regular basis? To answer this question, the specific character of PPDP and portfolio have to be taken into account. Learning from or through PPDP and portfolio requests reflection. Reflection takes time. Especially reflection in the PPDP that ends on formulated learning outcomes in new authentic situations, like e.g. apprenticeships, take again some time. For these reasons tutoring is set out on a quarter-year basis, eventually filled up with additional tutoring sessions, on demand of students, for particular reasons or goals.

Conclusion

Developing e-competences for life-long learning and e-learning demands new approaches towards learning and attitudes from learners and teachers/lecturers. E-portfolio and PPDP are very useful instruments to realize life-long learning and guarantee minimum quality in that learning. However this kind of learning has to be learned. Suggestion is recommended to start already with PPDP and e-portfolio in secondary education. Learning from these instruments takes time. Students have to be taught to write PPDP and fill in the e-portfolio with documents and files that 'prove' competences. Learning from these instruments does not occur spontaneously and tutoring online and offline on a regular basis are necessary to increase the quality of learning for learners. Teacher training will have to develop new additional e-competences for teachers. These competences have to focus on pedagogical and ICT-aspects in relation to working and learning with PPDP and e-portfolio, not only for a short period or a stand-alone course, but in regard to life-long learning.

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QUALITY LITERACY – BETWEEN REFERENCE MODELS AND PROFESSIONALISATION

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Abstract

The role of education for todays societies is seen as crucial in order to participate in the global concert of economies, provide prosperity and well being to citizens, improve conditions of life and reduce poverty as well as build stable societal structures. The quest for quality, i.e. the very nature of this education, is thus the central question in all debates in all educational sectors today – especially for countries on the rise, trying to provide higher education to strengthen the path into a better future development. In Europe this quality debate is more and more on stake, defining quality as one of the main policy objectives for education with the aim of developing societies in such a way that individuals can advance according to their abilities, and economies can prosper.

1. Introduction: Quality Development as a Negotiation Process

There is no doubt that quality is the most decisive factor determining the future of any higher education system. This is the reason for the great variety of concepts, suggestions and debates which now encompass a large section of society and effect many social sub segments. It shows that the question of quality touches the heart of the learning debate. We can regard quality more and more as a subjectively individual and collectively influential category. How should learning opportunities look like and learning environments be structured, now and in the future? How do we meet the demand for building high quality learning capacities in higher education which are an important cornerstone to transform our societies into learning societies? It becomes clear that the debate on quality is a debate about how learning and education should look like in the future. It is a debate about values and cultures and it takes place on basis of diverse experiences and convictions.

The concept of quality in the public perception and debate today has gained the significance of a leitmotiv for the educational field in all European countries, having the same importance like "equality" or "scientific orientation" in the educational debates of the 1970s in some European countries. Such concepts do not appear as empirical accurately defined and operationalised notions but are rather constituted by a dense bundle of a broad range of arguments, objectives, convictions and procedures (Terhart, 2000, p. 809). Quality in e-learning in this sense has become a leitmotiv for educational policies, a slogan for practitioners and a huge demand for learners. Achieving high quality is a hotly debated and much-sought-after goal in all segments of society and education. It is less characterised by its precise definition but rather by its positive connotation.

What is so difficult with quality, that everybody wants to achieve and nobody can really define it? Quality is a multi-dimensional concept and it is not possible to generally define a set of quality standards applicable to all countries and all educational sectors. Quality embraces all the main functions and activities of higher education: teaching, research, staffing, students, infrastructure, and the academic environment. It is the relation between the expectations and expected outcomes and the observed results. Continuous and permanent assessment and improvement are necessary to reach this objective. Quality – as much as education – is rooted in cultural values and traditions. Therefore quality strategies and definitions always have to be specifically taking into account the very context of their application.

To find a suitable model for quality development is of crucial importance for quality development in higher education. *Accreditation sets a frame for quality development which needs to be filled with more elaborated macro and micro strategies.* Due to the enormous variety of divers strategies in the field of quality development it is difficult to tell which of the available concepts fit the specific needs in the given context. After having chosen a suitable model for quality development it is important that this is

not implemented in a mechanistic manner into an organization but that it rather stimulates processes of pedagogical professionalisation. The utmost goal of quality development has to be to foster a professionalisation process of educational practitioners.

The nature of quality development is a constant adaptation process of the offered educational services to the target groups which are to be educated. Newer approaches highlight the aspect of negotiation as one very important for successful quality development (Ehlers, Fehrenbach 2004).

This relates especially to the open nature of quality which in itself is not a normative definition but a relation between the perceived and the offered provision. Within this open concept of quality development, we can identify four steps (adapted from the Quality Decision Cycle of the European Quality Observatory: http://www.eqo.info, see Ehlers, Pawlowski 2004) which have to be taken to develop quality in education in general, and e-learning in particular. To perform these steps of quality development, several competencies are necessary which we want to refer to as *quality literacy*. They involve:

- *knowledge* about quality development for general orientation and selection,
- *experience* with the usage of instruments for quality development,
- the ability of innovation and modification to *adapt* instruments and concepts to the own situation or develop new and
- *analysis* of abilities for assessing own needs and *evaluate* existing tools and concepts.

2. Quality Literacy

The concept of quality literacy (Figure 1) aims at describing skills which enable individuals in the situation of quality development to act competent. Sometimes these situations are very complex, e.g. when it comes to restructuring whole organisational processes. Sometimes, though, there is only little complexity when only one instrument is applied to perform quality assurance, e.g. a questionnaire at the end of a program or course.

In general it has to be noted that quality literacy applies to all forms of technology related educational concepts, like e-learning and blended learning – as well as presence courses. We derive the term from concepts of media literacy (Baacke 1996) which as a concept describes the abilities which individuals need, to act competent in a world mediated through media.

There are commonalities and differences between "traditional" educational scenarios and e-learning. Concerning quality development in both educational "domains" we have to note that it is a process of negotiation, with the goal of providing successful education. For e-learning we additionally have to deal with the specific field of technology. It becomes clear that additional areas of knowledge apply here, in principal, however, quality development requires the same competences of negotiation.

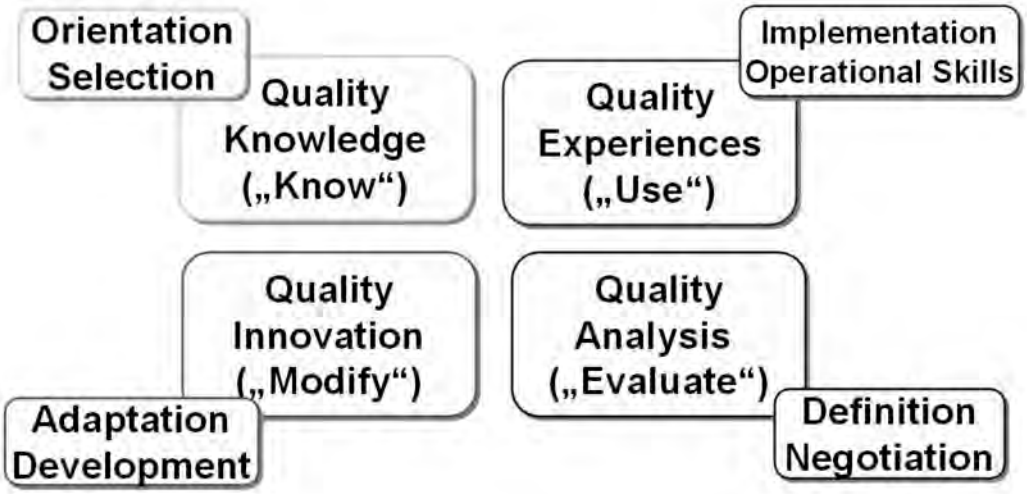

Figure 1. Dimensions of quality literacy

Quality literacy, moreover, is a concept which can not exclusively be learned by means of books or trainings but requires experience and practice. It is, thirdly, a concept which is subject to constant change, as the means and forms of technology enhanced education change as well.

Quality literacy (Figure 1) can be seen as a set of central competences which contribute to carrying out successful education. A more precise description of the inner structure and coverage of the concept follows by elaboration of the four dimensions the concept contains.

2.1 Dimension: Knowledge About Quality

This dimension addresses the "pure" knowledge about the possibilities of today's quality development and up-to-date quality strategies in e-learning. The term *quality strategies* refers to all guidelines, structures, rules, tools, checklists or other measures which have the goal of enhancing the quality of an educational e-learning scenario.

2.2 Dimension: Quality Experience

This dimension describes the ability of using quality strategies. It is based on the experiences actors have with activities in quality development and applying quality measures and strategies to e-learning scenarios.

2.3 Dimension: Quality Innovation & Adaptation

This dimension relates to the ability which goes beyond the simple use of existing instruments and strategies. It refers to the modification, creation and development of quality strategies and/or instruments for ones own purpose. An innovative and a creative aspect are important for this dimension: Innovation in the sense of further development and adaptation processes of quality strategies within the given system, and creativity in the sense of thinking and developing new strategies for quality development.

2.4 Dimension: Quality Analysis

This dimension relates to the ability to analyse the processes of quality development critically in the light of ones own experiences and the own situation and context. It is important to evaluate different objectives of quality development and negotiate between different perspectives of stakeholders. To "analyse critically" means the ability of differentiation and reflection of existing knowledge and experiences with education and quality development.

For learners this would mean to be aware of the responsibility which they have for quality in education as a co-producer of learning success. For providers this means to enable flexible negotiation processes in the educational offers in which individual objectives and preferences but also societal contexts and organisational structures are integrated into the definition of quality objectives for education.

3. Quality Development in Four Steps

In the context of the Quality Development Cycle, mentioned above, the dimension of quality literacy applies to the different steps of quality development (Figure 2).

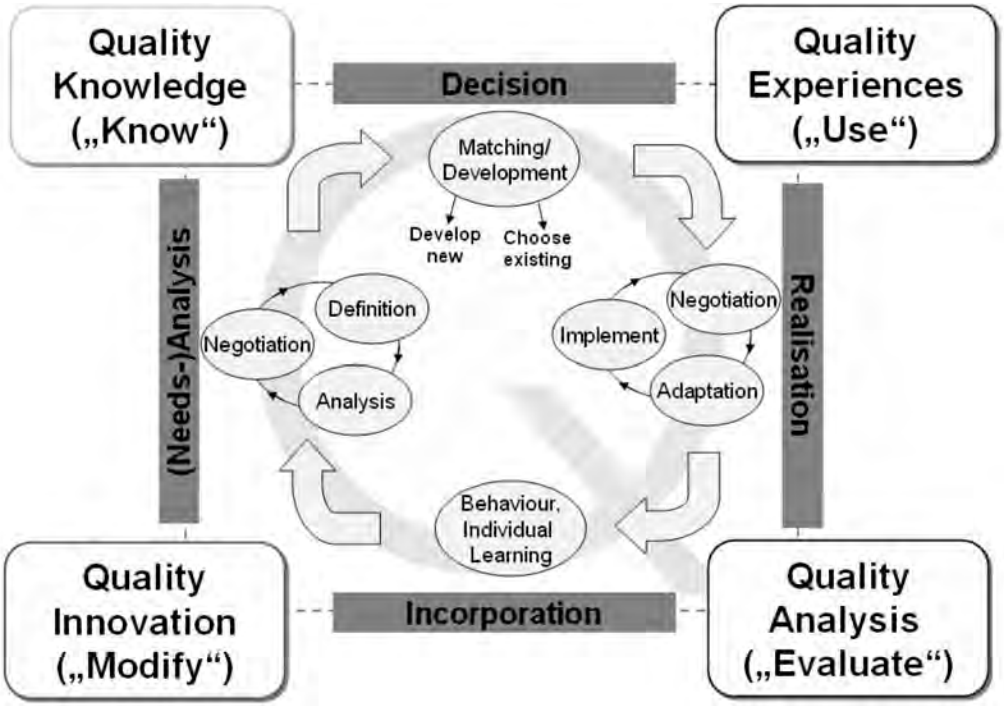

Figure 2. Quality development cycle (adapted from Ehlers, Pawlowski 2004)

According to the presented model (Figure 2), quality development takes place as a sequence of four steps which involve (a) a needs analysis, (b) a decision process, (c) a realisation phase and (d) an incorporation phase. The cycle thus takes on an organisations' perspective. This is important to note because it is especially developed to answer the question how an educational offer can be provided through an organisation, e.g. a university, to be of high quality. It is not primarily concerned with helping learners, who have to choose a course or a program, helping them to find an offer of high quality. For each phase in the quality development cycle certain competencies are required for the actors performing the quality development process.

Needs Analysis: In the needs analysis phase, the organisation examines the needs for quality, and the situation and the context in which the educational scenario is embedded. The needs analysis phase includes in itself an iterative cycle which consists of an analysis phase of the current situation, a negotiation process between the involved stakeholders (e.g. learners, teachers, administration), and a definition phase where the needs are finally defined.

Stakeholders who are involved in these processes need the ability to evaluate and define the needs of all stakeholders which are involved in the educational scenario and negotiate between them to achieve a high quality of the offered learning environment (Quality Analysis). Additionally, knowledge about the possibilities of quality development and about quality strategies or good practice examples could be of help in the needs analysis phase.

Decision Phase: In the decision phase the previously defined needs for quality development are matched with available approaches (*Quality Knowledge* is needed). If those approaches sufficiently meet the requirements, they have to be chosen as model for the quality development project, and the next phase can be entered. If there is no strategy which meets the needs, a new, own quality strategy has to be developed. For this phase two competences are especially important: *Quality Knowledge* and *Quality Analysis* skills. When it comes to developing an own strategy the ability of *Quality Innovation*, i.e. creatively and innovatively developing a fitting quality strategy, gains importance.

Realisation Phase: In the realisation phase the quality strategy is implemented into the organisation and thereby adapted to the specific organisations' needs. The new set of rules and processes have to be "transformed" into the organisations' "language" and be refined for the organisations' specific context. This process to a large extent involves experiences, adaptation processes, evaluation and analysis of competencies.

The usage of models and instruments for quality development like checklists, process descriptions and/or evaluation questionnaires, requires a high amount of *Quality Experiences*. The adaptation of these instruments and models demands the ability of innovation and modification and is conceptualised in the dimension of *Quality Innovation*. Critical analysis and assessment form an integral part of this phase. *Quality Analysis* thus becomes important.

Incorporation Phase: The incorporation phase relates to the modification of activities and actions which have to be performed by the individual actor of an organisation as a result of the quality development process. Quality development – in the final consequence – is always directed at modifying the behaviour of individual actors of an organisation – be it the tutors or teachers or the authors of courses, the system administrators or the organisational representatives.

In the incorporation phase it is therefore examined whether the changed processes and new values which are suggested in a new quality strategy are incorporated into the activity patterns of the stakeholders. A great deal of critical analysis skills and evaluation experiences is necessary for this phase. *Quality Analysis,* therefore, becomes important in this phase.

Conclusion

As we have seen, quality development involves negotiation processes and can be described as a cycle of four steps. It covers quality development from the first organisations' negotiations about their needs, to the modified behaviour of the organisations' actors. For each phase a set of skills and competences is necessary to perform the required activities. These can be describes with the concept of quality literacy which is elaborated above. However, it becomes clear, that the dimensions of quality literacy are not completely distinct from each other. They relate to different skills and competences but influence each other. *Quality Knowledge*, for example, is connected to *Quality Experience* and this again to the ability of *Quality Innovation* in the field of quality development.

However, the concept of quality literacy allows to operationalise skills which are necessary for successful quality development. This is important for trainings and support services in the field of developing quality for e-learning

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THE EFQM SELF-ASSESSMENT MODEL IN E-LEARNING QUALITY MANAGEMENT

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Introduction

It is challenging to support and enhance quality management in e-learning. The need for quality management in e-learning has risen since the use of e-learning has expanded. Expanding the use of e-learning has put pressure in changing the organisation, processes and services in education. More emphasis has to be put on the quality of operations and contents of teaching and learning, online learning materials and pedagogic and technical support services for e-learning.

We have to find answers on the following questions: How is quality defined, how can quality be assessed? How can quality be integrated in the existing operational procedures of the learning organisation? What kind of quality management system can be implemented? In this paper we focus on the assessment of quality.

The EFQM excellence model is a famous quality management tool. We have translated it to be useful in e-learning quality management. EFQM will be used as a framework for self-evaluation. We identified the main enabling criterion and positioned them in a stakeholder enable model. We built our stakeholder self-assessment model upon the Kirkpatrick evaluation model. A set of quality criteria have been identified for self-assessment by the learners.

1. Quality and excellence model of e-learning

1.1 Introduction: quality management in e-learning

The same principles apply to e-learning as in the quality of teaching and learning in general. However, there are some special characteristics in e-learning that need to be specified. Quality management has to cover three areas, first the teaching and learning, including the organization of the learning process, second the learning content and third the pedagogical and technical support for e-learning including equipment and facilities. Quality criteria have to be defined for those three areas.

We identify several stakeholders in quality management.

1.2 The stakeholders and their changing roles in e-learning

We focus on the learning/training organization or more specific on the learning department of a company or an institute, that is organizing the learning activities and also the e-learning activities for the staff of all the departments of the organization.

To become excellent, the learning department has to balance and satisfy the needs of all relevant stakeholders. The stakeholders consist of the company management, all departments to which the learners belong, the individual learners, the suppliers of all learning resources and the customers of the company.

Students and teacher's roles are changing when evolving from traditional teaching to online teaching and learning, thus demanding new skills both from the teacher and the learner. Teacher's role online is one of facilitator and tutor, guiding the student on the path of discovery and learning. The student is in a role of independent explorer, who receives help from his/her tutor. The student has to take more responsibility for learning, thus demanding more embedded clear instructions, help facilities and interactive and attractive content delivery.

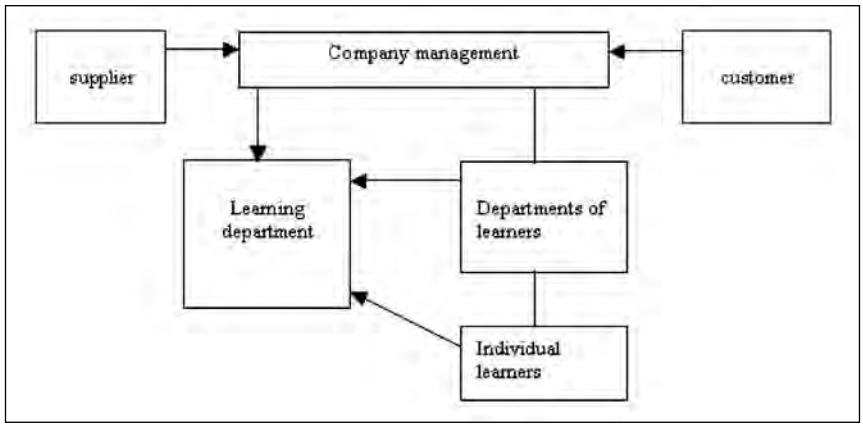

Figure 1. The stakeholder model

1.3 Quality of learning materials and of support services

Learning materials have to fit the content demand and goals for learning. The teacher has to take care of the effectiveness of teaching by including learning tasks, embedded help facilities. The production process modeling is important from the viewpoint of the developer of the materials. The standardization of the materials will result in re-usable learning content.

Quality management of the type of infrastructure in e-learning is seen as a natural part of the quality management of other learning and teaching support services. Process descriptions of pedagogical and technical support services or quality criteria have to be defined. Existing models as for example EFQM can be used by the organization to measure its current situation, follow its progress, find development areas and improve its operations.

1.4 Some fundamental concepts of excellence

1. *Results orientation:* A first result the learning organization has in view is to enhance the knowledge of the learners. An excellent learning content has to be delivered and the learning process has to be organized in an optimal way, taking care of some built in interaction, of an attractive user interface and of the organization of an effective tutoring. The e-learning solution has to fit the learning objectives that are set forward by the learner and the learner's department. A second result must be that the learner will retain and transfer back the new knowledge and skills on the job. Will the learners change their behaviour as a result of new learning? As an example, a representative has participated in a sales training program and has changed his attitude. Namely, if a prospect did not buy anything, the representative will end the contact with specific future action steps. A third result is the business impact of the training of the staff member. As an example if the maintenance staff is better trained in the technology of their product, the number of calls to the help desk will decrease.
2. *Client focus:* The direct clients are the learner and the learners' department. The indirect clients are the company management and the customers of the company. The clients are the final arbiter of product and service quality. The basic element of quality management is taking the viewpoint of the client and the processes. Operational quality and processes from the point of view of the learner, the manager, etc.
3. *A strategy of continuous learning, innovation and improvement* will lead to excellence. Organizational performance is maximized when it is based on the management and sharing of knowledge within a culture of continuous learning, innovation and improvement. Management must be aware of new and innovative products, technologies and methods. New product design and at the same time optimized production processes will result in excellence. The innovation and the improvement are also situated in the learning department. The adoption of up-to-date learning content must be delivered and new learning concepts and tools will optimize the learning process of the learners.

4. Learning objects can be grouped into larger components of content, as part of the e-blended learning process.
5. Each learning object has descriptive information, metadata, allowing it to be easily found by a search.

2. The EFQM excellence model in e-learning

2.1 The EFQM excellence model

Regardless of sector, size, structure or maturity, to be successful, organizations need to establish an appropriate management framework. The EFQM Excellence Model is a practical tool to help organizations do this by measuring where they are on the path to excellence, helping them understand the gaps and then stimulating solutions. The EFQM model is based on some fundamental concepts or characteristics of excellence.

The EFQM Excellence Model is a non-prescriptive framework based on 9 criteria. Five of these are 'Enablers' and four are 'Results'. The 'Enabler' criteria cover what an organization does. The 'Results' criteria cover what an organization achieves. 'Results' are caused by 'Enablers' and 'Enablers' are improved using feedback from 'Results'. Each of the nine criteria has a definition, which explains the high level meaning of that criterion. To develop the high level meaning further each criterion is supported by a number of sub-criterion. Those pose a number of questions that should be considered in the course of an assessment. For example in the criterion leadership, focus is on the way management can motivate and stimulate the organization to evolve to continuous improvement. Some questions: How is management engaged in creating a culture of continuous improvement? How is management supporting the improvement activities? How is management evaluating and motivating the staff?

The EFQM model is a tool that organizations may use for the following purposes: first as a framework for self-evaluation that enables an organization to identify its strengths and areas for improvement and the extent to which its operations and results are in line with the characteristics of an excellent organization, second as a way to Benchmark with other organizations and third as a guide to identify areas for Improvement.

2.2 The EFQM model in the e-learning organization

The enabler criterion:

1. *Leadership*: the promotion and support of a culture of innovation and continuous improvement.
2. *Policy and strategy*: career guidance for the staff and a training plan to support it.
3. *People management*: learning has to be promoted.
4. *Resources*: management of staff, buildings, materials, intellectual and information resources on an effective and efficient way, to contribute to learning, attainment and improvement in the organization.
5. *Processes*: to take care for improvement of learning and teaching processes.

The results criterion:

6. *Client satisfaction*: to meet the needs and expectations of the stakeholders.
7. *People satisfaction*: to meet the needs and expectations of the learning organization/department, responsible for the learning process.
8. *Impact on society*: leadership in adoption of advanced and innovative learning concepts and e-learning solutions.
9. *Impact on the company's success*: the business impact of the training of the staff members.

3. EFQM self-assessment

3.1 Introduction

Following EFQM, the process of self-assessment is a catalyst for driving business improvement. EFQM self-assessment can be defined as being a comprehensive, systematic and regular review by an organization of its activities and results referenced against the EFQM Excellence Model. The self-assessment process allows the organization to discern clearly its strengths and areas in which improvements can be made and culminates in planned improvement actions that are then monitored for progress. Organizations have enjoyed various benefits as a result of undertaking self-assessment using the EFQM excellence model.

3.2 How to do self-assessment?

There is no definitive answer to the question "which technique is the right one for my organization". There is no single "right" way to perform self-assessment. We adopted the questionnaire approach.

This technique can be one of the least resources intensive and can be completed very quickly. It is an excellent method for gathering information on the perceptions of people within an organization. Some organizations use simple yes/no questionnaires, others use slightly more sophisticated versions that use a rating scale. Self-assessment using standard questions designed to get the organization started thinking in terms of process improvement. Questionnaires can also be used to facilitate group discussions about improvement opportunities and to inform management workshops.

3.3 The stakeholder enabling model

In the figure we assign the enabling EFQM criteria to the stakeholders.

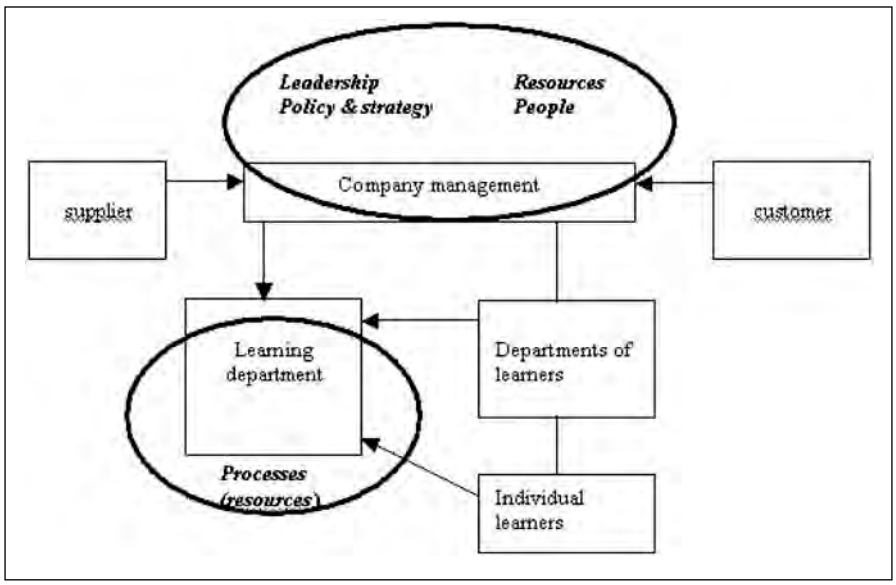

Figure 2. The stakeholder enabling model

3.4 Stakeholders self-assessment model

In 1975 D. Kirkpatrick presented a four-level model of evaluation, that can be applied to traditional way of learning and also to e-learning. The levels are: 1. students' reaction, 2. learning results, 3. behaviour in the workplace, 4. business results.

We have built our stakeholders responsibility model upon this Kirkpatrick model. In this model we identify the quality criteria or self evaluation topics and assign them to the stakeholders.

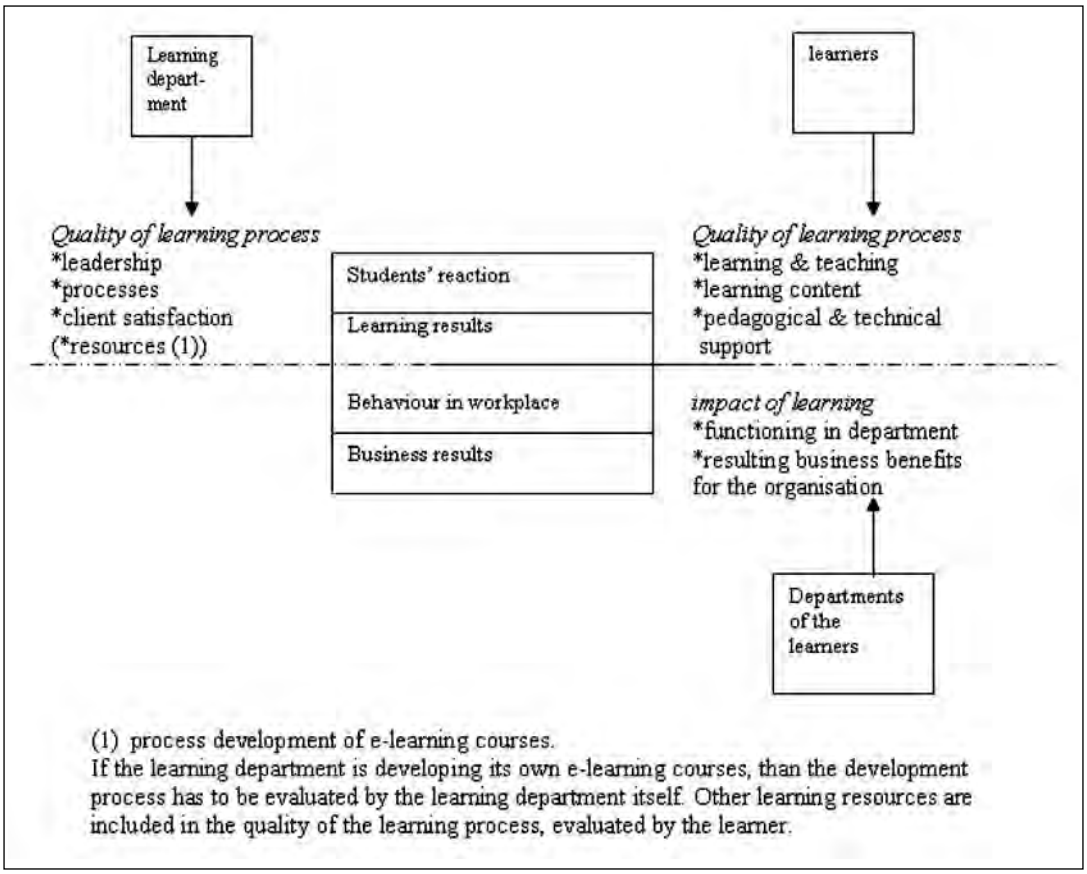

Figure 3. Stakeholder self-assessment model

4. Evaluation of e-learning by the learner

4.1 Introduction

Once the self-evaluation topics are identified, we have to decide on the organisation of the self-assessment. Who can evaluate which quality criteria or self-evaluation topics? The learner can fulfil the role of evaluator of the quality of the learning process, except some resources criteria. If the learning department is developing its own e-learning course, than the development process has to be evaluated by the learning department itself. Other learning resources are included in the quality of the learning process and will be evaluated by the learner. The evaluation of the impact of the learning can best be done by the department of the learner.

4.2 Our set of quality criteria for the self-assessment by the learner

1. Content
   - 1.1 the matching of the learning objectives of the learner
   - 1.2 the learning level
   - 1.3 the foreknowledge of the learner
   - 1.4 the difficulty level of the e-learning course
   - 1.5 the pace of the e-learning course
   - 1.6 the availability and quality of the assignments, tests and exercises
2. Usability and delivery
   - 2.1 the quality of the navigation in the course
   - 2.2 the quality of integrated communication

2.3 the quality of the embedded tutoring

2.4 the way the learning environment is motivating, stimulating and encouraging to learn

2.5 the feedback to the end user about the progress, scores, etc.

3. Technical specifications

3.1 the set up and installation of the e-learning systems

3.2 the session start-up, the performance and the uploading of the pages

3.3 the browser independency of the pages

3.4 the availability and systems stability

4. Organisation

4.1 the welcoming of the learner while starting the course

4.2 the quality of the helpdesk facilities

4.3 the quality of the administration activities: registration, scheduling, training, payment procedure, course information

5. Conclusion

It is challenging to support and to enhance quality management in e-learning. In this paper we found answers on the question how quality can be assessed. We have translated the EFQM model to become useful in e-learning quality management. A set of quality criteria has been identified to be used for self-assessment by the learners. The learner can fulfil the role of evaluator of all aspects of the quality of the learning process. The impact of learning can best be evaluated by the department of the learner. We have still to identify a set of criteria for the assessment by the department of the learner.

And if the learning organisation/department is developing its own e-learning courses, than the development process has to be evaluated too. In that case we have to identify a set of criteria for the assessment by the learning organisation/department.

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QUALITY IN THE NEW LEARNING SPACE: ONGOING PROCESS OF TEACHER AND STAFF TRAINING

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Presentation of the e-Quality project

The e-Quality project, partly funded by the European Commission under the Socrates/Minerva Programme[1], while deeply rooted into the ongoing normalisation work, proposes to offer a ground for practical design and implementation of a quality methodology, a training package for staff in charge of its implementation, a validation field and a knowledge database for results and best practice dissemination. Five countries are involved: Finland, France, Poland, Spain and Switzerland.

The pedagogical approach puts the student's needs at the root of the ODL quality process. This approach is comprehensive: it encompasses all the processes needed to validate in real situation the produced methodology and documents.

The project supplies core methodology and tools, as well as accompanying interactive documents and resources (guidelines, best practices, models...) which explicit the use of the methodology and tools. Our references are mainly the EFQM model and partly the norm ISO 9001, in its version 2000, as it is applicable to services and focused on "clients' satisfaction".

First results on quality implementation

The e-Quality project starts with the comparative analysis of the partners' context that permits to be aware and detect a set of existing blocking factors in the implementation of quality. A questionnaire has been designed and validated by partners, to describe the situation in all participating countries. National studies have been conducted in the 5 countries, using this common questionnaire. Five reports and a synthesis have been written and are available on the project website[2]. The synthesis includes also an interesting comparison on blocking or helping factors for quality implementation in Higher Education institutions, in general and for ODL in particular [3]. This collaborative work has been used to elaborate the objectives and to build the material of the training of national teams working for ODL development and delivery.

In the frame of the e-Quality project, through a collaborative work, a set of criteria and indicators are being developed. The idea is offering guidance enhancing the improvement of ODL higher institutions in quality terms. Furthermore this information may be considered as key success elements when implementing quality methodologies.

We focus our work on 2 main sub-processes: "Learning Material Design and Production" and "student support". This choice allows us to work on 2 very different kinds of sub-processes, each one being a useful representative of its sort. The first one concerns the production phase of ODL and is merely resource-oriented, including technical quality aspects, dealing with issues such as interoperability, metadata, learning objects, etc. The second one concerns the diffusion phase of ODL and is human relationship oriented, dealing with issues as pedagogical strategy, communication abilities, delay for response, etc.

[1] Project number: 110231-CP-1-2003-1-MINERVA-M i – 2003-2006

[2] www.e-quality-eu.org

Why training ODL staff on quality issues?

The project produces a training package to train, in face-to-face and at distance, several teams of concerned staff (both trainers, technicians and administrative, with students as observers) to understand changes, to use the resources and apply the methodology. In the five countries, training sessions began in Fall 2005 and will go on during the first quarter of 2006.

We focus our work on training teams working in ODL as we agree on the need for an institution that has to develop ODL or to organise its ODL service on a collaborative base between all actors concerned: teachers but also technicians and administrative staff. This a priori choice has been sustained by some result from the national surveys showing that – in institutions not completely dedicated to ODL – the support given to teachers and the lack of consideration for ODL are still blocking factors.

Our training strategies and training material

The e-Quality project assumes that the training session takes place in order to transfer the knowledge gathered by the project to ODL professionals. The training session event has been organized in five European countries: France, Spain, Finland, Poland, and Switzerland. The training session evaluation consists in determining the differences of the trainee's understanding of quality in ODL before and after the training session. Moreover an adaptation phase is required in order to overcome the language issue and to adapt the training material to local conditions. Because the project participants are interested in the course knowledge implementation, the validation phase is scheduled after some time period (e.g. one semester).

The training session covers the following subjects:

- Concept of Open and Distance Learning (ODL),
- Basic quality concepts,
- Concept of student lifecycle,
- Student support sub-process,
- Learning material design and production sub-process.

The training materials were delivered to the trainees through traditional lecture as well as through distance learning. The training session is organized as an equivalent of a five day education event. During the training session, the face-to-face and distance meetings take place. Trainees are also expected to work by themselves on the training materials. Every trainee has his/her own virtual space on the Moodle platform, which gives him/her access to content and forum.

National training sessions: preliminaries

The evaluation procedure used in the training sessions is based on the concept of the Goal-Question-Metric (GQM) method [1]. Main measurement goals for the e-Quality training session:

- Recognition of the trainee's competence in the quality aspect of ODL;
- Production and verification of the project's approach to the e-Quality course design and delivery;
- Evaluation of the e-Quality project training materials.

Measurement goals for preliminary information about trainee phase

- Information for the training session setup and pedagogy;
- Information basis for the assessment of the success and redesign of the training sessions (second phase of evaluation).

Measurement goals for post-session information and the report on training sessions phase

- Evaluation of the success of training session;
- Information for the redesign of the training material;
- Information for the redesign of the training session setup and pedagogy;
- Information for the general report on all the training sessions (general aspects and comparative analysis).

Measurement goals for post-session trainee's knowledge about quality in ODL phase

- Evaluation of the success of training session;
- Information for the general report on all the training sessions (general aspects and comparative analysis).

To deal with measurement goals two evaluation methods are used: questionnaires and reports. Before the training session starts the trainees were asked to fill in a pre-questionnaire. After the training session they were asked to fill in two questionnaires, named: post-questionnaire and knowledge questionnaire. The first one is designed to estimate problems the trainee has encountered, concerning the course environment and resources (e.g. problems with technology, terminology misunderstanding, class interaction). The second one is designed to evaluate the trainee's competence in the quality aspect of ODL. The trainee's understanding of quality in ODL is evaluated on the basis of his/her answers. Moreover, the tutor was asked to create a training session report about his/her training session. The report covers the issue of the training session scenario, personal opinion and observations.

The pre-questionnaire covers the following subjects:

- Profession (professional status, work related with learning, work related with e-learning/ICT);
- Experience (previous training related to e-learning, involved in e-learning courses, previous training related to quality, previous training related to quality in education, IT experience);
- Motivation (quality importance in work, expectations from the training, future application).

The post-questionnaire covers the following subjects:

- Social climate (trainer's attitudes, training atmosphere, trainer's ability to stimulate the trainees' curiosity and engagement);
- Content issue (pragmatic of material, were trainees encouraged to present their opinions, judgments and doubts, trainees' problem with initially requested knowledge and technical competencies);
- Organization issue (ordered, logic and consistency of training, trainees exchange information during the training session);
- Training session material (additional illustrative examples, complementary sources and supplementary explanations, tools/templates which could be used in practice);
- Technical support (access to training resources and trainers, technology solution);
- Trainee's personal benefit (new knowledge, new skills, ability to use training knowledge, ability to use training materials);
- Trainee's satisfaction (usefulness of training, trainee's satisfaction);
- Trainee's self confidence (difficulties in putting the quality approach into practice).

The knowledge questionnaire covers the following subjects:

- Quality in education (meanings of quality concept in education, quality dimension in education, quality and industrial standards, concepts of benchmarking, accreditation, quality policy, procedure);
- Quality in European Higher Education (Bologna process, Open and Distance Learning, Bergen framework, responsibilities of Higher Education National Agency, ENQA);

- Student support process (key actors, quality criteria and indicators);
- Learning material design and production process (key actors, quality criteria and indicators).

Results from the national training sessions

So far the pre-questionnaire phase has been done. Out of 24 questionnaires from three European countries following results were obtained:

- The examined group mainly represents (multiple-choice): content designer (10), author (9) content producer (9), tutor (13), tutor-counselor (11), teacher (13), evaluator (11). It means that most of the trainees are involved directly in student support sub-process and learning material design and production sub-process as well.
- The trainees have a wide experience in learning teaching process (18 out of 23 persons have worked more then 5 years in professional field related to learning) and in the same time a reduced amount of experience in e-learning (16 out of 23 persons have worked less then 5 years in professional field related to e-learning). The reason for that is a relatively young age of e-learning movements (8 persons have worked with ICT in learning and have been involved in e-learning courses for 2 years). On the other hand most of the professional recognize the importance of e-learning and migrate to this direction (10 persons have taken training related to e-learning).
- The knowledge about quality is relatively good. 17 persons have taken training related to quality issue before, including: 3 persons have taken training related to industrial quality standards (e.g. ISO), 5 persons have taken training related to quality issues in (traditional) learning, 4 persons have taken training related to quality issues in e-learning. However, 12 persons have not got any experience on quality nor quality assurance in learning.
- The trainees have considered that e-learning is important to their work because of working basis and main topic of work. The main function of quality is improvement of learning and work contexts.

Preparation of the validation phase

During the training session, the trainers gave personalized advice to the trainees and helped them to define concrete actions to implement quality. These actions are related to quality criteria, quality indicators able to be measured. These actions will be observed during the validation phase.

At the end of the training session, we ask each trainee to define actions in order to implement a quality approach. We find out some difficulties:

- To stand measurable indicators and measure tools,
- To foresee iterations in the quality process,
- To give indicators related to different scales of time.

Validation phase

The main objective of the validation phase is to assess how the trainees who followed training sessions in their countries intend to apply e-quality methodology in their own professional contexts [11]. This validation requires a sufficient time for observation, evaluation and analysis. The output of the work is compiled into a document, using online documents sharing and communication tools. It will be put into the best practice data base.

We should measure the impact of the training on the production of ODL environments and course material, as an increase in quality, analyzing such real production in a real situation (including real students) and real tutoring in a professional context [12].

To do so, we decided to measure the gap between the appropriation of the methodology (*learning process*: what I understood and learned) and the application of the concepts with supposed improvement for final students and other actors in the e-learning developing (*transferring acquired concepts on other concrete situations*: what I intend to do with this instrument, what I effectively did and what has been improved in my practice using the methodology).

This phase has been divided into three sub phases:

1. Measurement of the appropriation of the methodology through the training sessions;
2. Measurement of the application of the methodology in concrete professional situations;
3. Measurement of the final user satisfaction rate (student, administration staff or e-learning course developer).

Validation concept

The purpose of validation in ODL is to:

- Improve quality of ODL by indicating the essential activities promoting quality in different processes;
- Help recognize best practices and blocking factors;
- Act as guidelines and support media for the development of education in a new situation with new technologies;
- Function as a tool for quality assurance;
- Function as a learning process for the whole team working with the course;
- Increase the understanding of the success of different areas;
- Act as a comparison when looking for best practices and examples for the improvement of ODL;
- Function as a quality guarantee or recommendation in relation to students, other users and producers of ODL.

The quality criteria and their indicators should not be seen as separate aspects of education. The criteria are an elemental part of constructing learning events or learning objects and of strengthening different processes necessary for the modern higher education. Even in traditional modes of education such criteria are always in place as an integral, unexpressed aspect of the cultural tradition of the university teaching. Thus the criteria and their indicators are not artificial tools or evaluation scales for ex post facto quality measurement, but guidelines and support media for the development of education in a new situation with new technologies.

Instrument implemented

Collecting data instruments

The validation concept has been built on three main developments:

1. Implementing pre and post training sessions questionnaires to measure what has been acquired *during* the training session;
2. Implementing questionnaires to verify what are the *intentions* of the trainees, which concrete measures they have decided to apply to their professional context and how these measures have concretely been applied. These questionnaires are to be designed related to the roles trainees take on in the ODL process. Some trainees undertake different roles (tutor, course designer, content specialist), others undertake only one role and are for example not in direct contact with the student;
3. Implementing interviews to assess the end user's satisfaction rate whoever it will be.

The questionnaires will take into account the country of origin of the targeted public and will allow the survey to build interesting comparison not only in the increase of quality in ODL course but should as well present the reason why, should the problem appear, the whole quality level has not been improved.

Grid and indicators

To build the set of questionnaires, indicators should be produced. These indicators are created to cover two sub processes: *student support* and *learning material production*.

Student support criteria examples:

- The schedule is in balance with the different aspects of the course
- Rules for the course are created and explicit
- Pedagogical choices are justifiable, etc.

Learning material production and design criteria examples:

- Learning material have an easy access
- The cost of the usage of learning material is reasonable
- Learning material are available on required languages, etc.

The whole validation concept, centered on ODL actors follows the whole ODL lifecycle and starts from the trainee's intentions to apply e-quality methodology to reach reality of this implementation. Where the implementation has been successfully integrated to the ODL process, the selected criteria will allow the project to answer the following relevant issues.

Has the application of the e-quality methodology notably increased

- the global quality of the ODL course?
- the global student's satisfaction?
- the knowledge appropriation by students involved in an ODL course?

Final meeting in Poland

The integral survey will be launched during the second trimester of 2006 and figures and facts will be published at the end of the year. A final meeting will be organized in Poland in September 2006 and all project results will be presented and discussed with specialists involved in ODL and interested in the application of quality standards to their professional contexts.

Conclusion

Teaching and learning in open and distant learning system is a difficult, though rich and rewarding process. However one of the main difficulties students as administrators meet in this particular way of transmitting knowledge is the numerous students that drop off a course, even if they have paid for it. About 80 percent of students leave their course with different consequences on the whole ODL process and related tasks (invoicing, tutoring, editing, etc.) Many explanations could be produced but we firmly think that integrating a quality vision to ODL courses and particularly on processes as material production and coaching, tutoring, could decrease the phenomenon and generally improve student's satisfaction in the knowledge appropriation. This is the main goal of e-quality in ODL project.

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THE QUALITY MANAGEMENT APPROACH "EFMD CEL – CERTIFIED ACCREDITATION OF E-LEARNING"[1]

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Conception of the quality management approach CEL

After a period of testing and exploring the potential of e-Learning in different contexts, there is a broad consensus that much more effort should be put into the question of quality improvement. The quality of both the products and programs in the field of e-Learning vary widely, and although there are some proposals around we still lack a concept of quality improvement which is theoretically sound and at the same time meeting the expectations of practice.

CEL is designed as a quality accreditation scheme that focuses on e-Learning supported programmes. A programme is to be regarded as "e-Learning supported" if a minimum of 20% of its overall duration is delivered by teaching and learning methods within the range of e-Learning. This is the case if one of the following two requirements are fulfilled:

- **Interactive multimedia:** the programme utilises one or more media types other than printed text or recorded lecture material.
- **Network interaction:** the programme requires the use of a network to provide interactivity between a student and standalone content, or to connect different students to an e-Tutor/e-Moderator or to each other.

A "programme" is more than just an e-Learning medium (e.g. CBT, simulation tool), an event of e-Communication (e.g. e-Lecture, discussion forum, virtual classroom session) or a learning sequence of short duration. The following definition of a programme underlies the CEL scheme:

- Programme will correspond to the equivalent of **at least 100 hours** of candidate learning effort (defined by educational managers, not necessarily contact hours).
- Programme ends with an assessment, evaluation, examination or the like.
- Programme must be operated on a **durable basis**. This is in principle regarded to be the case, if the programme has at least been running once.

This paper is to outline CEL as a quality management approach in operation with its major components, the scientific basis and methodical derivation.

Rationale for CEL

Analysing relevant initiatives of other organisations, one comes across of some references to e-Learning. In the context of distance learning programs, some accreditation bodies have started to sketch specific criteria for e-Learning components within distance learning (Maslen, 2001). Although several accrediting agencies are trying to enter this market, so far there is no system designed to cover the multi-dimensional challenges of introducing and running e-Learning programs (OECD, 2001, 4; Maslen, 2001, A35; PLS Ramboll Management, 2004, X).

The CEL-scheme provides an empirical and theoretical substantiation of the quality criteria which allows the end users to better understand the meaning and relevance of the specific quality criteria. Furthermore, it operationalises the quality criteria into indicators and CEL standards. Through this operationalisation, the gap is closed between the theoretical quality framework and the guidance notes used by those executing the quality evaluation (see Figure 1).

[1] EFMD CEL is a joint initiative between EFMD (European Foundation for Management Development), the Swiss Centre for Innovations in Learning (SCIL) at the University of St.Gallen, and Spirus Applied Learning Solutions AG.

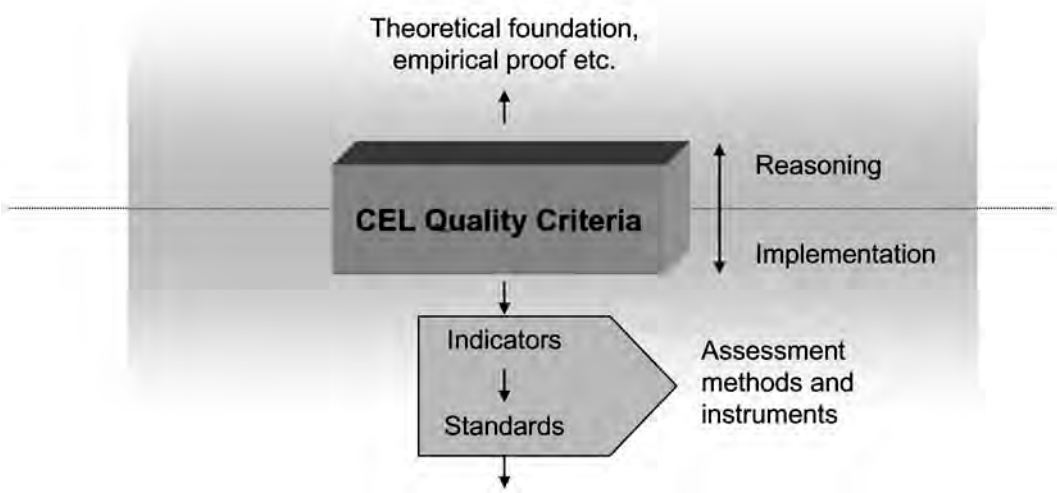

Figure 1. The methodical derivation of the CEL Quality Criteria

By providing the substantiating background of the CEL quality criteria, the developed scheme raises a scientific dialogue on the quality criteria and standards used and thereby establishes and improves the comprehensiveness and acceptance of the CEL quality criteria.[2]

The CEL quality accreditation programme grounds its own quality on criteria which are theoretically sound and supported by empirical or theoretical evidence and/or argumentative reasoning. Hence the relevant literature was evaluated. Based on this analysis, the criteria and evaluation types are set. In order to make the criteria evaluation more transparent to the relevant stakeholders, the standards for each criterion are defined and elaborated in the CEL manual. Where criteria allow or imply that different levels of achievement are being evaluated (mainly where objective standards may be set), the standards are broadened by a more detailed set of indicators that allow the peers and auditors to evaluate the criteria more adequately and homogeneously. As opposed to many other criteria lists that are currently available, the CEL criteria explicitly reflect the major interdependencies between them. Not the truth makes good quality criteria, but a sound and comprehensible substantiation of them. There are different ways and different weights of reasoning (Wirth, 2006):

- **Comprehensibility:** evidence and self explicability of criteria that obviously support the quality of e-learning supported programmes (e.g., it is obvious, that the used technology should be stable).
- **Theoretical reasoning:** Arguments and reasoning that can be deduced from widely accepted (scientific) theories (e.g., psychological theories suggest that the learning environment must correspond to the learning pre-dispositions of the learners).
- **'Best or Good Practice' Benchmarks:** Well prepared case studies may (often although only context specific) highlight success factors and pitfalls. Returning success factors may be used as crucial elements of a quality e-learning programme (e.g., self paced learning oft only works in combination of an adequate learner support).
- **Empirical evidence:** Results from qualitative or quantitative empirical research often provide specific answers to certain questions. In contrast to single-case based best practice literature, empirical results can often be considered to be more objective and externally valid (e.g., faculty support as such was identified to be very crucial for high quality e-Learning by several studies such as from IHEP[3]).

[2] The manual on the CEL quality criteria as well as the guidelines for executing the quality evaluation are published on www.efmd.org.

[3] The Institute for Higher Education Policy (www.ihep.org) studied active distance learning programs at six institutions. They examined the question whether the benchmarks for all types of distance learning programs are applicable to internet-based distance education. The final outcome is a list of 24 criteria meant to be essential to ensure quality in internet-based distance education.

Putting CEL quality criteria in operational terms is regarded to be a crucial element and very much differentiates this approach from others.

Underlying Understanding of Quality

Quality is understood as a construct that expresses the characteristics of processes, products or services, evaluated against the specific demands of relevant stakeholders. The understanding of quality can be characterized by analysing different perspectives (Wirth, 2006):

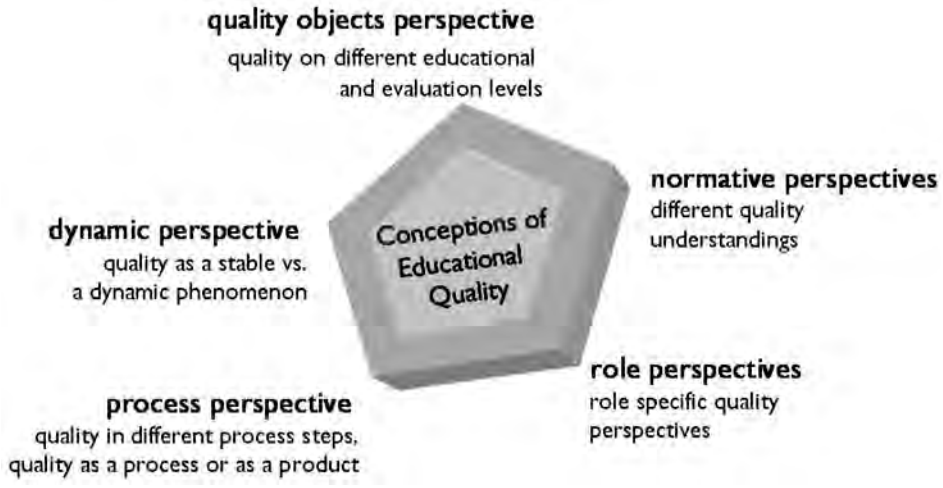

Figure 2. Conceptions of Educational Quality

The term "quality management" refers to all management related activities that define quality policies, goals and responsibilities and realize them through quality planning, quality assurance, quality evaluation, and quality improvement (based on DIN EN ISO 8402/DIN-EN 9000). In that context, CEL is an example of a quality management approach because it defines a specific set of decisions that lead to comprehensible structures and priorities as well as clarified goals, that allow to deduce quality criteria, indicators and standards. It is a context specific operationalisation of the (general-abstract) term 'quality'.[4]

Quality Dimensions and Criteria

The CEL system of quality improvement grounds its own quality on criteria which are theoretically sound and supported by empirical evidence. For that reason, the relevant literature was evaluated and subsequently two empirical studies were conducted at the Swiss Centre for Innovations in Learning (SCIL)[5]. Based on interviews with 25 experts in the field of e-Learning and validated by a delphi-study with 38 experts, a set of criteria could be isolated and clustered into the following dimensions (Seufert & Euler, 2003; Seufert & Euler, 2004):

- **Programme strategy** takes up questions like: are the main characteristics of the programme transparent for all interested parties? What (added) value does the programme provide especially by integrating e-Learning components?
- **Pedagogy** covering all aspects of the learning and teaching process. They address questions like: what type of learning environments does the programme consist of? What is the (added) value of those learning processes supported by e-Learning?
- **Economics** involving all facets related to efficiency in the use of resources. The main question is: are the resources in terms of funds and competencies efficiently used?

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[4] Compared to quality management systems which define a surrounding framework, consisting of organizational structures, methods, activities and resources that is required to manage processes influencing quality (based on DIN EN ISO 8402).

[5] See http://www.scil.ch/publications/index-en.html.

- **Organisation** dealing with the question: are the organisational measures in running the programme adequate to meet the programme's underlying objectives?
- **Technology** addressing the question: is the functionality of the technology implemented adequate to meet the programme's underlying objectives?
- **Culture** looking into the question: are the cultural factors of change and innovation considered adequately?

These dimensions comprise the main categories of a systemic view on e-Learning quality development within programmes resulting in 30 quality criteria (see Figure 3):

	Input	Process	Output	Perspectives	Quality Perceptions
Programme Profile	PR1, PR2, PR3, PR4			- Management - Learners	Quality as fitness for purpose in respect to institutional settings and strategic goals
Pedagogic Dimension	PE1, PE6, PE7	PE2, PE3, PE4, PE5, PE8	PE9, PE10	- Learners - Lecturers/ Teachers	Learning and transfer success, strenghening of the self study competence, pedagogical added value
Economic Dimension	E1	E2		- Management	Sustainable funding and sustainable added value
Technological Dimension	T1, T2	T3, T4	T3, T5	- Technical Staff - Lecturers/Teachers - Learners	Quality as standards oriented Zero-tolerance Quality as added value
Organisational Dimension	O1, O3	O2, O4, O5		- Management - Lecturers/Teachers - Learners	Fitness for purpose in respect to the set programme and learning goals and programme stakeholder
Cultural Dimension		C1, C2, C3, C4		- Lecturers/Teachers - Management/Staff	Quality as transformation: Empowerment for innovations

A total of 30 quality criteria

Figure 3. Overview of the CEL Quality Dimensions and Criteria

Operating Mode of CEL

The operating mode of the CEL scheme is mainly defined by the organizational structures (in terms of governing boards) as well as the operational structures (in terms of the CEL process) which will be briefly outlined in the next two sections.

CEL organizational structures

The organizational structures of the quality management approach EFMD CEL are highly comparable to analogous systems, so it is not necessary to describe everything in detail. Although the important role of auditors should be mentioned. Based on prepared documents, they visit the customers, examine the programme along the criteria and report on their findings. Their recommendation will be the basis for a decision of the awarding body. Due to their important role, auditors will be coached and trained by the training arm (SCIL, incorporating outside experts) and accredited by EFMD.

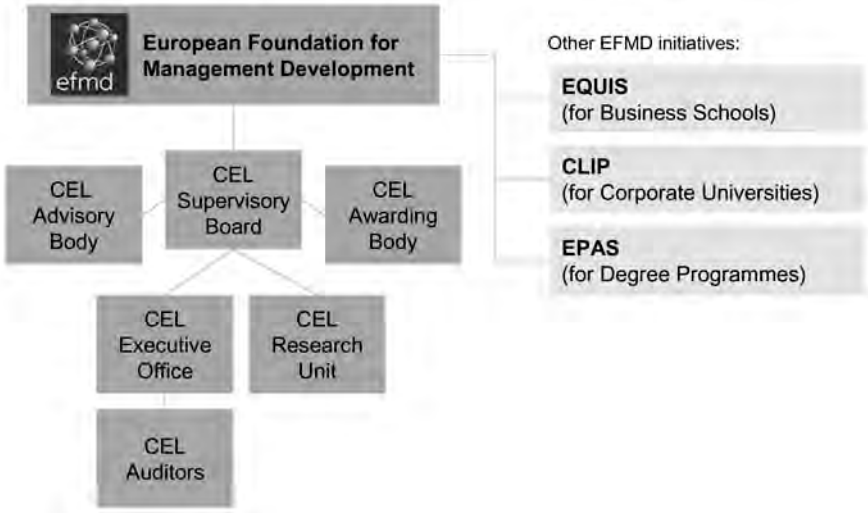

Figure 4. CEL – Organizational Structures

CEL operational structures

The CEL accreditation process is composed of several distinct stages. Figure 5 below describes this process and shows the way in which the different stages are linked:

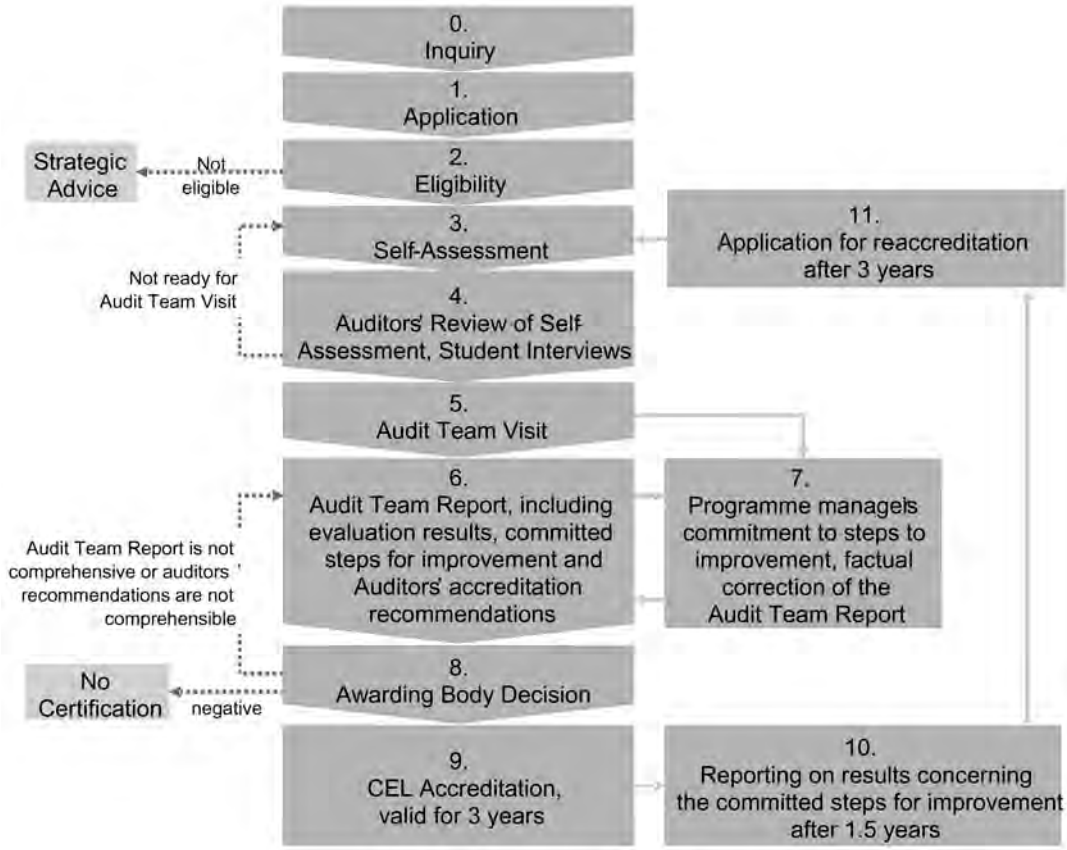

Figure 5. CEL – Operational Structures

Experiences and concluding remarks

The quality scheme EFMD CEL has been in operation since 2004. Since then four accreditations have been executed, three of them successfully, resulting in a CEL quality award. James Fleck, Professor and Dean of the OUBS stated: "The scheme is particularly valuable because it recognises that e-learning is

about more than just technology; the accreditation process looks very carefully at the effectiveness of the teaching and learning process." Dietmar Albrecht, Head of Knowledge and Learning Strategy, Volkswagen Coaching, emphasized that the EFMD CEL quality management approach now serves as a blueprint for the development of further programs. The experiences show that the CEL scheme can be used in Academia as well as in the corporate sector even though the terminology and concepts employed are different in the two areas.

Furthermore, it has become clear that every quality management approach is subject to economic conditions and limitations. Albeit it would be desirable to interview alumni, employers and also students in order to evaluate a programme, the costs would be prohibitive. Therefore, efficiency and quality goals in certification are conflicting to some extent. In the context of given organisational and economic conditions, an pragmatic solution in terms of evaluation instruments, information sources and scale of quality criteria has to be achieved. This is to say that the quality management approach has to accept an economically justifiable compromise without neglecting quality standards of high priority. In consequence, a quality management scheme such as CEL can not be expected to provide a comprehensive representation or evaluation of training processes and outcomes (e.g., by examining the learner behaviour with comprehensive tracking data, participating the courses or by a detailed inspection of the technological infrastructure).

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BUILDING ON PEER LEARNING: A FRAMEWORK FOR ICT EVALUATION BY INSPECTORATES OF EDUCATION

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Conditions, use & outcomes

Conditions, Use and Outcomes. Six inspectorates of education decided that these were the three key areas to define the quality of ICT use by schools. They came to these areas after an intensive year of peer reviewing each other's work and instruments.

In two peer review triangles, inspectors from England, Scotland, Ireland, France, Sweden and The Netherlands evaluated not only their instruments, but actually joined colleagues while carrying out school visits.

This article is built up of two parts: in the first part I will describe the review process, concluding with some recommendations. The second part of this article will focus on the framework itself. At the moment of writing this paper this work is still in progress.

Peer reviewing – recognition, affirmation and surprise

First some project details. The project Peer2Peer was initiated by European Schoolnet (EUN). EUN is supported by a membership base of 27 ministries of education in Europe[1]. The project was co-financed by the DG Education and Culture of the European Commission. Updates on the work within these projects and of these evaluations can be found at http://insight.eun.org.

The conception of the Peer2Peer Inspectorate strand (p2p-i) can be found in several earlier experiences of cooperative work between inspectorates. The most recent example was the ERNIST ICT School portraits project.

It is not uncommon for inspectorates to exchange views and methodologies. As members of SICI (the Standing International Conference of Inspectorates) most inspectorates regularly attend workshops or sometimes embark on joint projects. Other examples of joint work are the ICALT and ESSE project[2].

Six inspectorates – Two triangles

We split the six partners up into two groups. There were several mostly pragmatic reasons. People would find it hard to free up enough days to be involved in all reviews, it would be too costly to have a core team of 12 inspectors do six reviews and it would pose more problems to find an appropriate schedule without some simultaneous work. More importantly however, there was the fact that for the type of participatory research there were limitations to the number of guests that each host could accommodate.

The peer review visit was built up according to a more or less fixed format. Each review lasted for two to three days and started with a briefing session. Topics that would be typically addressed during such a session were:

- education policy
- the position of inspectorates: mandate and mission
- ICT policy and the involvement of the inspectorate in the evaluation of this policy
- Introduction of the school that were going to be visited

[1] More information on EUN and recent projects: http://www.europeanschoolnet.org

[2] See also http://www.sici.org.uk

Such a briefing session would last about half a day. Usually the next day or sometimes in the afternoon following the briefing, the guests would go on school visits. The visits were in primary and secondary schools, but sometimes also in institutes such as local centres for community learning. Each inspector would join a colleague during (part of) a regular visit. The way the school visits were organised and the extent to which it was representative of a regular inspection depended on the way ICT was usually evaluated. In some cases, the ICT evaluation is completely integrated in regular inspections that last a number of days. This would mean that the visitors would only have the chance to see part of the regular visit, slightly compromising the validity of the review. On the upside, this usually meant that one visitor could see more then one school and could join more then one colleague. In other cases, inspectors joined a complete ICT evaluation scheme of one day which gave a full picture of how inspectors in the host country operated to come to their views. This did mean however that each visitor only joined one inspector and saw one school.

After the visit there was an evaluation and debriefing session. The visitors were asked to mention strengths and weaknesses of what they had seen. Also, issues of similarity and contrast were discussed and of course what both host and visitors got out of this particular review. All in the context of the three main issues that we were looking at: the context of the inspectorate, the instruments used for the evaluation of ICT and the expertise and effectiveness of inspectors.

In total, some 45 inspectors were involved in the project and 31 schools were visited.

Guiding points for external evaluation

Based on the six peer review visits, on talking to all involved, on our work in several meetings and based on the six review reports, I formulated a number of guiding points that can be used by others – especially inspecting bodies – when formulating and shaping evaluation activities. These points are the result of my personal reflection and do not necessarily reflect the opinion of any of the inspectorates involved. They do however reflect the wealth and high quality of the approaches that we saw in the process of the peer reviews.

- Involve schools – not only headmasters or boards but also teachers and pupils in the definition phase of 'quality'
- Make your instrument flexible – can it reflect the different pedagogic approaches, the different school levels and types, the different contexts, the different school populations?
- Involve schools in the execution of the evaluation – let them carry out regular self-evaluations and use these as information source and starting point of your evaluation
- Make sure to identify good practices and make them known – not because we expect copy-paste innovation but because we need to bring schools together to learn from each other
- Design a set with standards or indicators, complete with guidance for observers. Be careful not to be too prescriptive when not absolutely necessary – there is a fine balance between being clear and stifling innovations. Make a distinction between what you see as critical, what you deem important but not essential and what you deem possible but maybe not for all
- Provide a set with critical questions that the observer uses during the visit for teachers, pupils, school leadership and parents
- Make a written report about the evaluation – use pictures to illustrate your observations and refer to the standards or observation points that you have used
- Always triangulate – Use different sources of evidence, use observers with different fields of expertise
- Document your visit well
- Provide feedback during your visit, both to test your findings so far and to give the school time to reflect before the final observations

The framework

Each of the inspectorates involved provided a number of instruments that were or had been in use to describe and evaluate the use of ICT in schools. This meant we had a wealth of information available on which we could build our shared framework.

The assignment we set ourselves was: to formulate criteria for the use of ICT in education that are usable in all of the countries involved, regardless of the respective policy measures for ICT, the position and mandate of the inspectorates and the level of implementation of ICT in the respective countries.

3 Themes, 9 areas of quality

We first designed the skeleton of our framework. We used all the existing frameworks for inspiration, looking at main areas and themes that were used throughout these. We decided on three main themes: Conditions, Use and Outcomes. These main themes mirror the way the more comprehensive frameworks are built up. They identify the need for good conditions and underline the interest that exists in accounting for outcomes. Furthermore, they acknowledge that the use of ICT is pivotal in the successful implementation.

For each theme a number of quality areas were formulated, eight in total, taken directly from existing frameworks. Sometimes the wordings needed some adaptation or categories were moved about.

- Conditions: Leadership, Infrastructure and access, Curriculum planning, Quality assurance and improvement
- Use: Pupil use, The teaching process, Administrative use
- Outcomes: Impact on learning and standards

For each area one or more quality indicators were formulated. And for each quality indicator a number of observable practices under the header of Evidence.

Coherent set of indicators that can be used 'stand alone'

We needed a framework that could be used only partly if an inspectorate decided that this was necessary. There are several occasions when such a slimmed down approach would be imaginable. For instance when there is only a short visit to a school, or just a single teacher observation, or when headteachers have limited mandate, it would be appropriate to only use a selection of the framework. That said, we agreed that we wanted the integrity of each quality indicator to remain intact even when used on its own. At the same time, the framework needed to be as coherent as possible: together with the criteria, all aspects that play a role in the successful implementation and use of ICT in schools need to be described and evaluated. The solution we found is that we first designed a set of coherent indicators. These could be redundant: e.g. pupil use and teacher use are often interconnected. However, to make observations clearer, to define each stakeholder's role and to enable the stand alone use as described above, it was essential to make them into two separate areas. Redundancy was also one of the bigger hurdles to overcome. Although we did not feel that redundancy was not necessarily a bad thing, we had to be careful not to end up with too many indicators: when discussing quality in education, every aspect matters and when changing one variable, all others change as well. When discussing quality assurance and improvement for example, we could have included every single indicator that we found, as quality assurance is linked to every detail in the school's quality policy. For each quality area we needed to define what we exactly meant by it. This meant that we decided for example that quality assurance and improvement is all about the process and to what extent it is well-organised.

The extent we have succeeded in this, needs to be shown in a field test. However, the fact that all inspectors involved – each from their own background and with years of experience in assessing ICT – means that there is at least theoretical agreement on the fact that the indicators we formulated meet this claim of coherence and of stand alone use.

Evidence

One level closer that what can be observed are what we call 'evidence'. In the existing frameworks similar categories are sometimes also called 'attention points' 'observation point's' or 'examples'. The wording is usually depending on the type of instrument that is used. From these words, 'evidence' seems to come closest to what we mean: what evidence can you give that this quality indicator is met?

In the following paragraphs I will briefly discuss the whole framework, organised per theme. Please note, that at the writing of this article the framework is still work in progress.

Conditions

We defined four areas under this theme: Leadership, Infrastructure and access, Curriculum planning and Quality assurance and improvement.

Leadership

The term leadership does not imply only top down, hierarchical leadership from management. Leadership can be found at all levels of school staff. It also means a leadership style that is appropriate for the context of a particular school and is open to the different roles of school leaders. This open definition of leadership needed to be reflected in the formulation of the quality criteria.

- A clear and shared vision: looking for evidence whether the school has a vision on the use of ICT which is related to the school's broader vision on education.
- Implementation strategy: the vision must lead to a sustainable implementation strategy. There are links to 'Quality assurance and improvement', where the focus of the latter is more on process requirements (is the process systematic) versus a more reflective and strategic focus in this indicator (is there leadership in the way the strategy is implemented?).
- Staff competence: this indicator deals with both developing and making best use of staff competence.
- Internal and external communication: continuous communication about all of the above is an essential part of leadership. Note that this indicator is not about the technological aspects of communication, which are dealt with under 'infrastructure and access'.

Infrastructure and access

For this area we formulated three quality indicators, dealing with:

- Availability of resources: key to the formulation of evidence here is to what extent the resources match the intended use of ICT in terms of the school's strategy and vision. This means that there is only little attention paid to numbers of computers etc., although we did formulate the minimum need for a safe and networked environment.
- Deployment of resources: availability alone is not enough. There needs to be efficient and safe use and resources need to allow for a range of different learning opportunities.
- Support systems: staff and students are supported in such a way that the flow of learning is not interrupted due to ICT problems.

Curriculum planning

Including the following indicators:

- Meeting stakeholder requirements and intentions: the school has a clear view of what is needed in terms of e.g. national requirements and pupils' needs.
- Curriculum breadth: is there evidence (eg. in the form of documentation and discussions with pupils) to meet a range of opportunities to learn with ICT?
- Coherence, balance and consistency: Throughout their school career, do pupils encounter experiences that are coherent, balanced and consistent? In other words: is the provision

building on experience in other years and classes, is there limited redundancy in what is on offer and is it appropriate for their skills.

- Taking into account new developments and professional practice: Looking for evidence that developments in the wider world are taken on board.

The word curriculum led to some discussion between the partners, as sometimes the curriculum planning is outside the control of a school. Sometimes schemes are quite tightly planned around national expectations. Regardless of this point, schools do have the responsibility that this planning is not only theoretical, but also put into practice.

Quality assurance and improvement

This indicator is concerned with the processes that schools implement to evaluate the effectiveness of ICT in learning, in teaching and in administration support for learning and teaching.

- Review and self-evaluation: Does the school know what its strengths and weaknesses are?
- Actions are planned and implemented: Based on the self evaluation, plans are made for improvement, including division of tasks and setting targets. There is evidence throughout the school that these actions are implemented.
- Monitoring: Targets and milestones are monitored by using both formative and summative evaluation and appropriate actions taken.

Use

We described for areas of quality within this theme: Pupil use, The teaching process and Administrative use.

Pupil use

This is an important area, but not without problems. The definition of ICT skills and the prescriptiveness of the indicators was under discussion. It is clear that this area reflects the autonomy that schools have in terms of curriculum definition and planning.

- Skills: Pupils develop appropriate ICT skills that provide opportunities for effective citizenship and that prepare students for future education. It was very important to us not to limit this definition to the knowledge of a specific piece of software. Rather we tried to formulate the criteria in a way that it is future and context proof, so to speak. In this indicator we also included important skills such as critical and creative use of information sources.
- Enhancement: Pupils use ICT to extend and enhance their learning across all subjects and years. With this we mean that it makes learning more motivating, supports both individual and group work, etc.

The teaching process

We deliberately avoided the phrase ‘teacher use’ as increasingly we find that teaching is not necessarily done by teachers, but also by coaches, classroom assistants, etc. We clearly wanted to acknowledge both the diversity of roles in schools throughout Europe and the importance of all staff involved in the teaching process. We also do not mean ‘just’ traditional classroom based activities but try to evaluate all teaching activities.

- Supporting pupils’capabilities: This is the mirror of ‘Pupils use’: what do teachers do to actively support the skills mentioned there?
- Teachers’ capabilities: This indicator deals with the way in which teachers work on enhancing their own capabilities in using ICT, not only in delivering lessons, but also in preparation, testing, using portfolio’s and alike.
- Enhancing teaching: The pedagogic dimension of the use of ICT.

Administrative use

Besides the use for teaching and learning, a third primary application of ICT within schools is for administrative purposes. Although it could be argued that this area would sit well under the header of 'conditions', we feel that the appropriate use of ICT for administration is such a central and powerful application means that it should be under *Use* rather then in the more conditional context. It is clear however that all administrative use is aimed at increasing the efficiency and effectiveness of the teaching and learning process and thus should be seen in that light. The effective use of a pupil following system to record pupil performance is for example a strong tool when dealing with pupils who need special care. More conditional administrative issues are dealt with in other places in the framework, notably under *Infrastructure and access*.

- Communication is supported: This indicator deals with communication about all matters in school and by all stakeholders in and around the school and how ICT is used to support this communication. There is redundancy between this indicator and the indicator under 'Leadership'.
- Teaching and learning is becoming more effective by administrative uses of ICT. Absence monitoring systems, pupil following systems, portfolio's and intranets can all make teaching and learning more efficient and effective: This indicator tries to gather evidence if and to what extent these tools deliver.

Outcomes

A difficult theme as everyone who has been involved in the evaluation of ICT in recent years is aware of. We do feel that schools need to at least try and account for the funding that they have put into ICT. The evaluator should look for two types of evidence: whether there is documented proof of impact on learning and whether there is documented proof of impact on standards.

Impact on learning and standards

This quality area looks at the impact of ICT on standards. Rather then *Pupil use*, this area deals not with processes but rather looks at the outcomes and attainment.

- Identifiable gains in learner achievement: Is their identifiable proof of the enhancement of learning as mentioned under Pupil use?
- Pupils' attainment in ICT capability: With reference to e.g. all schools nationally/regionally.
- Pupils' and school's progress year on year: Is there a line visible in the attainment of pupils when seen longitudinally. Also related to 'Curriculum planning'.
- The broad impact on pupils' standards across subjects: Is there evidence showing that ICT has impacted pupils' standards in all other subjects?

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ONLINE ASSESSMENT METHODS FOR VIRTUAL PROJECT MANAGEMENT TRAINING

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Introduction

This paper outlines the approach of assessing different kind of skills and learning outcomes in a Virtual Learning Environment (VLE) for a project management training in the Leonardo da Vinci II project POOL. First the structure of the POOL project and the purpose of the assessment workpackage, which is part of the POOL project are explained. Furthermore the paper deals with different assessment approaches and exposes the methods in practice through a student project which is distributed over three countries (Austria, Finland, Romania) and which is the key element in POOL.

The POOL project intends to achieve two major outcomes:

- Firstly, curriculum design aimed eventually at the main beneficiaries, the students. The work packages centred around and prototypically implemented in the student-industry project will result in independent modules each addressing specific aspects of online project management such as quality assurance, intercultural communication, presentation skills, virtual group collaboration and of course assessment. Together these will form a model curriculum for online project management training for engineering students.
- Secondly, the experiences gained in the course of this project feed directly into an online handbook which will serve as a reference source for curriculum designers at higher educational institutions as well as in companies and will support the implementation of transnational online project management.

Assessment in a Virtual Learning Environment forms a central activity in the POOL project and, because of the nature of project management, it provides challenges in providing on-line assessment of a number of skills and knowledge developed in each course which are displayed in figure one (underlined). The purpose of the assessment workpackage is to develop techniques, select suits of software and platform, applying the integrated course structure of the POOL project. The primary objective is to figure out if the courses have to be assessed on their own to be successful or in combination with other courses, which will result in an interdisciplinary course assessment.

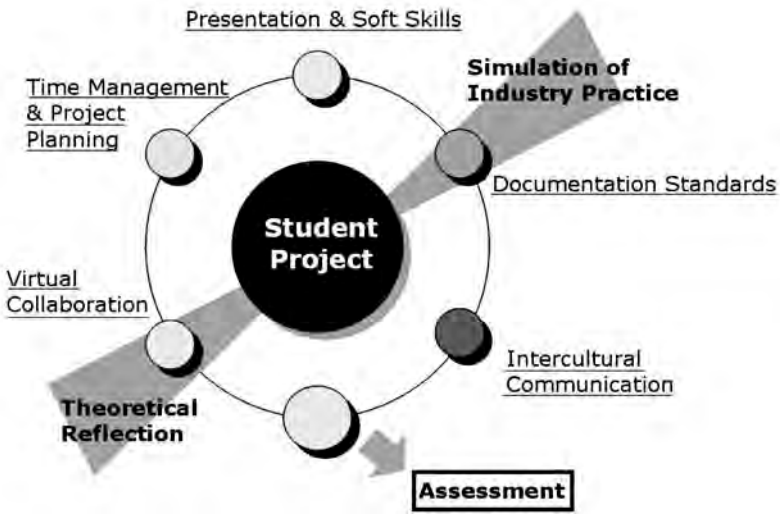

Figure 1. Structure of Workpackages in the POOL project [3]

Assessment

Assessment is one of the most important parts in a learning environment – both for learners and for teachers. Assuming that assessment has two main purposes first to assist in the learning process and secondly to determine the effectiveness of the educational system. These could be summarised as student learning, student certification and quality assurance. Questions might be asked, for example: what do we want to assess? – basic knowledge, skills, higher cognitive skills. For what purpose? – diagnostic, formative or summative and finally in which mode? Norm referenced or criterion referenced? It is important to have clearly defined learning outcomes for both the overall course and for constituent modules and that these learning outcomes would be the instruments of assessment. The learning outcomes should ideally be stated in terms such as knowledge, skills and competencies to reflect the levels of the cognitive processes involved. Finally the assessment model should be mapped onto the virtual learning environment model.

Teachers have to prepare course content in a well structured way and present it in a professional fashion, they have to get feedback from students achievements through assessments. On the one hand there are formative assessments, which are carried out periodically during a course to measure the level of learning, and usually not used for grading, mainly for diagnosis and giving feedback. On the other hand there are summative assessments, which are carried out at the end of a course and give "feed-out" like a diploma or a certificate. But these assessment methods are mainly used in traditional face-to-face classes, but what is happening in a Virtual Learning Environment (VLE) and in a distance education course? There are numerous assessment methods available at the moment, but the majority tend to evaluate at the lower levels of cognitive skills. Others are experimental or have not had widespread acceptance by teachers or students to deliver successful feedback of improvement in knowledge, skills and competency. Technology has developed rapidly over past years, which affected the ways of communicating and learning but has not been fully exploited for assessment purposes.

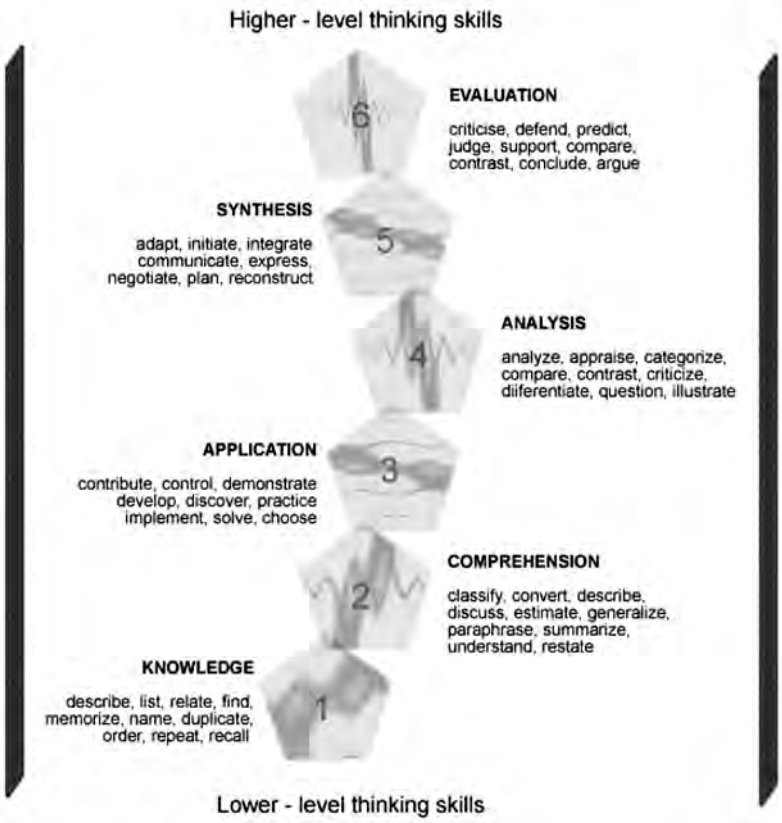

Figure 2. Bloom's Taxonomy

In 1956 Benjamin Bloom [1] developed a classification of intellectual behavior in learning. Bloom found that for over 95% of the test questions, students required thinking on the lowest possible levels, therefore Bloom established six levels of cognitive thinking skills. Although the fact that it is about 50 years ago when this theory was established, the principle is the same. These levels should assist teachers

in writing objectives and assessments. The most common question types like multiple-choice questions cover only the lower levels (1-3); reports, essays or oral interviews can measure the high-level thinking skills. This is a crucial problem which should be solved through new ideas and methods for online education and discussed in this paper.

Assessment in POOL

The task of the assessment workpackage in POOL is the evaluation of online assessment methodologies. There are numerous kinds of assessment methods existing but a minority of methods assess the higher level skills. Thus a few methods have been defined which are tested in the student project. Assuming that there is no best method for everything, a combination of methods is proposed as the most appropriate assessing strategy. As a case study the workpackage *project planning and time management* is used for demonstration. The first crucial step is to define learning outcome for the training, which is displayed in Table 1 with the proposed assessment.

Table 1: Learning Outcomes

Learning Outcomes Project Management and Time Planning	Assessment Methods
1. Be able to define a complete project scope and break this scope into manageable packages and activities	Report, case study or written scenario
2. Be able to prepare and schedule a project plan, use it, and be able to communicate it effectively to others.	Presentation of the project plan, scenario
3. Understand how to use communication and collaboration tools to communicate the project information properly and in time.	Scenario, formative assessment, user activity

The first step in the training of is to define the project scope and to make a work breakdown structure. The theory will be provided by the workpackage *time management and project planning* so students have to put the theory directly into practice. In order to identify occurring mistakes in early stages so the project goal can be reached, it is very important to have ongoing assessments and controlling processes. Figure 3. shows the first step in the training: *Defining a Project*. A decent result should be a proper project definition and work breakdown structure, which is reviewed by the teacher including feedback to students. This is one possibility for formative assessments, displayed as grey blocks in the assessment row. The summative assessment, which is the final assessment, is at the end of the training – big grey block at the end of both training and assessment row.

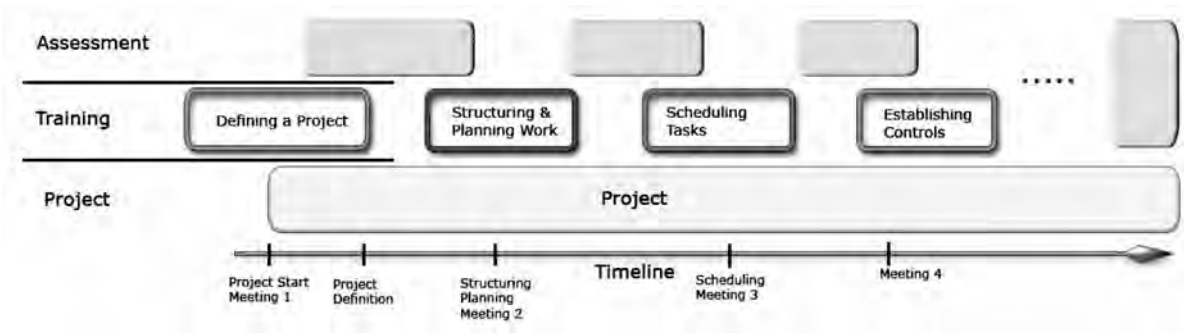

Figure 3. Training cycle

Due to the fact that students from Romania, Finland and Austria have to communicate with each other to succeed in their project, it is absolutely necessary to evaluate the online meetings, to recognize progress and decisions as well as participation, cooperation and motivation. This can be realized through the minute's sheet, where students write down their impression about the meeting which is explained later in detail. In Figure 3. the timeline displays the meeting dates. In Table 1 the learning outcome 2, which states that students should be able to prepare and schedule a project plan use it and communicate it effectively to others. To measure the communication skills, the presentation sheet which

is implemented in the Virtual Learning Environment is one option. During the presentation each participant can evaluate the presentation in realtime, so the presenter gets immediate feedback from the others. There is a very important issue arising considering the coherence between the courses. As example there is the workpackage *Presentation and Soft Skills* interfering with the workpackage *Project planning and Time management* where the presentation sheet is used for assessment. So there could be two kinds of assessing the knowledge and skills of a course:

1. Assessment as usual: Assessing one course, as it is done in the described situation previously.
2. Interdisciplinary assessment: Comprising more courses for instance the aforementioned situation to assess in this case not only the project definition capability as well as the presentation capabilities.

And these two kinds of assessment strategies should be a result of the POOL project at the end of the testing phase, which is the end of the student project, to get in practice results for evaluation.

Question Types

There are mainly two different question types. On the one hand there are open/open-ended questions, where students have to fill in answers, on the other hand there are closed/close-ended questions (cloze) where specific information is needed. Students can choose between given answers or give very short and precise answers. Considering Bloom's Taxonomy, open-ended question types are measuring the higher level of thinking where words are used as: discuss, describe, interpret, explain or questions like: What do you think caused this problem? Whereas indirect questions require higher level thinking closed or direct questions request lower level thinking, triggered by such words as who, when, where, what.

Table 2: Question Types

Open ended – indirect questions	**Closed – direct questions**
• Essay • Report • Interview • Oral presentation • Fill in the Blank • Minutes sheet • Presentation sheet • Research assignment	• Multiple choice • True / False • Matching • Short Answer • Hot Spot • Tree node • Plot question

Strategies/Methods

Minutes Sheet

The minute's sheet is maybe one solution to assess higher level skills. This kind of report can be used as a formative assessment as well as a peer and self assessment. After an online meeting, students record their impression of the meeting. Each student does this independently from the group members and then they discuss their minutes with the attended meeting group members. Minutes mean:

What happened in the meeting? What were the main decisions? Which problems did occur? Which problems were solved? Were there problems solved? Which solutions were proposed? What difficulties were unresolved? Who made the greatest contribution in the meeting?

The lecturer gets an overview of the individual student participation activity in the meeting.

Did the student follow the discussion actively? Does the student know the next steps, and his role in the project? Did the student understand the solution, problem, and decision?

On the one hand it is a good measurement of the activity of each student for the lecturer (formative assessment) and on the other hand it is a self-assessment as well as a peer assessment for students when they discuss the minutes together. The students are able to recognize their weak points by themselves, and get feedback from the other team members. The probability of misunderstanding in decisions, next steps and allocation of responsibilities or upcoming events is substantially reduced.

There is another interesting aspect, which could be included in the minutes, i.e. the identification of the different roles played by members attending a meeting. For example, it is always one person, who "leads" the discussion; other roles exist, which should be identified.

Who was the moderator in the meeting? Who made the greatest contribution in the meeting?

Asking students these questions will make them decide to whom the roles belong. This will result that each person will get feedback about how the others perceive him. Motivation and group dynamics is increased. If there are any cultural differences, social differences, which were never discussed it will be one possibility to air them.

Presentation Sheet

The presentation sheet can be a peer assessment from students for students as well as a self assessment. As a part of the Virtual Learning Environment the presentation evaluating online form contains questions concerning the introduction, speed, preparation of content, presentation tools, slides, mimic, gesticulation, eye contact and much more. There is the option to include an online chat during the presentation to ask questions or make helpful suggestions to start a discussion. Another feature is that the teacher or administrative student can send the presenter a message that the presentation is too fast or the voice too quiet. The presenter immediately can respond to this feedback. Of course this kind of presentation evaluation is a traditional one, slightly expanded, but hopefully it can be used the same way in a virtual world, with the same or even better results.

Case Study/Scenarios

Students get a case study/written scenario containing problems, solutions, and mistakes. After they have read/seen it they are supposed to answer questions about the case study, analyse the situation and express their opinion to measure their critical thinking, ability to judge, compare and the ability to use theory and rules.

Would you act different? Who did make a mistake? How could you prevent such a situation? Which mistakes were made? Did each role player act right appropriately? What was positive, what was negative?

Presentations: the teacher provides the student with a short text. They have to read it and then prepare a presentation to deliver to the others, the content of the text, using presentation techniques and different presentation tools. Another possibility is that each student has to write a speech about the text and write down the presentation techniques and tools – including the 'why' aspect. Why did I use a Gantt chart instead of a Pie chart?

The case study, which is provided to the students, can be realized with:

- Video & Audio: special situation is displayed as an example: students are making mistakes in work structuring, concerning time issues and effort during a discussion. The student should recognize that and either answer questions about the video (multiple choice questions), or write a short essay how he would have handled the situation.
- Written text: a written scenario is given to the students, and they should answer questions about the content/situation of the written text or provide a solution to the occurring problem or preventions of the problem.

Conclusion – Outlook to the Future

Assessment is a very important part in online teaching and online learning. The assessment methods listed in the student project of POOL are now undergoing testing. Feedback from the students about the methods used will be evaluated and, if necessary, used to modify the techniques that are used for assessing higher level skills in a VLE. The results of the two major assessment methods concerning the interdisciplinary combination of courses will show how such a combination of courses in assessments will influence the complexity and effectiveness of sustainability in learning progress.

The assessment area of e-learning needs to evolve, so that teachers can more fully exploit the advantages that are inherent in current technology where distance and diversity is no barrier. Generally, in the recent past, more effort has been expended on the development of course content and course delivery in VLE's than in developing suitable and effective online assessments. This area of e-learning is now attracting more attention and is increasingly becoming more and more importance. In addition a process of convergence has begun amongst the features offered in software assessment tools which should lead to easier decisions on the selection of the overall VLE environment.

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AN EXTENDED METHODOLOGY FOR E-LEARNING EVALUATION BASED ON THE ACCOMPLISHMENT OF EDUCATIONAL OBJECTIVES

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1. Introduction

The emergence of e-learning has brought up big changes in the way courses are taught, the role of the teacher and the interaction between teachers and learners. The structure of knowledge transfer to the learners has been totally altered: it is based on various electronic channels (such as Internet, intranets, satellites, interactive TV, CDs, etc.), and therefore has become more impersonal than in the past. The role of the teacher has dramatically changed: since the e-learning system is delivering the course, the role of the teacher now is to guide, support and motivate the learners via a non face-to-face interaction with them through electronic channels, which demands considerable effort and necessitates the use of new techniques that did not exist in the past and for which teachers are not sufficiently trained. At the same time huge investments for the development of e-learning are taking place. So, as it happens with all investments, there is a growing need for methods to evaluate e-learning, both at the formative level, in order to diagnose weaknesses and make improvements, and at the summative level, in order to measure the value these investments create and conclude, whether they have fulfilled the objectives they have been created for.

However, due to the above radical differences between the e-learning and the 'traditional' education, the evaluation of e-learning cannot be performed using the methods developed for the evaluation of the traditional education, e.g. [1], [2], [3]. For this reason an on-going debate has been started concerning e-learning evaluation methods and many researchers coming from different scientific domains (e.g. education, management, technology, marketing, etc.) have conveyed their thoughts about this issue. A considerable stream of the research conducted in this area focuses mainly on the extent of use of e-learning by the learners and on their continuance intentions (user acceptance) as the central dependent variables and basic surrogate measure of the value that e-learning generates, attempting to explain and understand them, based mainly on models from the IS domain, such as the Technology Acceptance Model (TAM) [4]. On the contrary, the basic measure of educational effectiveness, which is the extent of accomplishment of the educational objectives, has been ignored by this research stream.

In this paper, after a short literature review, we propose an extended methodology for evaluating e-learning, which focuses both on the extent of use of the e-learning system by the learners and the extent of accomplishment of the educational objectives as central dependent variables. It is based on four pillars:

1. Information Systems (IS) success research,
2. traditional education evaluation research,
3. TAM-related research and
4. e-learning evaluation and critical success factors research.

This methodology has been initially created for the evaluation of e-RMIONE (e-Learning Resource Management Service for InterOperability Networks in the European Cultural Heritage Domain) project (www.ermione-edu.org), which is part of the eTEN Program of the European Union, but it is intended to be applied for the evaluation of various other e-learning systems, as well. Finally an insight on the next steps of our research is given.

2. Background

A significant part of the research that has been conducted in the area of e-learning evaluation concerns mainly the formative level, and aims at the identification of the factors affecting either the extent of use of e-learning by learners (user acceptance), or the learners' intention to use e-learning, which are regarded as the basic surrogate measure of the value that e-learning generates. In this direction Selim [5] used the Technology Acceptance Model (TAM) [4] in order to investigate empirically the acceptance of course web-sites by students and identify its main determinants. For this purpose he developed "the Course Website Acceptance Model" (CWAM) consisting of the three constructs of the TAM (Perceived Usefulness, Perceived Ease of Use, and Use). By creating a questionnaire based on literature review, he validated the above model (using structural equation modelling techniques) and revealed the most important critical success factors of web-site acceptance. Saade and Bahli [6] conducted an empirical study aiming at understanding and explaining the acceptance (intention to use) of Internet-based learning systems. They have based their study on an extension of the TAM, which includes the concept of Cognitive Absorption as antecedent of Perceived Usefulness and Perceived Ease of Use. The results of this study, stemming from data collected from students, provided support for this model as explaining the acceptance of the Internet-based learning system and for Cognitive Absorption as an important variable affecting the TAM variables. In the same direction other researchers focus on the e-learning continuance decision, regarding it as being strongly associated with the value created by e-learning. Chiu *et al.* [7], aiming at supporting the formative evaluation of e-learning, examine the factors affecting the e-learning continuance decision, using a research model combining the Expectancy Disconfirmation Theory (EDT) with conclusions of studies on customer satisfaction and IS quality; their results suggest that continuance intention is determined by satisfaction, which in turn is jointly determined by perceived usability, perceived quality, perceived value and usability disconfirmation.

Wang [8] has a totally different approach: in order to support (mainly) summative evaluation of e-learning and – to a lower extent – formative evaluation, he developed a global instrument for measuring the total e-learner satisfaction with asynchronous e-learning systems (i.e. a global satisfaction index). This index was calculated as the sum of 17 relevant variables, which have been determined through a review of the literature, and then on data analysis of a sample of e-learners. His final model theorizes that e-learner satisfaction is determined by four major constructs: content, learner interface, learning community, and personalization.

The conclusion drawn from reviewing the e-learning evaluation literature is that this area is characterized by 'absence of widely established and practiced methodology by which rigorously to evaluate e-learning, and through which to develop the secure body of knowledge on which to build learning technology as a discipline' [18], however there are only some general 'e-learning evaluation frameworks' reported in the relevant literature. Moreover, most of the empirical studies that have been conducted in this area focus on the formative level and aim at explaining and identifying the main factors affecting either the extent of use or the continuance intention, regarding these two constructs as main surrogate measures of e-learning value, clearly influenced by a marketing or product placement perspective. However, the use of e-learning is often just better than the other existing options, or even in some cases mandatory (i.e. there are no other options), so it does not always reflect the magnitude of the value created by e-learning (we can have e-learning systems with equal use by the learners but offering very different levels of value). For this reason a much better direct measure of the value created by e-learning is the extent of accomplishment of the various kinds of educational objectives. Therefore further research work is required in this area in order i) to develop a complete methodology, which supports both the summative and the formative level, and includes appropriate measures of the impact of e-learning (i.e. the value it creates) and of the capabilities and resources offered to the e-learners (e.g. content, support by instructor, etc.), and ii) to validate it empirically in 'real-life' conditions.

A complete e-learning evaluation methodology should consider and exploit the extensive previous research and the existing methodologies in the area of traditional education evaluation and especially in the area of students' evaluation of (traditional) teaching effectiveness (SETE) e.g. [1], [2], [3]. Wang [8] mentions six SETE instruments: Endeavor Instrument, Student Instructional Rating System (SIRS), Instructor and Course Evaluation System (ICES), Student Description of Teaching (SDT) Questionnaire, Students' Evaluations of Educational Quality (SEEQ) Instrument, and Instructional Development and Effectiveness Assessment (IDEA). These SETE instruments provide useful information about the dimensions of teaching that should be evaluated e-learning.

The theories and models developed from the extensive research concerning the measures and determinants of IS success [13], [14], [15] can also be useful for the development of an e-learning evaluation methodology, since they offer a good background concerning the meaning, the dimensions and the underlying relationships of the terms IS success, impact, quality, use and satisfaction. According to DeLone and McLean models [13], [14] information quality, system quality and service quality affect user satisfaction and use, which in turn determine the impact at the individual and organizational level. Seddon [15] propose a respecification of the DeLone and McLean model, in which user satisfaction is determined by system quality, information quality and perceived usefulness. Another view of IS quality is offered by the ISO/IEC 9126 Software Quality Model [16], which defines software quality to be based on the following six characteristics: functionality, reliability, usability, efficiency, maintainability and portability. Finally, an e-learning evaluation methodology should also take into account the findings of the e-learning critical success factors (CSFs) research [10], [11], [12].

3. An e-learning evaluation framework

Based on the above conclusions and constructs from:

1. the Information Systems (IS) success research,
2. the traditional education evaluation research,
3. the TAM-related research and
4. the e-learning evaluation and critical success factors research, we have developed an extended methodology for the evaluation of e-learning, which is shown in Figure 1.

We can see in the left column of Figure 1 that it includes at first level an evaluation of the basic e-learning capabilities and resources offered to the user: content, electronic support by the instructor, learning community, technical quality, customization and perceived ease of use. For each of these 'latent variables' a measurement instrument has been designed consisting of a number of relevant questions, based on the literature; from the variables corresponding to these questions one (or more if required) factor will be synthesized using exploratory factor analysis. 'Content' measures the quality of the course content and is based on the notion of information quality greatly emphasized in the IS success research, [13], [14], [15]. 'Electronic Support by the Instructor' measures all aspects of instructor activities in asynchronous e-learning (effort, skills, methods, motivation of e-learners and final contribution to the learning process). It has been influenced by the 'instructor methods' dimension the IDEA instrument [2], [3], although significant modifications were necessary so as to be adapted to the role and functions of the instructor in asynchronous e-learning environments (which are quite different than in the 'traditional education' for which the IDEA has been developed), and by the relevant conclusions of the e-learning CSF research, [10], [11], [12]. 'Learning Community' measures all the dimensions of the capabilities offered to e-learners for communication with the instructor(s) and with their colleagues, which is a basic CSF of e-learning, [10], [11], [12]. 'Technical quality stems mainly from both the IS success literature, where it is mentioned as 'system quality' [13], [14], [15], and the e-learning CSF research [11], [12], measuring variables such as system availability, accessibility, problems with bugs and technical support. Useful information about technical quality has also been retrieved from IST/IEC 9126 [16]. 'Customization Capabilities' concerns one of the greatest advantages of asynchronous e-learning [17], the flexibility offered to the student to adjust the learning process to his/her own wishes (according to his/her learning style, interests, lifestyle, etc.). Finally 'Perceived Ease of Use' is based on the corresponding TAM construct [4], and the conclusions of the e-learning CSF research [10], [11], [12], measuring how easy do users perceive the system to be (e.g. how easy it was to learn it, to find the content they need, to communicate with the instructor and the other e-learners via e-mail/chat/forum, and also how flexible it is, how clear and understandable are the screens and the messages, etc.).

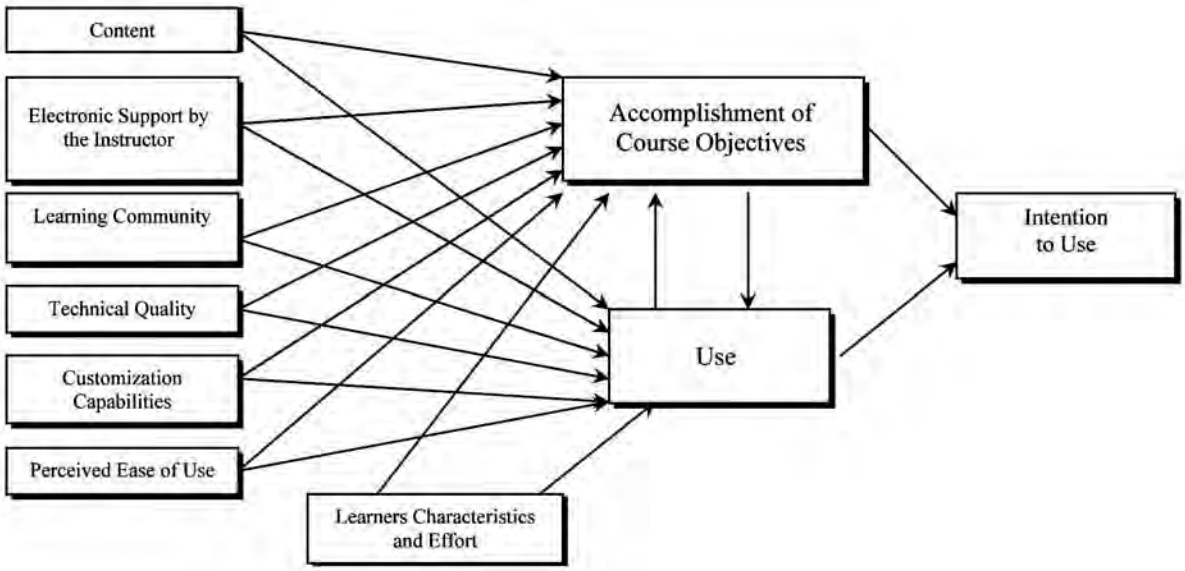

Figure 1. An extended methodology for e-learning evaluation

The proposed e-learning evaluation methodology, as we can see in Figure 1, includes also (at a second level) an evaluation of the two basic e-learning outcomes: the extent of accomplishment of the educational objectives (ACEO) and the Use of the e-learning system. ACEO is a primary measure of instructional effectiveness of the IDEA instrument (named 'students' progress ratings on course objectives') [2], [3], and is a basic determinant of e-learners' satisfaction. Use has been extensively utilized in the relevant literature as a 'surrogate measure' of e-learning value (mainly in cases where the use of an e-learning system is not mandatory), despite its limitations mentioned previously in section 2. For each of these two 'latent outcome variables' a measurement instrument has been designed consisting of a number of relevant questions. From the variables corresponding to these questions one (or more if required) factor will be synthesized using exploratory factor analysis. In the Appendix the reader can see the measuring instrument (i.e. set of questions) for the ACEO, created by combining elements of the IDEA model and Bloom's taxonomy of educational objectives [9].

4. Conclusions and further research

In this paper we have presented a methodology of e-learning evaluation both at a summative and formative level, which includes the evaluation of e-learning capabilities and resources (content, electronic support by the instructor, learning community, technical quality, customization capabilities and perceived ease of use) and e-learning outcomes (ACEO and Use). The structural model of our methodology, which is shown in Figure 1, includes the characteristics and the effort of the student (which according to the relevant literature contribute to ACEO), and his/her intention to use it in the future, and the initially hypothesized relations among all these variables. As next steps of our research we are planning to collect evaluation data from the users of an e-learning system as part of the e-RMIONE project using a questionnaire based on the above model. Elaborating these data, we will test the validity of the above model using confirmatory factor analysis methods (LISREL), so as to determine which of the relations of the model are statistically significant and to calculate their strength. The findings of this analysis will offer to us a complete picture of e-learning value and its generation mechanisms, which is quite useful at the formative level of evaluation. Moreover, from the variables measuring the e-learning resources, capabilities and outcomes, we are going to synthesize a complete e-learning satisfaction index using methods of exploratory factor analysis, which will be useful for summative evaluation.

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QUALITY APPROACH TO BLENDED LEARNING AT WARSAW SCHOOL OF ECONOMICS – A CASE STUDY

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Introduction – importance of the quality in higher education

E-learning in its various forms has become an essential part of university education in many countries. There is no doubt nowadays, that it can play an important role both in tertiary education and in lifelong learning. Also in Poland, even if there are still no legal regulations concerning this type of studies (and in Polish educational system all types of university studies has to be officially approved), extent to what e-learning is applied, indicates that the process at many universities has reached its maturity phase which leads to a significant change in approach, that can be illustrated by two questions. Previous approach described by the question: "Should we implement e-learning at our curriculum?" is now quite often replaced by the question "How should it be introduced in order to ensure the best quality of teaching process?" And further (at those institutions, which have already implemented it successfully) – "How to use all the advantages of e-learning in order to ensure systematically growing and long lasted high quality of that process?" It is worth mentioning that, although the quality issue has always been of great importance at majority of tertiary education institutions, with regard to e-learning, the mistrust of its value and quality have for a long time been so strong that there is still a need to prove its value and usefulness.

Quality vs effectiveness

When the e-learning elements are already implemented one of the most important issues is to ensure high quality of it. We can talk about the quality of learning environment, its accessibility and friendliness. The support offered to the university teachers involved in teaching process, as well as technical assistance and help-desk services.

Another important aspects of quality concern the learning process itself and learning materials. Closely linked to that are teachers qualifications and competences, with emphasis on their knowledge on specific requirements of online teaching. And last but not least the efficiency of that process is measured by the achievements of online students and results of the exams. Although it is quite clear that all these aspects are closely linked together, it is also true that each of them separately contributes to the global view of the role and position of e-learning at the university. As it is impossible to describe all of them in a short paper, we will concentrate on one particular aspect of research, which has been carried out in recent months. The questions we will try to answer are:

- How does the introduction of e-learning influence the university's didactic process?
- How is it perceived by the people involved in it – the teachers and their students?

Blended learning at the university – pros and cons

At first when the e-learning forms were introduced it was a commonly held belief that online teaching will very quickly replace traditional forms of teaching and revolutionise the whole teaching process. Especially in the USA such tendency was visible and the greatest enthusiasts claimed that in a few years the domination of e-learning would be undoubted. Nowadays, probably nobody would make such presumptions as it was proved that there are subjects and circumstances e-learning is most suitable for and such for which it is totally unsuitable.

In Poland the introduction of e-learning started a couple of years later than in Western Europe countries or in the USA, which means that we can learn from the mistakes the others have made and therefore we can try to avoid them. One of the main lessons to be learned is the role of e-learning in the whole

university system. For many centuries the teaching process at the university was based on lecturers, lecture rooms and blackboards. People are used to personal contacts and face-to-face meetings, not to mention the (unfortunately declining) relations between master and student. Not surprisingly one of the commonly raised arguments against e-learning is limited interaction between the teachers and their students as well as among the students. That is why the forms of blended learning appeared and gradually become more and more popular.

It is also to be stressed that introducing e-learning at the university requires significant organisational changes and preparing totally new curricula and syllabuses, not to mention the necessity to convince the academic community to such "revolution" in their stable life and work. It seems plausible, and practical examples have proved it, that blended learning is a form which can smooth this process and make elements of e-learning easily acceptable. While it is true that new technologies can help to improve teaching and learning, it is also true that they often require new skills both technical and pedagogical. The role of the teachers in teaching process transferred to online environment changes significantly and makes them feel uncomfortable and uneasy. Moreover, in traditional learning the main role of a lecturer is knowledge delivery. In online learning the necessary knowledge is presented on the platform and the teacher becomes more a tutor or a facilitator, who is expected to support the students in their individual work and to indicate them how this new information or skills can be applied.

Indicated obstacles and difficulties, as well as the experience of other universities have been taken into account while the decision about introduction of e-learning at Warsaw School of Economics was planned. After some considerations it was decided that the process will be extended for a few years and will be introduced gradually and that e-learning will not be the alternative to traditional learning but will supplement and support it.

A brief description of VLE at Warsaw School of Economics

Before we start to describe the scope of our research and its results we believe a brief description of learning environment at our university is necessary.

The process began in 2001 with implementation of the e-learning platform e-sgh. The possibility to use it for supporting traditional classes and lectures was offered. Necessary guidelines and university standards have been prepared. A wide range of actions was undertaken in order to promote the whole initiative among the teachers and to convince then that e-learning can significantly improve the quality of university's didactic offer. Some of them have responded to that challenge and their success encouraged the others. During the first 4 years the interest of academic teachers was growing systematically, which was proved by the number of lectures supplemented by online materials.

When the academic staff became familiar with these new techniques and possibilities a competition was announced and a number of full online lectures have been chosen. Since the winter semester of the academic year 2005/2006 students are obliged to choose in every semester one of the online lectures and to complete it as a part of their regular curriculum. It is planned that in the coming years the scope of the online lectures will be increased. In February 2006 another competition was announced and the next group of 14 lectures was indicated for online implementation, which gives a total number of 30 lectures (in the first competition 16 lectures were selected). 2230 students "attended" online lectures in the past semester.

The scope of the research and primary results

The process has been being monitored since October 2005 and in January a questionnaire was placed on the e-learning platform, which the students were expected to fill in. In order to ensure high percentage of the answers (a questionnaire was not compulsory) it has been decided, that the questionnaire should not take much time to complete it. It consists of 7 questions (some of them were single choice, whereas the others were multiple choice questions). Final question, the open one, gave the students the opportunity to include their own remarks and indications for expected changes or improvements. During the first 10 days almost 50% (1092 out of 2230) of online students filled in a questionnaire.

Although the number of questions was limited we tried to cover all the aspects of attitude towards e-learning we considered to be important. The areas covered by those questions are:

- Communication tools available on the platform (their user-friendliness and usefulness) (Q1)
- The extent to what teachers' assistance was
  - Needed (Q2)
  - Helpful (Q3)
- The form in which learning materials are presented (Q4)
- Usefulness of presented materials (Q5), its structure (Q6) and practical applicability (Q7)
- The final question (Q8), of an open type was: What changes would you suggest, if any?

As some questions (Q5-Q7) have been multiple choice question the number of answers sometimes exceeds the total amount of people involved in a survey.

What are the results we have got?

There is no place in a short paper to describe precisely all the aspects the questions have covered, so only some of them will be briefly presented and the most important conclusions will be derived.

With respect to the communication tools available for learners on the platform vast majority of the respondents found them useful and user-friendly, although half of that amount indicated that it takes some time to get familiar with those tools. These indications are quite important for two reasons:

1. We use our own e-learning platform, built at the university and some elements still need to be improved;
2. An introductory instruction course should be organised, at least for those who are interested in.

Quite different were the opinions about using interaction tools (chat, discussion forums) for communication with other students and the teachers. Almost the same amount of people (396) indicated that these tools are very important and helpful, whereas a similar number (358) complained that they did not fulfil their expectations of interaction.

Closely linked to the previous one was the question about the role of the teacher in online learning – how helpful and how necessary he/she was? Apart from the answers: "very useful and necessary" (391) or "useful but I would expect more help" (192), significant was a number of respondents (282), who choose the answer "I can't tell because I did not use it". Explanation of such situation is quite simple because independent online lectures were carried out for the first time (in opposite to the previous supplementary use of e-learning) and some students have not been aware that they should be more actively involved in the process of acquiring knowledge this way.

As far as the course content is concerned, more than a half students (575) appreciated it as useful and applicable, but quite a large group (282) indicated that it would be advisable to include more practical examples and case studies.

One third of those, who filled in the questionnaire used the chance to express their own opinions. The answers could be divided into several groups concerning:

- technology and platform (51);
- forms of interaction (42);
- curriculum and syllabuses (41);
- organisational aspects of e-learning (47);
- scope of the material being taught and the amount of work and time it required (91).

Definitely the most controversial issue was students' involvement in online lectures. Most of them expected the lectures to be similar to the traditional form and have been strongly surprised by the amount of time and work they had to put in order to get good results (it has to be mentioned that all the students had to take traditional exam to complete the course). Although it may sound strange, some of

them are still not familiar with the use of ICT in everyday life, not to mention their studies. Some of them have also not been prepared for independent work and lack of the face-to-face contacts with the teacher made it even more difficult. Quite a lot people expressed the opinion that the necessity of keeping discipline and work systematically throughout the whole semester was a big hurdle for them.

Some conclusions

The analysis of the questionnaire answers has brought a couple of hints that could be used in order to improve e-learning process at our university. As it was mentioned above, the process was monitored throughout the whole semester. One of the factors being traced were the forms of interaction between lecturers and their students, like discussion forums and chat rooms – how often they were used and to what extent. Comparison of these frequency and usability factors with students opinions expressed in a questionnaire will help us to modify the use of these forms. It has been suggested, that greater activity on discussion forum for instance, should give students some extra credits which could be taken into account in the final grade. Such method was already applied in some lectures in this semester and it will be suggested to extend it for other courses. But on the other hand, high level of activity combined with a great number of lecture participants could be some sort of obstacle both for the students, who want to add something valuable and for the teacher who has to monitor, moderate the discussion and finally to "evaluate" it.

To sum up it should be stressed that in general the form of presenting learning materials and delivering them were taken very positively. Some students pointed out that their attitude towards this form of acquiring new knowledge has changed during the semester – they admitted being sceptical at the beginning and satisfied at the end of the semester. Also the change in approach to e-learning among the teachers is worth to be mentioned. While at first they needed to be encouraged, at present they show their own initiative and willingness to be involved in the process. Such reactions have convinced us that the way of gradually integrating e-learning form with traditional curriculum is the best possible form. Systematic improvements provided , based on practical opinions, will be introduced we hope to achieve real enrichment of our didactic offer and significant benefits for the university and its graduates.

Presented results of the first step of research concern long term project, which is expected to supplement the whole university curriculum in a period of a couple of years. Warsaw School of Economics is a leading university among the schools of economics and one of the greatest Polish universities. Also the scope of the whole project places it among the leaders of e-learning in Poland. The solutions implemented at WSE are quite often followed by the other Polish high schools. That is why we feel obliged not only to preserve high quality of our initiatives but also to improve them systematically.

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MODELS FOR IMPLEMENTING VIRTUAL STUDIES ABROAD

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Introduction

The Bologna process [1] aims to promote real as well as virtual mobility of students. The EU project REVE (Real Virtual Erasmus; cf. http://reve.europace.org/) aims at enhancing the impact and efficiency of the Erasmus programme through the set-up of and support for a full-fletched virtual Erasmus action. In REVE, Virtual Erasmus is seen as a complement to the existing Erasmus exchange programmes. In these programmes, Virtual Erasmus can be used to prepare and follow-up the physical mobility and/or to take courses at a partner university while staying at a different place. For this purpose, REVE wants to embed networked e-learning as an integrated part in mainstream higher education, aiming at transferability, scalability and sustainability of networked e-learning. Examples include joint programme and course development/offering, joint learning activities implemented through virtual elements integrated into a blended learning concept, and taking courses abroad including (a mix of co-located and) virtual learning/teaching activities. To achieve these objectives, the partners in REVE develop the necessary technical, pedagogical and organizational services.

While previous projects, like the cEVU project (http://www.cevu.org/), focussed on how these goals can be achieved by providing a central agency that coordinates the different partner universities, this paper describes models that are based on a decentralized approach for forming a network of universities facilitating virtual mobility, and for coordinating their respective activities. Alternative coordination schemes range from one provider university offering a course to consumer universities up to universities that offer joint courses in a federated structure. In order to implement such virtual studies the partner universities need to coordinate their activities during all phases of teaching and learning. Five different models were identified based on existing joint course offers in the REVE project: each model identifies the stakeholders and typical activities needed to offer a joint learning activity in a virtual mobility way to students, and describes the typical interactions among the stakeholders to coordinate their activities. Thus, the models can serve as guidelines for organizing courses facilitating virtual mobility. Likewise, the models can serve as a basis for designing technology support (services, tools) to implement such courses efficiently.

In this paper, we present the characteristics of five distinct models, and describe one representative model in detail with a practically implemented example of how this model can be used to foster virtual studies. Finally, we discuss how the models can help other universities to implement virtual mobility.

A Schema for Describing Virtual Erasmus Courses

An analysis of existing and planned Virtual Erasmus courses in the REVE project revealed key stakeholders and their roles as well as recurring phases and activities.

Conceptually, we distinguish between a *Provider University*, which offers course material, teaching and assessment to students, and a *Consumer University*, which provides its students with access to material/services offered by a provider university. Sometimes, these roles are mixed, e.g., when a university imports course material (i.e. taking the *consumer role*) but offers local teaching and assessment (i.e. taking the *provider role*). Abstractions from these cases led to the identification of typical stakeholders (e.g. teacher, students, administrators) and their activities during preparing and offering a Virtual Erasmus course. In addition, typical sequences of activities describe how the stakeholders play together in order to provide students with teaching and learning. Knowing these interactions is a prerequisite for implementing Virtual Erasmus courses and designing computer-aided solutions for their support.

In addition to the roles, we could identify the following recurring phases and activities:

In the *announcement phase* a provider university announces a course to potential partner universities. Interested partners indicate their interest (and potentially negotiating conditions), and the network of participating universities and a joint teacher team are formed. The final step of the announcement phase is making the course available for enrolment to the students of all partner universities.

The *preparation phase* is an optional phase where the participating universities adapt the offered course to their local needs.

In the *enrolment phase* students enrol for the offered course at their own university.

During the *registration phase* the participating universities select and register the students and teachers in the learning environments. Selection is needed only when the number of seats in a course is limited, or when certain enrolment criteria of the provider must be met. After registration the course may start.

In the *learning phase* teachers teach and tutor the courses, students perform learning activities (in some cases including collaborative learning with co-located or remote students), and teachers assess the students.

During the *result registration* phase the teachers finally register the grades of the participating students at the students' home university.

An analysis of Virtual Erasmus courses in the REVE consortium revealed five different types of Virtual Erasmus courses: (1) remote Access, (2) franchising, (3) coordinated federation, (4) joint course offering, and (5) course adaptation. Each type differs with respect to the extent a certain phase is used, and to the distribution of the activities within the phases over the partners in the network. For space reasons we cannot describe in this paper all five models in detail. Therefore, we describe in the following the coordinated federation model, which is a good example of how phases and activities are distributed and coordinated among the partners. We then briefly discuss the variations introduced in the other four models.

The Coordinated Federation Model

In the coordinated federation model a course is provided by the provider university to any number of consumer universities, some of them providing no local support and others providing local teaching and assessment support. For coordinating the teaching, all universities build a joint teacher team (as a result of the announcement phase). Teaching and tutoring for this course is done by teachers from this team. Some consumer universities participate more actively in the teaching. They offer local teaching, tutoring, and assessment, in addition to local announcement of the course, local student enrolment, local student selection, and final registration of the students' grades. Others just provide the latter services. We assume that students access the course through the learning environment of the provider university but that local teachers (if existing) provide local teaching services. In this case except for enrolment, coordination of teachers, and registration of results, no further contact is required between a provider university and the consumer university.

A typical interaction between the provider and consumer universities is shown in the interaction diagram (cf. Figure 1). The model starts with an *announcement phase*, where the provider university announces the course availability to all potential consumer universities in the network. Those who are interested in joining the course will send a confirmation of interest to the provider university. Next, all consumer universities register their local teachers (if any) with the provider university. After this interaction, the provider university knows all consumer universities and their local teachers, and all partners (provider university, consumer universities) announce the course to their students.

In the coordinated federation model, no extra preparation phase is used, as the course material is used by all partner universities as provided by the provider university.

In the *enrolment phase*, students enrol into the course at their local university.

In the *registration phase*, local universities select those students matching the enrolment criteria. This assumes that during the announcement phase all partners agree on who gets how many seats in the course. After all partners sent their list of to-be-enrolled students to the provider university, the provider university actually enrols the students in the course with their personal data, and informs the selected students (also providing all information necessary to access the course material and learning environment).

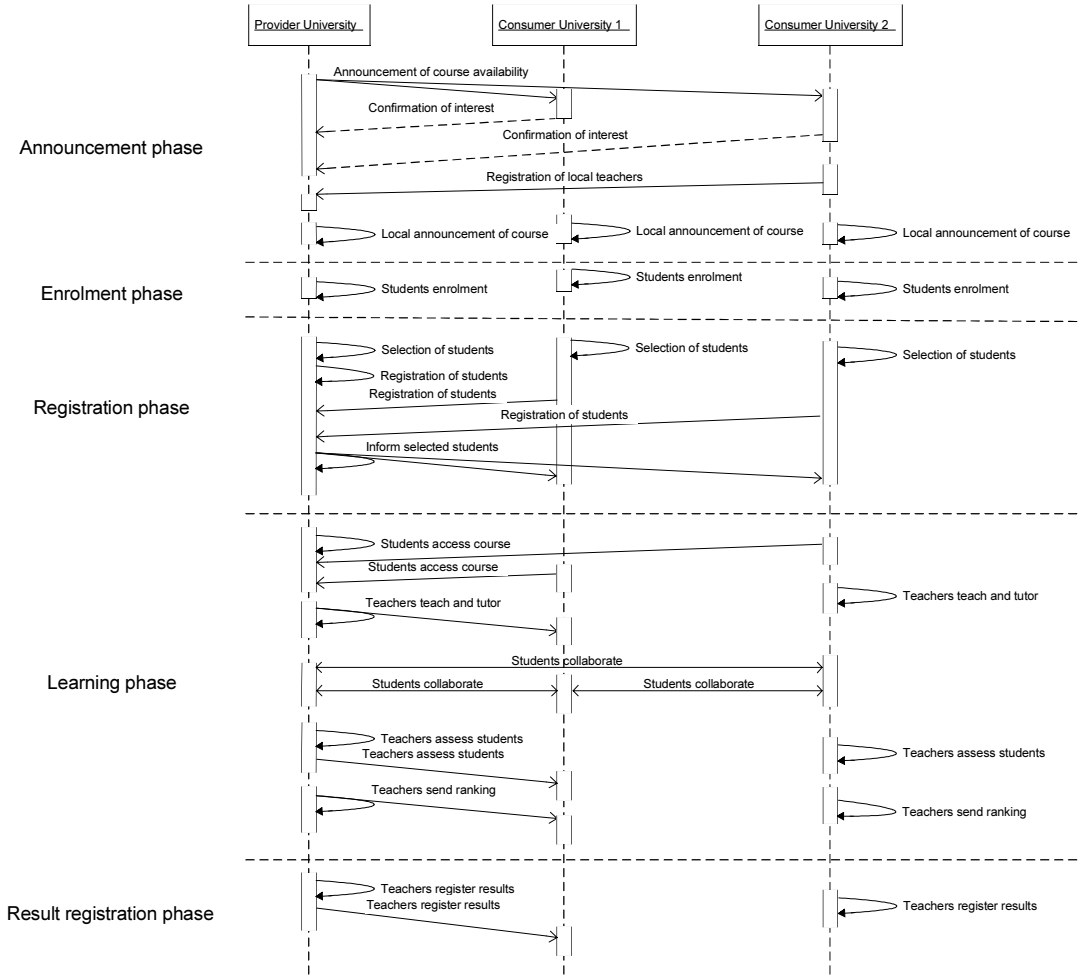

Figure 1. Coordinated federation model

In the *learning phase*, students access the learning environment and learning material. They interact with local teachers and tutors (if existing) or with provider university teachers and tutors (otherwise). Collaboration takes place across universities among remote and/or local students. Local teachers (if existing) assess students based on their interaction and learning results (e.g. assignments, tests) and provide a ranking of local students resp. their grades. Otherwise, provider university teachers assess students based on their interaction and learning results (e.g. assignments, tests) and provide a ranking of students resp. their grades. Often, assessment activities are interleaved with learning and collaboration activities (i.e. continuous assessment) – for reasons of simplicity this is not indicated in Figure 1.

Finally, in the *result registration phase*, teachers of the provider university inform the consumer universities without local teaching of the grades of their students, so that these grades can be entered into the local administrative systems. We assumed that for each course a local teacher will serve as a clearing house: checking grades, mapping them on local schemes, and entering them into the official records. Of course, this task could also be done by administrative staff if no adjustments are needed.

For provider universities with local teaching, the local teachers of each university enter the grades of local students into the local administrative systems. Of course, this task could also be done by administrative staff if local teachers provide them with the information.

The Other Four Models for Virtual Studies Abroad

The other four models address different learning scenarios and therefore differ at some phases/activities from the coordinated federation model. In the *remote access* model each consumer university just directs students to the provider university. Thus, in all phases the teachers of the provider university are responsible for all tasks and students access material entirely using the learning environment of the provider university. This has the advantage that the consumer universities do not need specialized staff for the course.

The *franchising* model uses a course from a provider university, but each consumer university uses local staff for teaching, tutoring, and assessment. In the announcement phase, all teachers are registered at the provider university, so that coordination between local teachers can take place. In the learning phase, local teachers teach, tutor and assess local students. Students collaborate locally. In the result registration phase, the local teachers register results of local students.

In the *joint course offering* model, every partner teaches in a coordinated way. The participating students interact mainly locally and to a lesser degree globally. However, collaborative learning across sites is an important ingredient in this type of course. Again, in the announcement phase, all teachers are registered at all participating universities. In the course phase, the students access learning material at all participating universities and collaborate with each other. As at each university local teachers teach and tutor, this requires strong coordination of the participating universities and synchronization points in the course phase. Otherwise, joint teaching and collaboration among the students would not be possible. The assessment phase and result registration phase are similar to the franchising model, i.e. the local teachers assess the local students and register their results.

In the *course adaptation* model, a course that is developed by one university (provider) is adapted to their needs by another (consumer) university. For this purpose, the course adaptation model uses the additional preparation phase. No further collaboration is needed in this model, which aims at reuse of content. All further phases are executed by each participating universities alone. While the previous models explicitly address virtual learning activities (e.g. attending remote courses, or collaborating with distributed peers), this model primarily aims at reuse of course material.

Obviously, these types of collaboration between universities can be combined, or other combinations may be possible. However, the above five models are the result of an analysis of existing Virtual Erasmus activities in REVE, and therefore have some empirical backing.

Implementations of the Coordinated Federation Model

One example of the coordinated federation model described above is the Erasmus Mundus Master Programme. The Erasmus Mundus Master Programme is defined as a 'co-operation and mobility programme in the field of higher education'. The Erasmus Mundus page on the website of European Union cites:

"the programme is intended to strengthen European co-operation and international links in higher education by supporting high-quality European Masters Courses, by enabling students and visiting scholars from around the world to engage in postgraduate study at European universities, as well as by encouraging the outgoing mobility of European students and scholars towards third countries."

A number of actions make these programmes different from other European graduate programmes.

Firstly, they are high-quality integrated master's courses, offered by a consortium of at least three universities in at least three different European countries. 'Integrated' here means that they involve a study period in at least two or three universities and that it must lead to a recognized double, multiple or joint degree. (Action I)

Secondly, to increase the visibility of the programme outside Europe, a scholarship scheme for third-country students and scholars from the whole world is linked to the graduate programme. (Action II)

Thirdly, the programmes should also encourage the establishment of partnerships with third-country higher education institutions. In the long-run, they should make it possible for graduate EU students and scholars to spend a period of time at these institutions. (Action III)

Fourthly, the programmes can be used to enhance the attractiveness of and the interest in European higher education. The participation in activities that improve the profile of the EHEA and internationalisation of higher education are greatly encouraged. (Action IV)

More than 50 Master's courses have by now been selected under Action I of the Erasmus Mundus Programme. K.U. Leuven participates in three of these programmes: the Erasmus Mundus Master in Nanoscience and Nanotechnology [2], the Erasmus Mundus Master in Adapted Physical Activity [3], and the Erasmus Mundus Master in Bio-ethics [4].

The Erasmus Mundus Masters programme can be considered as an example of the coordinated federation model. The Erasmus Mundus Masters programme consists of a set of courses. However, the coordination federated model proposed earlier was designed to support virtual mobility within a single course. Thus, the original model needs to be adapted for the case of a study programme.

The *announcement phase* consists in the first place in the creation of a consortium. This partnership of minimum three universities has usually been formed on the basis on previous cooperation. In the Erasmus Mundus programme, all partners can be providers and all partners can be consumers. The coordinating institute submits a proposal on behalf of the consortium to the European Commission to host an Erasmus Mundus Masters Programme. On a practical level, the partner universities agree on the general structure of the programme (i.e. how long does a student stay at a particular university, where does the student work on the thesis, etc.) and on a list of courses offered in the programme by the different universities. The programme is then publicized electronically and with brochures all over the world. A special website is created for the programme where all relevant information is collected. Different dissemination paths are used: the programme is advertised on the websites of the partner universities, on the website of the European Commission, through existing research networks of the partner universities etc.

In the case of a study programme, an additional *selection phase* needs to be introduced after the announcement phase. In this selection phase, students can apply for the complete programme through an online application form. A restricted number of students are selected for the complete programme from all the applying candidates. A number of students from third countries will also receive a grant from the European Commission. This phase is not necessary for individual courses in the programme. Individual courses are now handled as discussed in the previous section (see below).

Once students have been selected they can enrol for the programme and individual courses in the programme. This is the *enrolment phase*. In the Master's programmes of the K.U. Leuven, students are enrolled in the coordinating university and at the universities where they will spend a part of their study period. A special provision has been made at the K.U. Leuven, where students can be enrolled for 'EM regular' (for students who will spend part of their study in Leuven) or 'EM distance' (for students who will be studying at the other consortium universities, but not Leuven). As such, all students in the programme will be enrolled at K.U. Leuven.

In the *registration phase*, students are registered in the virtual learning environment of the universities they are enrolled in. This means all students in the Erasmus Mundus programmes coordinated by Leuven will be registered in TOLEDO, the learning environment of the K.U.Leuven. Each student will also be registered at the local learning environment of the partner universities where they will study during their Master's programme.

In the current implementation of the *learning phase* in the Erasmus Mundus programmes, learning activities are mostly restricted to the local partner universities. There is however much opportunity for virtual mobility. One virtual mobility activity that is being piloted in the first year of the programmes is the dissemination of lectures by experts in the field through videoconferencing to all partner

universities in the consortium. All partners can be provider university as the expert can be located at any partner institution in the consortium. All partners can be consumer universities, as they can participate in the lecture through videoconferencing. Virtual mobility can also play a role in the Master's theses, as students are not always located at the same institutions as their promoters. The Erasmus Mundus programmes structurally establish many possibilities to create more virtual learning activities, also involving collaboration across universities on different levels. The assessment of the students is the responsibility of the individual partner universities. A grading system has been agreed upon by the consortium, but each student is assessed only by the university where they study.

The *result registration phase* is usually theoretically in the hands of the consortium. However, practically, it is part of the tasks of the coordinating university. The exact procedure of registering results and conferring degrees differs from programme to programme.

Conclusions

In this paper we presented five models of implementing virtual mobility between partner universities. Each model describes the main phases and their activities as well as the interaction of the partners when carrying out these activities. Knowing these interactions is a prerequisite for designing work processes and technical infrastructures for efficiently performing these types of learning.

Open issues include how a university can find partners and establish a partnership? This is currently outside the scope of the models, as in REVE the network of partners exists due to the project. However, an initial phase is needed where networks of potential partners can form. Another question concerns the definition of the curriculum, if this is not already defined by a provider university. In such a joint course development situation, a phase prior to the announcement phase is necessary to define the curriculum, including any collaborative learning activities among students.

Participation in such forms of virtual mobility requires technological skills and capabilities of the universities and their teachers, otherwise collaborative teaching or material construction may be difficult if not impossible. It seems crucial to establish a community of practice for teachers to help them develop and maintain these skills (i.e., allow teachers to find partners, to discuss problems, to train themselves). Likewise, respective skills need to be developed by the students. Although this seems an overhead, we (and industry) see this as a real benefit of this type of teaching and learning: students develop intercultural collaboration skills.

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BEING MOBILE – DISSEMINATING VIRTUAL MOBILITY FOR STUDENTS AND TEACHERS

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Introduction

The European project 'Being Mobile' which began on 12 December 2005 aims to promote the concept of Virtual Mobility. Being Mobile is an Accompanying Measure supported under the Socrates Programme and its objective is to raise awareness about how European cooperation in education can be heightened through Virtual Mobility. Being Mobile is a targeted dissemination activity in the form of a workshop, a conference, a publication and a website and is coordinated by EuroPACE ivzw, the partners are ATiT (BE), SPACE (BE), ICWE GmbH (DE) and TietgenSkolen (DK).

The first Being Mobile activity was the creation of a handbook called "European Cooperation in Education through Virtual Mobility". This includes best-practise examples of virtual mobility initiatives in higher education that focus on either virtual student or staff exchanges, preparatory and follow-up activities of Erasmus students, joint course development and delivery or virtual internships. The handbook addresses some of the specific challenges of Virtual Mobility, such as accreditation and credit transfer, staff training, student preparation, pedagogical and organisational support.

This paper presents some of the main highlights from the Being Mobile handbook.

Face-to-face Exchange Programmes versus Virtual Mobility

Although physical student mobility is still marginal in Europe – in 2000, a mere 2.3% of European students were pursuing their studies in another European country [1] – we notice that mobility is becoming increasingly important for educational policy makers and that universities and colleges are placing more and more emphasis on the importance of internationalisation. This is born out by the fact that the European Commission has set a goal in its *Integrated Action Programme in Lifelong Learning* whereby in the year 2011, 3.000.000 of all European students should participate in the Erasmus programme [2].

But what about the remaining 80% of students: those students who do not have an opportunity to participate in Erasmus for social, financial or other reasons? Here too, there has been tremendous interest in the idea of *Virtual Erasmus* or *Virtual Mobility* schemes, interpreted to mean educational opportunities that are no longer location dependent and allow for collaboration with foreign students and teachers. Opportunities where learners are able to take courses independently of their physical location, be it in their homes, their places of employment or while staying as an Erasmus student at a host university and taking a course from the home university or a third university.

Or, in the words of the glossary of the eLearningeuropa.info portal, Virtual Mobility means "The use of information and communication technologies to obtain the same benefits as one would have with physical mobility but without the need to travel" [3].

Virtual mobility initiatives fit in the background of the Bologna process [4], which aims at creating a European Higher Education Area (EHEA) that has, amongst others, the objective of facilitating interuniversity mobility and co-operation between universities. Also the eLearning Action Plan [5] stresses the importance of collaboration when it defines eLearning as "the use of new multimedia technologies and the Internet to improve the quality of learning, by facilitating access to resources and services as well as remote exchanges and collaboration".

Types of Virtual Mobility Activities

Virtual Mobility is enabled through the use of Information and Communication Technology supported environments that include for example videoconferencing, live streaming, collaborative workspaces, and computer mediated conferencing.

Virtual Mobility can be interpreted in many ways, and the European Commission, as well as national agencies and individual institutions have actively promoted Virtual Mobility for some time, mainly through the financial support of projects within the SOCRATES/Minerva programme [6] and the eLearning programme [7]. These projects demonstrate different types of virtual mobility, including virtual student and staff exchanges, virtual preparatory or follow-up support to physical exchanges, joint course development and delivery, virtual placements and other more general intercultural activities.

From the Manual for a Collaborative European Virtual University [8] it appears that eLearning is mostly used as part of a blend for on campus teaching but to a lesser extent to support international networking and mobility among universities from different countries, even though virtual mobility bears, according to the investigations of the CVU consortium, the interest of many universities for various types of activities.

Virtual Student and Staff Exchanges

Like traditional Erasmus, students from one university can decide to take a course in another university supported through ODL techniques. Staff could be exchanged between institutions when, for example, they deliver guest lessons to students of another institution from their home university. ODL techniques for both cases include the use of videoconferencing tools, self-study combined with online tutoring, asynchronous video-lessons streamed over the internet, combined with slides and feedback – and other support mechanisms.

The aforementioned Manual for a Collaborative European Virtual University [8] also concludes that Virtual Mobility provides students with opportunities to have direct access to top specialists in various disciplines. Through such access, the working environment of academic communities is enriched and Europe's position in a competitive global market is enhanced.

Virtual Support to Physical Exchanges

Virtual mobility opens up possibilities to better prepare and follow-up students who take part in Erasmus exchanges. Student selection could be supported by, for example, videoconferencing, allowing teaching staff to put a face on a candidate and to check social and language skills. Later, a preparatory language and "cultural integration" course could be provided by the host institution supported via ICT.

Joint Course Development and Delivery

Joint course development and/or delivery by two or more institutions which broadens expertise and resources offered to students. Collaboration in course design and subsequent student support services not only saves effort but can also be used to reduce costs.

Virtual Student Placements

Student placements are organised between an institution and a company in a different country. Virtual placements in companies in particular give students a real-life experience in the working world and enable the educational instutiton to internationalise its course offer and adapt it to the dynamics of the economy.

Other activities

Intercultural awareness raising amongst staff and students can also take place in a more informal and less institutionalised way: through the organisation of transborder discussion groups, once off international seminars or through the set-up of an international learning community.

Best-practise Case Study of Virtual Mobility

The "Cinema and Literature" course has been taught simultaneously for several years now at both the Catholic University of Leuven and the University of Granada. Students from both universities work together in a networked way. Strong emphasis is placed on interactive and collaborative learning with small groups of students working together during a whole semester and writing a paper collaboratively using a wiki. The course also includes some videoconference sessions to further discuss and present the work done to the whole group.

Very specific for this course is the mix of technologies and the multilingual and multicultural approach. A blended learning model with both contact and an online part is adopted. Contact hours are in Dutch. In the virtual learning environment the syllabus and the course documents are made available in several languages (Spanish, French and English). In most cases parts of the text are even translated or summarised in other languages. When interacting and working with one another (using e-mail, chat, discussion forum, wiki, or during the videoconference sessions) students can use the language they feel most comfortable in, taking into account of course basic communication rules.

Benefits to Students and Teachers

Virtual Mobility of teachers and students enables them to benefit linguistically, culturally and educationally from the experience of other European countries and of their (academic) fields of study. Both students and teachers will develop the necessary skills needed in working life where internationalisation is becoming increasingly important.

It can create a sense of European citizenship in teachers and students who learn to work together in crossborder teams.

Furthermore, virtual mobility enables Europe-wide exchanges for all those not able to benefit from existing face-to-face programmes, for social, geographical or other reasons.

At the institutional level, virtual mobility initiatives enhance sound competition between institutions and thus contribute to the competitiveness and attractiveness of the educational offer. It provides an enrichment to the regular educational environment of all institutions.

Challenges and Recommendations regarding Implementation in the Regular Curriculum

Despite all efforts to promote opportunities afforded by Virtual Mobility, large numbers of educational staff remain unaware as to the opportunities afforded through different kinds of Virtual Mobility and important project outcomes including guidelines, procedures, pedagogical models, manuals and handbooks do not enjoy the take-up they deserve. Challenges for the integration of virtual mobility in mainstream education include issues such as tuition fees, assessment, cultural differences, course organisation, accreditation and cost issues.

Tuition Fees

Difficulties can arise when universities organise exchanges where the tuition fees for the courses differ from one country to another. England has much higher fees than for example Germany. Furthermore, some countries have national rules with regard to tuition fees. In Sweden, for example, it is not permissible to exchange courses with state universities that ask a tuition fee.

Consortium agreements for each individual case could be a solution but in the long term, it is better to look for broader solutions and even work on a European level (national laws are difficult to change).

Assessment

Recommendations received from teachers that participated in the REVE (REal Virtual Erasmus) workshop [9] during the EDEN Conference included a re-evaluation of assessment strategies. Teachers argued that assessment methods should include self-assessment and peer-evaluation. Peer-evaluation is necessary for a truly comprehensive assessment strategy. This is particularly true in large groups where it often takes too much time for the teacher to follow everybody.

One should also ask the question as to which technologies a teacher can use to assess distant students. He/she could for example use videoconferences or online portfolios but it is also important to bear in mind that not everyone has the same access to technologies.

Furthermore, assessment should be built not on results but on the process. Therefore, assessment throughout activities is very important, not only assessment at the end. Other teachers suggested tracking user participation through the use logging features.

These assessment procedures are not always be easy to design. One needs to take into account that some universities do not allow online assessment and that in other universities it may be forbidden to use logging features for assessment.

Cultural Differences

An other recommendation that came up during the REVE workshop at the EDEN Conference, regards the expected activities and assigments from the students. These need to be designed taking into account the difference in communication cultures among students: some participate actively in a forum or chat while others are more the observers. some students never enter a forum at all.

Course Organisation

Furthermore, the REVE workshop participants suggested that, as with any online course, virtual mobility initiatives require a high level of organisation. Not only regarding the structure of the content and the assignements, but also students need to be trained to be structured and self-organised, keeping time and meeting deadlines. This challenge also counts for the teachers who are supporting the activity.

Accreditation

If students receive credits for a course their motivation to participate actively is higher. Defining the workload of a course, and estimating the amount of credits a course gets remains however difficult. The workload of students usually differs a lot from university to university. Finland for example is proud to have a high workload for its students. Furthermore there is no real European standardised procedure for exchanging credits. It is often based on existing bilateral partnerships, or on personal links (at managerial level). Bilateral partnerships can be formal, i.e. strictly following the rules of university while exchange of credits based on personal links are more the results of “bargaining” between professors.

Conclusions

Virtual Mobility of teachers and students enables them to benefit linguistically, culturally and educationally from the experience of other European countries and of their (academic) fields of study. Furthermore, virtual mobility enables European cooperation opportunities for those not able to benefit from the existing face-to-face programmes, which is more than 80% of students. Challenges for the integration of virtual mobility in mainstream education include issues such as tuition fees, assessment, cultural differences, course organisation and accreditation.

From previous research it appears that eLearning is mostly used as part of a blend for on-campus teaching but to a lesser extent to support international networking and mobility among universities from different countries.

Despite this, virtual mobility bears, according to the investigations of the CVU consortium, the interest of many universities for various types of activities. Therefore it is important that through various

dissemination activities, results of projects in this domain are made available to the wider educational community. This is the only way to ensure that Virtual Mobility moves from pilot level towards integration in mainstream education.

However, a coordinated dissemination of pioneer activities in the field of Virtual Mobility often lacks key outputs, and results and experiences of pilot projects remain unknown to the target community. As a result, many virtual mobility activities, organised by few early adopters, remain isolated cases and are often considered a nice 'add-on' to a regular course as opposed to being an integral part of it. This attitude towards Virtual Mobility is a hindrance to large-scale collaboration on a European level amongst higher education institutions, their staff and their students.

In response to the lack of coordinated promotion, the Being Mobile project was set-up. One of the first activities of Being Mobile was the publication of a handbook "European Cooperation in Education through Virtual Mobility". This handbook can be downloaded for free from the project's website at http://www.being-mobile.net. The next activity is the organisation of a pre-conference workshop at Online Educa Berlin 2006. This full day workshop will take place on Wednesday 29 November 2006. This event is offered free to 150 participants and focusses on the theme "European Cooperation in Education through Virtual Mobility". It will include plenary and parallel sessions, networking and discussion fora.

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A NEED FOR VIRTUAL MOBILITY IN MAINSTREAM EDUCATION: CASE STUDY OF THE ERASMUS MUNDUS PROGRAMMES AT THE K.U.LEUVEN, BELGIUM

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1. Introduction

The Bologna Declaration of 1999 [1] marked a change in European education. In that declaration, the European Ministers of Education promised to work together in order to establish a European Higher Education Area by 2010. The aim of their meeting was to structurally support the existing movement towards more interaction between Higher Education Institutions across the European continent, a development that had already been going on for several years. The objectives that they stated to be of 'primary relevance' for the creation of such a European Higher Education Area were: (1) a system of easily readable and comparable degrees, (2) a system of basically two main cycles, (3) a system of credits, (4) promotion of mobility for students and for teachers, (5) promotion of European co-operation in quality assurance and (6) promotion of the necessary European dimensions in higher education.

A follow-up meeting was held in 2001 in Prague in which the objectives were increased to include lifelong learning, the involvement of higher education institutions and students in the creation of a European Higher Education Area (EHEA) and the promotion of the attractiveness of the European Higher Education Area [2]. In 2003, these objectives were restated during a meeting in Berlin and some additional actions were formulated. These are the importance of the existence of a European Research Area next to the EHEA, mid-term stocktaking of the progress in establishing the EHEA and the extension of the EHEA to the new member states [3, 4].

Since 1999, there has been much progress in the development of this common educational system, through a number of concrete measures. One of them has been the creation of Erasmus Mundus Master Programmes. In their design, these programmes achieve a number of the objectives mentioned above. This paper will first describe the structure of an Erasmus Mundus Programme and how it fits into the larger idea of a European Higher Education Area. Next, the focus will shift to the aspect of mobility in the Erasmus Mundus Programmes. The function of physical mobility and how it can be complemented by virtual mobility will be analyzed.

2. Erasmus Mundus Program

Structure of the graduate studies

The Erasmus Mundus Programme is defined as a 'co-operation and mobility programme in the field of higher education'. The Erasmus Mundus page on the website of European Union [5] cites: "the programme is intended to strengthen European co-operation and international links in higher education by supporting high-quality European Masters Courses, by enabling students and visiting scholars from around the world to engage in postgraduate study at European universities, as well as by encouraging the outgoing mobility of European students and scholars towards third countries".

A number of actions make these programmes different from other European graduate programmes [5]. Firstly, they are high-quality integrated master's courses, offered by a consortium of at least three universities in at least three different European countries. 'Integrated' here means that they involve a study period in at least two or three universities and that it must lead to a recognized double, multiple or joint degree (Action I). Secondly, to increase the visibility of the programme outside Europe, a scholarship scheme for third-country students and scholars from the whole world is linked to the graduate programme (Action II). Thirdly, the programmes should also encourage the establishment of

partnerships with third-country higher education institutions. In the long-run, they should make it possible for graduate EU students and scholars to spend a period of time at these institutions (Action III). Fourthly, the programmes can be used to enhance the attractiveness of and the interest in European higher education. The participation in activities that improve the profile of the EHEA and internationalisation of higher education are greatly encouraged (Action IV).

More than 50 Master's courses have now been selected under Action I of the Erasmus Mundus Programme. K.U.Leuven participates in three of these programmes: the Erasmus Mundus Master in Nanoscience and Nanotechnology, the Erasmus Mundus Master in Adapted Physical Activity and the Erasmus Mundus Master in Bio-ethics. All programmes have a number of grants at their disposal for students from developing nations, especially from a number of window nations in Asia.

The *Erasmus Mundus Master in Nanoscience and Nanotechnology* [6] is organised by a consortium of four universities. These are: K.U.Leuven (Belgium), Chalmers Tekniska Högskola (Sweden), Technische Universiteit Delft & Universiteit Leiden (The Netherlands) and Technische Universität Dresden (Germany). The coordinating institute is K.U.Leuven. It is a two-year programme, in which the students spend one year at one consortium university and the next in another university. The student decides the courses and the topic of the thesis before starting the programme. The individual programme of the student has to be approved by the consortium. The first run of this programme started in October 2005.

The *Erasmus Mundus Master in Adapted Physical Activity* [7] is a cooperation between five European universities: K.U.Leuven (Belgium), the University of Limerick (Ireland), the Palacky University Olomouc (Czech Republic), the Norwegian University of Sport and Physical Education and the Norwegian School of Sport Sciences (Norway). The K.U.Leuven is the coordinator of this programme as well. In this one-year programme, every student spends the first semester in Leuven and the second semester at a different consortium partner. Students take classes during the first semester at Leuven. A number of experts from consortium universities and from institutes outside the partnership will be invited to give guest lectures at the different consortium universities. During the second semester, the students work on their thesis, take part in some seminars and gain some practical experience in the field. The host university during this period is linked to the topic of their thesis. A number of students can choose Leuven as the institute to work on their thesis, in the second semester. To ensure that they also have the experience of studying at two different European institutions, they spend half of the first semester in Leuven and the second half in Oslo. They return to Leuven in the second semester. This programme is organized for the first time in the academic year 2005-2006.

The *Erasmus Mundus Master in Bio-ethics* [8] is organized by three European universities and one European Institute. These are: K.U.Leuven (Belgium), Radboud University Nijmegen (The Netherlands), the University of Padova (Italy) and the Fondazione Lanza in Padova (Italy). This is a one-year programme that can also be taken part-time, over two years. It runs from September to June. The idea is that the students spend about an equal amount of time at the three universities. September to December is at the K.U.Leuven, from January until Easter is at Nijmegen and the remaining time is in Padova. Exams are conducted at all universities at the end of the stay in that university. The first run of this programme will be organized in the academic year 2006-2007.

Role in creation of EHEA

The Erasmus Mundus Programmes are the result of a number of concrete steps taken to achieve the objectives of the Bologna Declaration [9]. They also create the opportunity to find concrete workable practical solutions for cooperation between European higher education institutions.

The fact that the Masters Programmes are integrated, i.e. encompass a period of study at different European universities and lead to a joint degree, is a sign that comparable degrees have been created over the past six years in a European framework. A system of credits and credit transfer is in place, which makes it possible to compare study load and workload of different courses at the consortium universities. The design of the programme incorporates teacher and student mobility. The cooperation between the consortium partners around a Master's programme can be a starting point for increased mobility between the partners. Students and teachers are encouraged (sometimes obliged) to spend time at different partner universities. This aspect is discussed more in depth in the next section.

By participating in a European Master or Erasmus Mundus programme, the institutions are actively involved in the creation of the European Higher Education Area. The teachers and students at these universities have the immediate opportunity to work closely with people at other European institutions. While increasing the internal collaboration in Europe, Erasmus Mundus programmes also promote the EHEA outside the European continent: a number of grants will be offered specially to students coming from countries outside the EU. Cooperation with institutions outside the EU is also being encouraged and rewarded. Furthermore, the creation of a European Research Area is also encouraged through the Erasmus Mundus Programmes. The study programme can be a starting point for more interaction between different institutions and scholars working in the same research field. The programme thereby establishes an environment where research collaborations can also take place. Often, the consortia offering an Erasmus Mundus Master have been created on the basis of previously existing research partnerships.

As such, the Erasmus Mundus Programmes are concrete effects of the European Higher Education Area. On the one hand, they are concrete realisations of many of the objectives set in the Bologna Declaration and are in a way a symbol of how far the EHEA has progressed since the Bologna Declaration. On the other hand, they also create the structural environment for much more interaction and cooperation in the EHEA.

Influence on student and teacher mobility

As stated above, the Erasmus Mundus Programmes incorporate many of the objectives in the Bologna Declaration. In this section, one objective, i.e. aspects of teacher and student mobility will be discussed in more detail.

The design of the Erasmus Mundus Master ensures that students spend some period of their study in different European universities. This can be a whole year (e.g. the Erasmus Mundus Master in Nanoscience and Nanotechnology), a semester (e.g. Erasmus Mundus Master in Adapted Physical Activity) or even less than a semester (e.g. Erasmus Mundus Master in Bio-ethics and special case of Erasmus Mundus Master in Adapted Physical Activity). Through mobility, students get exposed to different teaching methods and research methods. They get access to different kinds of facilities at the different universities. They also get first-hand teaching by experts in different fields in their working environment, in their laboratories. The Erasmus Mundus Master covers teacher mobility as well. Teachers are encouraged to teach at other institutions than their own. Mobility gives them the opportunity to interact closely with teachers from other institutions. They can come in contact with different teaching and research methods, which may help them in their own work.

The Erasmus Mundus Programme creates many possibilities for mobility. However, it is still quite restricted to physical mobility. Teachers and students have to move physically to different parts of the continent to take advantage of the facilities at a particular institution. Mobility is restricted to a certain time and place.

This can be partly overcome by including virtual mobility in the programmes. Virtual means can increase communication between teachers and students at different locations. Communication does not need to be constrained by time: in theory it can happen from the very first day of the programme till the last. Virtual mobility can also be very useful for maintaining social contacts with family and friends back home and with colleagues in different consortium universities. Virtual mobility in the classroom is not a new concept. At the K.U.Leuven, there are a number of examples of courses where students in different countries collaborate on a same assignment or where a teacher guides his/her students in a different country making use of communication tools through the internet or videoconferencing. Other examples exist where the learning process or research path of the student is made more visible to fellow students and the teacher through the use of weblogs. These activities are however limited to certain courses and the initiatives of certain teachers.

In the run-up to the start of the Erasmus Mundus programmes in K.U.Leuven, much thought was given as to how virtual technologies could be used to increase the interactions between teachers and students at the different consortium universities. From the point of view of the K.U.Leuven support centre AVNet, it was important to suggest tools and methods useful for all (current and future) Erasmus

Mundus programmes. At the same time, it should be possible to provide custom-made solutions as well, if necessary. The support activities are conducted in the framework of the REVE project [10, 11]. The ideas and issues that came up are discussed in the following sections.

3. Virtual mobility in the Erasmus Mundus Master Programs

Physical mobility in the Erasmus Mundus Programmes (and indeed any jointly organized programme or learning/research activity) can be complemented by virtual mobility. The central issues in any virtual mobility activities are communication and collaboration between teachers and students, teachers and teachers and finally students and students. A number of collaborative tools and technologies can be used to achieve this.

Firstly, it is considered useful to create a forum where teachers and students can interact, regardless of time and location. A *joint virtual learning environment* (VLE) for all participants in a Master programme, regardless where they are located can bring much added value. The students will have one central point where they can find all information regarding the programme and the courses. A VLE can be used to disseminate course material. It can offer a platform for discussions on the study material. These aspects of a VLE are often already used in many European universities, but can now be extended to a Master's programme with its participants in different locations. The use of a common VLE creates the possibility of future online courses. On a social level, it can be used by students to keep in touch with fellow students and exchange experiences. It can be argued that, encouraging a 'community'–feeling between the students in the programme enhances the learning experience. Many Erasmus Mundus students, even though in the same programme, might not meet each other physically, because they move to different institutions across Europe as part of the programme. Support offered in an online community (creating the 'I-am-not-alone'-feeling) might be very important for students away from home. The use of a VLE also greatly increases the internal visibility of the programme for the students. The website of the programme can be used as an external dissemination tool for attracting potential students and for general information.

At present, most consortium universities are using their own VLEs to disseminate their courses. Access to the VLE is usually restricted to students enrolled at that particular institution. An agreement has to be made to give access to students who are enrolled in the programme, but not directly enrolled as students in the university. This issue will also be relevant for giving students access to other digital resources that an institution might offer (e.g. libraries, databases, etc.). At the K.U.Leuven, it has been decided to open up the learning environment Toledo[1] of the university to students enrolled in Erasmus Mundus Master programmes, coordinated by Leuven. For administrative reasons, all students will be registered as students at the K.U.Leuven, even if they might not spend a period of their study in Leuven. A special student status has been created in this regard. The objective was to have the space in Toledo become the central virtual meeting point of students and teachers in the Erasmus Mundus Master programme. After the first six months of the programmes, however, it can be noticed that Toledo is mainly used to disseminate general information about the programme. The objective to have it become the central tool for the students in the programme has not yet been achieved. This may be due to the lack of encouragement from the teachers' side. Teachers also need training in the use of VLEs, and this has been underestimated. The next step in the support will be to address this issue.

Secondly, *teacher-student communication* can be enhanced through virtual means, if they cannot meet physically. On the one hand, individual students can be tutored/coached personally by teachers at other universities. This is particularly likely in the Erasmus Mundus Master in Adapted Physical Activity. Students spend the first semester in Leuven and the second semester in a partner university, during which they will work on their thesis. The general topic of the thesis and the promoter however are decided in the beginning of the year. Videoconferencing or FlashMeeting[2] can be used to bring students in touch with supervisors and to create the possibility for them to see each other and discuss possible topics for or progress of the thesis. In this way; the student also gets the opportunity to start work on

[1] Toledo is the learning platform of the K.U.Leuven.

[2] FlashMeeting is a conferencing tool, developed by the Open University UK. More information can be found on their website [12]

the thesis during the first semester while still being in Leuven. The student can keep a record of the research activities in a personal weblog, which is made available to fellow students and the promoter. Other technologies such as e-mail, wiki, Skype etc., can also be used. On the other hand, teachers can also communicate with groups of students in another location. The VLE can be used to start discussion forums on certain topics, in which teachers and students can equally participate. Students can work together in group on a text in a wiki as part of a course. Weblog communities can discuss course-related topics, in which the teacher also regularly participates. Lectures by experts in the field visiting any consortium university can be disseminated to students at the other partner universities in real time. By incorporating such technologies in the everyday running of the programme, all students registered in a programme could get access to the same material and lectures, wherever they are located within the consortium.

Examples of these kinds of virtual mobility activities can be found at the K.U.Leuven. For example, the university has experience in conducting lectures through videoconferencing within Flanders, (e.g. in the Pentalfa project and 'Lessen voor de 21ste eeuw'). This method of working has also been extended to the Erasmus Mundus Programmes. A lecture series disseminated to all consortium institutions though videoconference is being conducted as part of the Erasmus Mundus Master in Nanoscience and Nanotechnology and in the Erasmus Mundus Master in Adapted Physical Activity. Using videoconferencing for tutoring remote students is currently being used on the basis of individual students and professors in the K.U.Leuven. The Erasmus Mundus Programmes offer a good environment to increase the use of this facility. Wiki and weblogs have also been actively and successfully used in research work in the Faculty of Arts (Japanese Studies). This can be encouraged in the European graduate programmes as well.

Thirdly, communication technologies can support the *selection procedure* of the non-EU students (i.e. teacher-candidate communication). The Erasmus Mundus Programmes receive a limited number of substantial grants to be awarded specifically to non-European students. This poses a great responsibility upon the organisers of the programmes, in the sense that they are to select the best candidates from the applications. Often paper applications may not be complete or adequate to make the decision. To help this, virtual technologies in which the selection committee and the candidates can see and hear each other, can be used to interview the candidates. Possible technologies that are being used for this are videoconferencing, conferencing tools such as FlashMeeting and Skype, audioconferences, etc. The interviews can go hand in hand with an assessment of the candidate's language skills and knowledge of the subject.

Fourthly, communication technologies can also support the *logistics* of the programmes. For example, the annual face-to-face meetings between the consortium partners can be complemented by videoconferencing.

Finally, whereas the focus of this section has been mainly on student-student communication and teacher-student communication, solutions have to be found for *teacher-teacher communication* as well. Issues, such as student's progress in a subject, organization of the local tutoring at different partner universities for students, etc., may need to be discussed by teachers. Furthermore, there may be a need to share learning material, scientific material etc. between teachers at the different universities. There is a need for a virtual platform where teachers can communicate as well. On a social level, the creation of an online community for teachers may be important as well. Just like the students, the teachers can also get a first-hand experience of working with other (European) colleagues on a same programme. This is likely to increase the enthusiasm for the programme and strengthen the relations between the partner institutions.

In conclusion, collaboration on a European level can be greatly enhanced through virtual mobility. As the advantages of physical mobility are quite restricted by time and place, the use of virtual technologies has the potential to create continuous interaction with colleagues all over the European continent. Teachers and students in the Erasmus Mundus Programmes can benefit from the possibilities that new virtual technologies have to offer.

4. Conclusion

The Erasmus Mundus Master Programmes have been created under the European Union's initiative, within the framework of the European Higher Education Area. On the one hand, the Erasmus Mundus Masters' programmes cover several objectives of the Bologna Declaration. On the other hand, the Masters' programmes offer an environment that can accelerate the momentum of the Bologna Process.

The focus in the Erasmus Mundus Master Programmes is very much on mobility. Students are obliged to spend at least part of their study period in different universities. Teachers are encouraged to spend time at other institutions than their own. This type of physical mobility, which is quite restricted by time and place, can be complemented with virtual mobility. Virtual technologies can be used to create more regular, if not continuous, interaction between teachers and students at different European institutions. Within the Erasmus Mundus Programmes at the K.U.Leuven, a number of concrete issues involving the facilitation of teacher-student, student-student and teacher-teacher communication and collaboration have been defined and solutions aimed at implementing virtual mobility have been suggested and are currently being tested.

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BRIDGING THE DIGITAL DIVIDE: THE RURAL WINGS PROJECT

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Within the framework of the mid-term review of the eEurope 2005 Action Plan in early 2004, the European Commission will propose to set up a Forum on the Digital Divide. This Forum will bring together all stakeholders in the area of the Information Society and electronic communications, including the satellite constituency and ESA, and will analyse how to bridge the digital divide.

White Paper "Space: a new European frontier for an expanding Union", COM (2003) 673

Introduction

In recent years there have been several initiatives in the field of satellite telecommunications applications, in order to address the needs of rural communities. This indicates the unique advantages of satellite technologies for providing high quality wireless broadband connection to any type of population within large geographical areas. Rural Wings is an ambitious project that proposes to develop an advanced learning platform through satellite DVB-RCS access technologies, promoting a **user-centred** methodological approach which constitutes its major innovation. The main aim of the proposed approach is to support the creation of a new culture in rural communities promoting digital literacy and reducing resistance to the use of new technologies. It will go a step further, encouraging users to add their significant contribution to the emerging applications by involving them in meaningful activities, tailored to address the needs of different user groups. Thus, Rural Wings aims to offer stimulating and creative learning environments to support vibrant user communities and will attempt an extended implementation in dozens of pilot sites in 18 countries worldwide. It is expected that Rural Wings project will help to catalyse the satellite broadband take up in Europe and beyond.

The Rural Wings project[1] will be based on innovation practices and techniques deployed in industrial environments, aiming to the optimization of the new products' development process. The ultimate goal is the transfer of knowledge and the adjustment of these practices in different knowledge spaces (at school, at work, at home) as a mean for interaction between user needs and technological developments: the needs of users in rural areas feed the integration of the educational environment with dynamic requirements for new services or for the adaptation of existing ones. In this way the users' perception of their problems/needs leads the development of technology and of learning practices.

Project's background

Information and Communication Technologies (ICT) are inherently associated with the access and use of knowledge which is the fundamental and strategic resource of society. ICT require the active, informed, literate participation of the user. The internet is of little use to people who are not able to exploit electronic access to information to improve their lives. In 2003, about 150 million European citizens had not completed higher secondary level education and about 2/3 of EU workers had never had any computer training. The term "digital divide" in its more generic definition refers to the technological and socio-economic disparity among countries and peoples as is reflected to the ICT access, applications, literacy and usage skills. This broad definition includes inequalities between

[1] The Rural Wings project is co-financed by the European Commission (FP6-IP-516161), the Canadian Space Agency and the National Science Foundation (USA).

countries at different levels of development, between urban and rural regions of the same country and between people of different ethnic group, gender, age, educational level and income. The digital divide brings grave disparities in economic opportunities, education, health, safety, housing, employment and even transportation, and as such has an important and long-term impact on society (P. Cohendet (2003), Report for ESA: "The Digital Divide in the European Enlarged Economic Scenario: An Assessment of the Socio-economic Effects").

The European Union aims at becoming a truly knowledge-based economy, to enhance the quality of life, the working conditions and the overall competitiveness of its industries and services. Through its Europe 2005 Action Plan, the Union has set itself the objectives of providing adequate infrastructure for education and medical care and a favourable environment for private investment and for the creation of new jobs, in order to boost productivity, to modernise public services and to give everyone the opportunity to participate in the global information society. To achieve these objectives, widespread availability and usage of broadband and high-speed Internet throughout the EU needs to be established. However, the digital divide in Europe remains large as the rural and less favoured regions lack the same access and supply of internet access and broadband connection as the urban areas have. Even where the rural areas do have access, connection speed is lower (employing early technology) than in the cities. A large number of European households, living in remote areas – as many as 14 million – do not have a realistic perspective of achieving access to high-speed Internet before many years. This constitutes a serious obstacle for making the benefits of the information society available to all citizens in the European Union.

Unfortunately, despite the incredible technological advances of the past decade, the digital revolution has not yet touched the lives of many people. In fact, there are indications that the digital divide is actually growing as a result of the new technological developments, as is occurring with broadband access in some countries, leaving the rural communities increasingly behind in the digital revolution: On the one hand, cities and suburban areas offer service providers a ready, high-volume market and provide an incentive to the private sector for developing, installing and maintaining state-of-the-art infrastructure, access and services. On the other hand, local infrastructure developments in rural areas are restricted due to the impossibility of reaching commercial viability. And there is little hope that providers will develop and maintain infrastructure for services in rural areas (bridging the digital divide) without incentives to built the information highways and policies aimed at bringing down existing barriers for providing the necessary infrastructure (P. Cohendet (2003), Report for ESA: "The Digital Divide in the European Enlarged Economic Scenario: An Assessment of the Socio-economic Effects").

This is a problem that the European Union and local governing authorities have recognised. The European Union's eEurope 2005 initiative states that all businesses, schools and universities of present Union members must have broadband access to the Internet by 2005. The EU has also stated its intention to use existing Structural Funds, such as regional and social funds, to facilitate broadband access in remote and rural regions throughout Europe (including the 10 new European countries). Thus, the market place is evolving towards the use of IP applications requiring broadband connectivity (streaming, FTP, News feed, Web-browsing, Video Conference). This is further driven by the fact that reliable and cost efficient broadband access technologies are more and more being deployed. **It is thus now becoming more and more evident that the vision of "Education for All" will be realised through the emergent actions for "Broadband for All".**

Figure 1. Learning and teaching in rural schools in Greece, Finland and Peru. Different countries, different cultures several thousands of kilometers away with a common need: "Education for All"

Can satellite be one of the alternative wireless technologies that can help close the widening digital divide in Europe?

Depending on the required bandwidth and the population density, several access technologies are presently in use: via copper lines, cable networks, terrestrial or satellite wireless connections, fiber optics networks (see Figure 1).

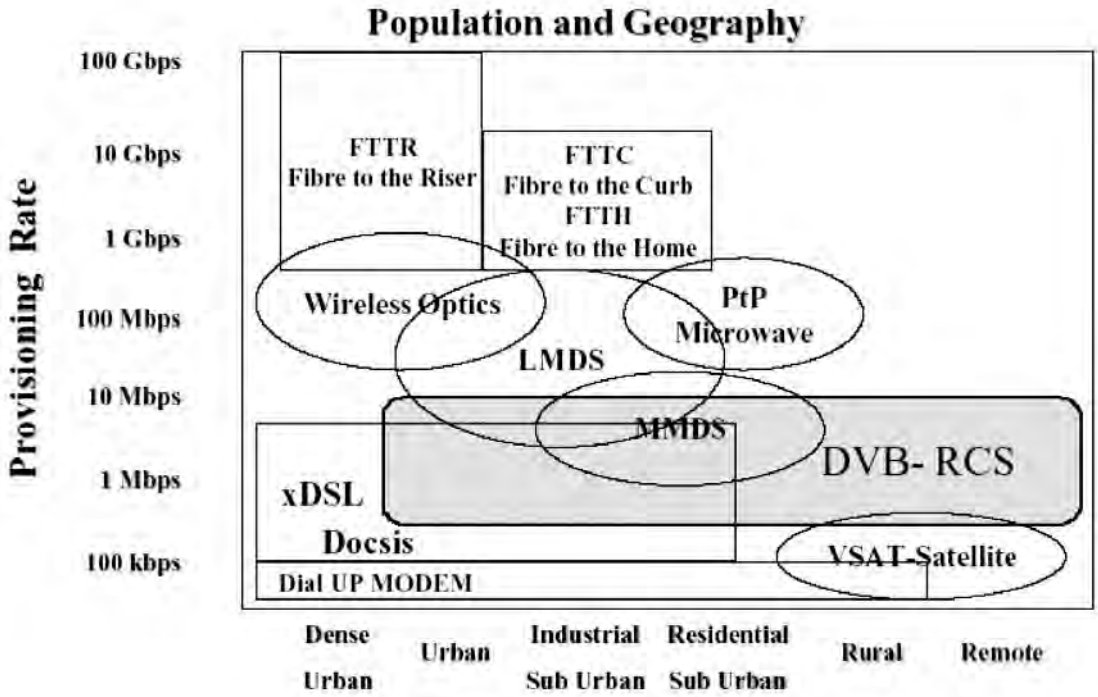

Figure 2. Access Technologies (S. Boom & G. Adams (2001): "2 Way-Sat" by Newtec)

Within the satellite environment, the broadband two-way access is often released in a hybrid form, forward link via satellite and return link via terrestrial manner. Most of these methods even those allowing for high bandwidth capacity, target markets that are typically situated in dense or urban population areas and to a less degree in sub-urban areas, but are certainly not suited for rural and remote areas. This is because either the service (capacity and performance) degrades as a function of distance or number of users, or because the network roll-out requires existing installations or implies large investments thus they are only cost effective in areas where high revenue potential is available. The optimum solution to quickly start closing the digital divide is clearly a broadband fixed wireless access, as wireless solutions have the ability to be both transitory and permanent technologies at the same time. By strategically placing wireless access points, operators or local authorities enable business and home users across wide areas to enjoy permanent access to the Internet at speeds ten to twenty times faster than a traditional modem. The DVB-RCS (Digital Video Broadcast – Return Channel via Satellite) is a solution totally based on satellite telecommunication (without any terrestrial links involved) typically targeting the broadband access networks. It requires asymmetrical connectivity (forward rates of 1 to 10 Mbps and return rates of 0.2-2 Mbps) thus is well suited for suburban and rural regions with the potential to address all users in those regions. DVB-RCS, recently published as an ETSI standard, forms the specification for the provision of the interaction channel for GEO satellite interactive networks with fixed return channel satellite terminals (RCST). The standard, developed under the auspices of the DVB Forum, was created through the cooperation of satellite operators and satellite equipment manufacturers, including system providers, hub manufacturers and terminal manufacturers. Companies from Europe, North America and the Middle East have been involved in this activity. DVB-RCS may well become a global satellite standard that allows equipment manufacturers to focus on the same technical solution, thus providing a healthy and open competitive environment, with enormous benefits to industry and users alike.

According to the recent report "Reducing the Digital Divide in Europe – Competitiveness of satellite among broadband access technologies" (Vista Advisers, October 2003) the answer to the question, **"Can satellite be one of the alternative wireless technologies that can help close the widening digital divide in Europe?"**, is **"yes, technically"**, but no in its current form of offering, considered as **not cost-effective enough for a mass market deployment**. As bandwidth and equipment costs remain the main barrier to a mass deployment of satellite access services, it is essential to look for ways to reduce these costs. Two major possibilities are currently being considered by manufacturers and operators, a) reduce the bandwidth cost by using bigger satellite platforms and b) reduce the cost of satellite equipment per user. According to satellite operators and satellite manufacturers, spot beams and frequency re-use on new generation satellites should make it possible to lower the capacity costs by approximately a factor of five. The lower cost of bandwidth should enable more affordable pricing for the satellite ISP's broadband access.

According to the same report an immediate way to share satellite access costs among small groups of users is to combine a two-way satellite with a Wi-Fi last mile service. The satellite/Wi-Fi combination brings the cost of broadband for remote locations down to the same level as ASDL or cable broadband in metropolitan areas. The fact that both technologies are standard platforms contributes enormously to the low cost. **This hybrid solution could definitely stimulate the process of closing the digital divide, even though the business models are still problematical as of today.**

However, much needs to be done and understood about these technologies before they can play a more significant role in providing services in rural environments. Issues of availability, effectiveness, usability, suitability, reach, network design, cost and authorisation, all have to be tackled and understood, both by potential service providers and potential users. **It is important that the potential and implications of satellite communications are understood by the final users, in order to influence the way in which services are made available and also to benefit early on from the exciting opportunities they offer.**

The importance of the human factor: users' needs in rural areas

In rural towns and communities the necessity of telecommunications services cannot be overstated: where growth and economic development is desired, telecommunications infrastructure and high-speed communications to attract new business and industry are essential. Everybody in a rural community – schools, hospitals, businesses, city and county governments, community groups and individuals – benefit from access to improved communications, commerce and information. Underdeveloped communications infrastructure has a direct impact to the economic and social welfare of rural communities: schools can provide limited access to internet resources, remote tele-workers are unable to transfer large data-files between office and home, the local commercial or civic web-sites cannot be accessed rapidly, discouraging a potential customer or visitor from within or outside the community.

The rural-urban divide has a direct impact not only on the access but also on the **creation of knowledge**. Without access to broadband for example, a researcher has no access to data-intensive applications that are only available to colleagues connected by urban local area network, and a rural automotive designer needs to relocate to the company headquarters to participate in interactive, real-time, computer-aided modeling of a new vehicle. The remoteness of a rural area leads to massive set-up costs. With poor career training and low literacy rates, it is unlikely that a poor rural individual, who values access to the internet and other technologies, will be able to afford the access costs. Thus, large-scale technology initiatives have little hope of success unless at least a basic level of community capacity is in place. "The social structure of creativity relies on the existence of a milieu open to all forms of creativity – artistic and cultural, as well as technological and economic. This milieu provides the underlying ecosystem or habitat in which the multidimensional forms of creativity take root and flourish" (P. Cohendet (2003), Report for ESA: "The Digital Divide in the European Enlarged Economic Scenario: An Assessment of the Socio-economic Effects"). Thus, **it is paramount to offer stimulating and creative environments to support vibrant communities – educational** (teachers and students in schools, universities and training centers), **scientific** (research and science centers), medical (doctors, nurses, emergency units), **artistic, local government, business**. This in turn will help to attract those who create in business and technology and to facilitate the rapid transmission of knowledge and ideas.

The contribution of the Rural Wings project

The Rural Wings project will address how the learning needs of rural communities could be served by satellite communications. The objective will be to select the most appropriate applications and propose a roadmap up to the operational status including demonstrations and technical developments in order to promote and facilitate the use of satellite communications over Europe and beyond. **This project seeks to use advanced technology as a tool to foster Human Development, in order to use the great potential capacity the new technologies have in addressing major societal challenges**. This project places a great emphasis on the pedagogical, social and human development dimensions, where ICTs only play an instrumental role in order **to empower people through knowledge, development of creativity and enhanced concerted action**.

The project's approach is aiming at the development of **a cognitive based open learning system and environment** that can generate creativity and a capacity of learning to learn in the users, through the development of **a new learning culture**. It will offer the users (students, teachers, doctors and health personnel, farmers, local administrators and public authorities) ubiquitous access to the learning content. The Rural Wings learning environment will be developed through the effective utilization of a wide range of ICT applications for educational purposes (e.g. WebTV channel for students, virtual visits to museums, science centres, research laboratories) based on a participatory methodology in which users will play a very active role in creating additional components, through the creative use of constructionist principles and related ICT technologies. The Rural Wings learning environment will also support the exchange of material between users and experts, it will allow easy uploads and downloads of relevant material, it will facilitate the direct communication between the users and the networking activities of all the actors involved. Such a service offers high speed two-way connection that gives the opportunity to deliver content utilizing completely the capabilities of multimedia tools. High quality video streaming broadcasted can be delivered to users at school, at work or at home. Real-time on-line seminars can be realized in this way, while the users will have the opportunity to download simultaneously educational and training material and supporting documents or software according to their needs.

Overall, the Rural Wings project aims to improve the **functionality, usability and acceptability** of future information products and services through the development of innovative models for the provision of learning services, fully exploiting the potential of **ambient intelligence technologies,** enabling **ubiquitous, interactive, personalized** and **tailored access** to **learning and knowledge on demand**. It will develop advanced learning schemes at school, at workplace and at home and will encourage lifelong learning, thus reflecting the needs of a knowledge-based economy.

The Rural Wings project's specific objectives

To perform an extended validation process and a usability evaluation during the development and integration to the final system of the technology, scenario settings and services that will be offered to the users. The goal is two-fold: a) to specify all the tasks (users' activities within the pilot scenarios) that are relevant to the Rural Wings system and to evaluate the users' task on job demands in terms of characteristics and context and b) to mobilise a large group of stake-holders to take-up the results and create a sustainable plan for exploit them, and to further explore the potential domains of their application.

To determine how the DVB-RCS platform will need to evolve in order to fulfil increasing user expectations and to compare this with current developments that are under way at the equipment manufacturers. The Rural Wings project proposes to develop innovative ways of implementing the DVB-RCS platform in order to demonstrate the huge potential of communication via satellite to the users in rural areas. The objective will be to select the most appropriate applications, and propose a roadmap up to the operational status including demonstrations and technical developments in order to promote and facilitate the use of satellite communications over Europe and beyond.

To create of a world-wide network of Learning Hubs in rural areas. These centres (in the initial phase schools, public offices and health centres will serve as Learning Hubs) will be equipped with the necessary infrastructure in order to support the project's implementation. These Learning Hubs' pilot sites will serve as working models and demonstration sites within which the project's activities will take

place. The Learning Hubs should not emulate traditional training centres. The Learning Hubs will be a place for digital creation, fostering the human spirit, civic development and collective efficiency. The tools available should be wide ranging, from computers, broadband access, digital cameras and a variety of supportive software tools (e.g. for creation of web-pages, video capturing and editing).

To introduce a new learning culture. The aim of this project is not to impose solutions but rather to empower people in all the stages of their life to invent their own solutions. The project is going to demonstrate the use of a new generation of technologies and applications that enable people to design, create, and learn in new ways, helping them to become more active participants in their communities. The aim is to empower rural communities to both use and generate knowledge that is relevant to their basic needs by developing their local capacity to use ICTs in a creative way that allows them to create sustainable rural livelihoods and improve their quality of life. The Rural Wings consortium will test these ideas and technologies in pilot sites around the world, helping individuals and communities to develop new strategies in their daily activities ranging from commerce to agriculture to health care – and, more broadly, to transform the ways they learn and evolve. The proposed applications are supporting a "constructionist" approach to life-long learning, by helping people take charge of their own learning throughout their lives.

To provide a range of learning methods that will enable users to become independent learners. The Rural Wings project targets several types of users. As each person has different ways of learning and understanding, the proposed competence-based scheme should provide a wide variety of instructional approaches. The proposed methodology has to support learners to work independently, co-operatively and in an increasingly self-organizing way. This will be achieved through the development of different educational scenarios (educational pathways) that will cover different contexts (Learning at School, Learning at Work and Learning at Home), users (students, teachers, doctors and health personnel, farmers, local administrators and public authorities) and will touch upon several subjects from different perspectives. The scenarios will attempt knowledge construction at several levels: (a) access to information, (b) adaptation of learning material, (c) knowledge sharing and (d) technology potential (depending on the usability and the features they offer) and they will enhance a factor that guarantees success in every educational approach: the "**fun factor**". The users will be involved in a series of "**learning to learn**" situations. As research in pedagogy demonstrates, successful learning can be achieved in authentic situations. Furthermore, very much related to constructivist learning theories, the learner should be encouraged to actively explore "the world" by himself/herself instead of adopting teacher-oriented approaches which are often based on the idea of "knowledge transmission". In the framework of the proposed activities, the users will be able to personalize a set of resources for reference and problem solving.

Provision of eLearning tools that can be used by all members of the local community who are in need of continuous training, education and support. Apart from the students and teachers, the local community members in need of such support include farmers, people in the tourist industry, small/very small businesses, etc. The key to the proposed framework lies in the decomposition of knowledge into independent, reusable "eLearning modules". This can be achieved by an efficient representation of knowledge in reusable modules by means of semantic mark-up and by devising algorithms that can efficiently match the requirements of prospective trainees to a sound combination of "eLearning modules". **Professional Development Portals** (PDP) will also be created in order to support the proposed activities and to act as stimuli for further communication between the user groups. These portals will be linked to relevant annotated documents, databases and interaction forums and will serve as a repository for locally produced materials, including archives of presented streaming sessions.

Utilization of the ICT capabilities for promoting the local community's interests. Special attention will be given to the use of ICTs to serve the local community's goals. The use of ICTs is expected to contribute strongly to the connection of the young people's education with real life in their community and the transformation of the Learning Hubs to communication centres for social and economic development. This will be achieved with the active involvement of the users (teachers, students, farmers, health personnel, local administrators) in the **organization/materialization of activities (scenarios)** that will demonstrate the benefits of the use of ICTs (self-training and learning, virtual and collaborative applications) for the local community and economy (e-shops for agricultural products, e-newspapers, weather forecast, etc.).

Enhancement of the communication between rural communities. The aim of Rural Wings is to create a **virtual learning community** where people will be encouraged to communicate and will get familiarized with the idea of cooperation and networking. The Rural Wings learning environment will be, among others, an integrated communication tool. People will be able to participate to video-conferences, to have electronic discussions with their partners on the problems, to learn about other countries and cultures.

Conclusion

In order for the Rural Wings project to meet its ambitious objectives a multidisciplinary team (satellite communications' providers/operators, software experts, telecommunications companies, experts in distance and lifelong learning methods as well as a large number of users' communities in Europe, Canada, Latin America and Africa) has been established. The consortium is bringing along significant expertise gained from the application of many related research and demonstration projects worldwide (RCST[2], TWISTER[3], ZEUS[4], MUSE[2], SCHOOLSAT[1], AMERHIS[1], BARRD[1], RIA[3], NMB[3], VERDI[1]).

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[2] ESA projects

[3] EC projects

[4] National Initiatives

THE SKYWATCH PROJECT, SUCCESSFUL CASE FOR COMMUNICATING EUROPEAN RESEARCH THROUGH A WEB-BASED LEARNING ENVIRONMENT

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Sofoklis Sotiriou, Elias Vagenas, Ellinogermaniki Agogi, Greece

Abstract

Within the scope of the SkyWatch[1] project were the organisation and realisation of an International Astronomy Contest concluding to a central European Exhibition and a Best Projects Award Ceremony, a series of distance learning courses (Interactive Popular Science Courses) and a series of science communicating events (Science Days). To perform project activities, young people were given access to an existing global network of remotely-controled robotic telescopes through the SkyWatch web portal. The young participants were prompted to organize teams and accomplish science projects, under the guidance and support of experts. The results and participation in the project's activities are presented and future perspectives for their continuation are examined.

Introduction – Objectives

The aim of SkyWatch project was to build on the youngsters involved in a series of science projects in order to create a virtual community of young prospective researchers promoting scientific culture. Through SkyWatch project the opportunity was provided to the European youth to access and use remotely robotic telescopes in real time, perform observations, analyze data and results and finally develop and suggest solutions and provide answers to selected research – scientific topics. This was achieved through the utilization of an innovative web-based learning environment, the project's web portal (www.sky-watch.org). The dissemination of the project's activities was also served through a European Science Contest on science topics and projects, some Interactive Popular Science Courses (IPSCs) and tools for distance learning, a series of communication events (Science Days) for the European youth, promotion of concepts and ideas of science of a multidisciplinary nature: physics, mathematics, statistics, chemistry, etc. The project through its science and technology advances has created a 'feel and interact' user experience, allowing for the development of an increased scientific culture adequately modulated to the needs and capabilities of each user.

SkyWatch did not act simply as a science demonstrator but primarily as an interactive and vivid initiative where users equipped with powerful real scale research tools are becoming the researchers, the seekers and finally the leaders of the scientific quest. The young participants were prompted to organize teams (groups of students) and design, develop and implement projects and activities with the use of robotic telescopes under the guidance and the continuous support of a team of experts in the field.

The concept and the results of the project in terms of publicity and participation in the contest, as well as opportunities that are raised for the future in the fields of science communication and teaching are presented below.

[1] The Sky Watch project was financed by the European Community, within the framework of Science and Society, FP6-2003-7-013609. The Sky Watch consortium is composed by the following partners: Q-PLAN (GR), EDEN – Open Classroom Working Group (UK), Astrophysics Research Institute – Liverpool John Moores University (UK), European Physical Society (FR), Ellinogermaniki Agogi (GR), Stockholm University (SE), SCIENCE PROJECTS (UK) and University of Duisburg – Essen (DE).

The SkyWatch Concept

SkyWatch project constitutes an innovative approach aiming at promoting increased public scientific and research culture. This approach targets to crosscut the boundaries between schools, research centres and science thematic parks and involve users in extended episodes of playful experience and scientific research. This target was reached basically through the deployment of two categories of initiatives involving mainly young people, an International Astronomy Contest and a series of science communicating events called "Science Days". Of course, the point of reference for the contest and the communication with the participants and the wider public has been the project's web portal, which has been developed and operating since March.

The SkyWatch Portal

The SkyWatch Web Portal (Figure 1) has been the main communication tool of the project and the basic platform for the contest operation throughout its duration. Essentially it functioned as an interactive learning and communication environment, informing the wider public on the activities of the project through the SkyWatch bulletin and newsletters and at the same time assisting the contest participants with online lessons, Q&A courses, an observation data library and an interactive help desk where they had the opportunity to be in continuous communication with experts in the field.

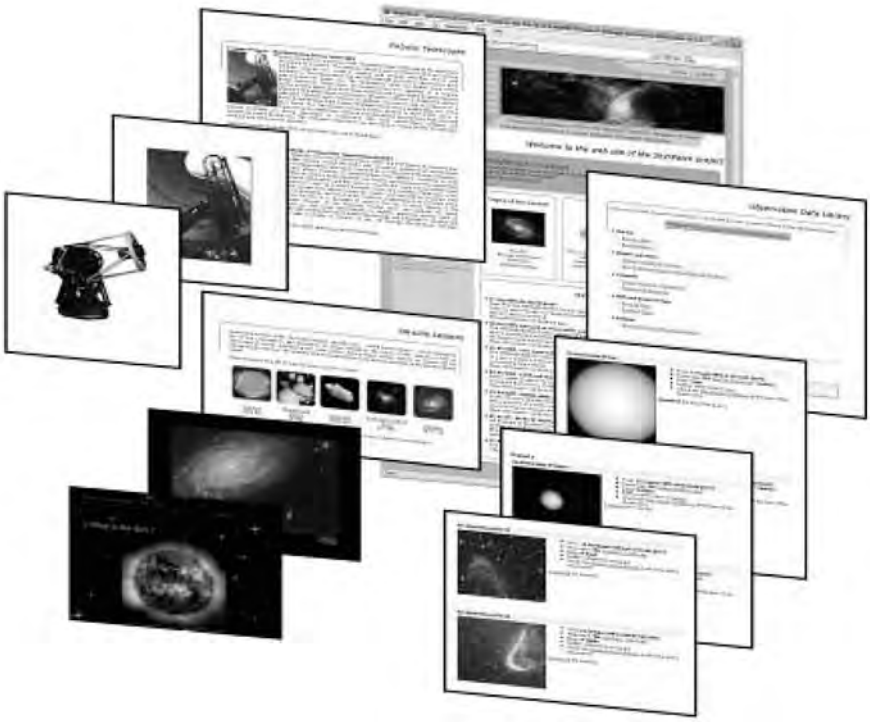


Figure 1. The SkyWatch Portal

A special section of the portal is devoted to the SkyWatch contest, providing all interested visitors with information about the contest topics and rules, tips for success, guidelines and example projects, the relevant registration and project submission forms, important dates and deadlines, and evaluation procedure and criteria.

The SkyWatch International Contest

The contest of the SkyWatch project was launched in April and lasted until the 30th of September. The contest addressed three age groups, which were defined according to educational level and perceptual abilities, as follows:

- Age group 1: Students < 15 years old
- Age group 2: Students between 15 and 18 years old
- Age group 3: Adults

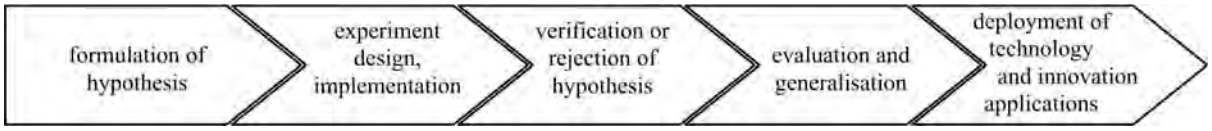
The contest topics, evaluation criteria and presentation format were common for each age group, but eventually the projects were evaluated separately for each age group.

The contest topics have been selected in order to cover the wider range of astronomical knowledge possible, but at the same time offer a fruitful research field to all participants, from children to amateur astronomers. Eventually there were 5 contest topics:

The Sun	Planets and Moons	Asteroids	Birth and Death of Stars	Galaxies
				
- Sun as a Star - Solar Rotation	- Characteristics of a Planet - The Characteristics of the Surface of the Moon	- Characteristics of Asteroids - Rotation of Asteroids	- Birth of Stars - Death of Stars	Characteristics of Normal Galaxies

The participants had to register in the contest and afterwards submit their projects, following specific rules that were published in the respective section of the project's web portal (www.sky-watch.org/contest-rules.htm). The evaluation procedure and criteria were also posted in the portal (www.sky-watch.org/contest-evaluation.htm) and were available to all the participants from the beginning of the contest.

The implemented strategy of SkyWatch contest should aim to demonstrate the procedure of scientific inquiry as a whole. Towards this scope, the SkyWatch scientific committee has defined the general basis upon which all the participating projects in the contest should be built:



Those steps were considered to be the first crucial factors of assessment. Furthermore, the SkyWatch scientific committee evaluated the contesting projects, according of course to their age group, based on 9 specific evaluation criteria (as published in the portal):

1. Narrative/structure,
2. Illustrations/layout/design,
3. Clarity of presentation,
4. Understanding: good use of facts and theory,
5. Use of SkyWatch data (from the portal observation data library),
6. Use of own (or found) data (images),
7. Creativity/originality,
8. The value of the proposed observations to the subject,
9. Overall impression.

Science Days – Interactive Popular Science Courses

Within the scope of SkyWatch, besides the contest, was the organisation and realisation of a series of events that would promote scientific culture and disseminate the project's activities. These events, called "Science Days", took place from May to November in several European countries and have contributed on one hand to the transfer of astronomical knowledge from experts, and on the other hand to the dissemination of the project's activities and contest to school students, researchers and the wider public. Lessons on Astronomy, lectures on the use of telescopes, live observations, experiments and hands-on experiments and constructions related to Astronomy were some of the activities that took place during the 25 "Science Days" that were realised from SkyWatch within the whole duration of the project, with a total of more than 2000 people attending.

The Interactive Popular Science Courses (IPSCs) were developed and linked to the SkyWatch portal in order to assist the visitors to check their knowledge on Astronomy and the contest participants to have additional backup for their projects. They were constructed in such a sense so as to follow the contest topics and different difficulty levels and under the concept of a distance learning tool. The SkyWatch scientific team selected and gathered material, which was reviewed by numerous professionals involved in the project, accepted by the consortium and linked to the SkyWatch web site as Q&A quizzes (Figure 2). Specifically, the resources for the questions were taken from numerous secondary and undergraduate university level physics textbooks. In addition, the NASA web site was utilized for information and confirmation. The textbooks were referred to, for example, to find different difficulty levels of questions for the users, as well as to find relevant information for a broad and structured inclusion of a wide range of topics.

Figure 2. The IPSCs' "Asteroids Easy" and "Planets Moderate" sections

The Science Days and the IPSCs served the project's goal for wide dissemination and science communication to a great extent, and additionally provided the project with feedback from the visitors.

Project Results

Overall the SkyWatch Web Portal has been visited by 4200 individuals from 53 countries all over the world since June 2005. 57% of them were from Greece, 10% from the UK, 6% from Germany, 3% from Switzerland, 3% from Poland, 2% from Hungary, 2% from Sweden, 2% from Romania, 1% from the USA, 1% from Bulgaria, 1% from Belgium, while 7% was from other countries of the European Union. The rest 5% came from various countries all over the world (Italy, China, Israel, India, Hong Kong, Brazil, Australia, even Iran and Indonesia).

Another interesting statistic regarding the visitors of the portal is the one concerning the page reference. 54% of the visitors have visited the page directly, while 27% visited the page following the www.sky-watch.org link from several web sites where this has been posted. This shows that the majority (81%) of the project's web site visitors, on one hand have already been informed about the project before they entered the portal, and on the other hand visited the portal on purpose and not by chance (e.g. searching the web for something else, similar in title, and got mislead to SkyWatch), thus were interested specifically in the project.

The interest and participation in the contest was great, since 95 teams comprising of 250 individuals from 30 countries have registered. Eventually, 53 projects have been successfully submitted in the 3 age categories.

The SkyWatch scientific committee ranked the submitted projects for each one of the evaluation criteria in a scale of 0-5, according of course to the respective age categories. The 53 projects were eventually ranked by the sum of ranks of the 9 criteria. In the second age category 6 projects were assessed as too interesting to be left out, while in the adult category only 2 projects were considered to be good enough to be awarded.

Analytically, the results of the contest were:

	Students below 15 years old	Students between 15 and 18 years old	Adults	Overall
Participated	23	55	17	95
Submitted	10	36	7	53
Awarded	3	6	2	11

The 53 contesting teams consisted of 78 persons and originated from 13 countries. In the first age category 16 individuals comprised the 10 teams, 7 of which were females and 9 of which were males. In the second age category, 21 females and 34 males formed the 36 teams, while 3 female and 4 male adults contested (Figure 3). The UK was represented by 18 teams, Greece by 12, Sweden, Hungary and Bulgaria by 4 each, Latvia, Israel and Bahrain by 2 each, while Switzerland, Russia, Poland, Italy and Estonia had from one contesting team each (Figure 4). The 11 winning teams were consisted of 8 females and 11 males originated from 8 countries (UK, Israel and Hungary had 2 winning projects each, the rest were from Bulgaria, Greece, Latvia, Russia and Switzerland).

Figure 3. The distribution of the contestants per gender

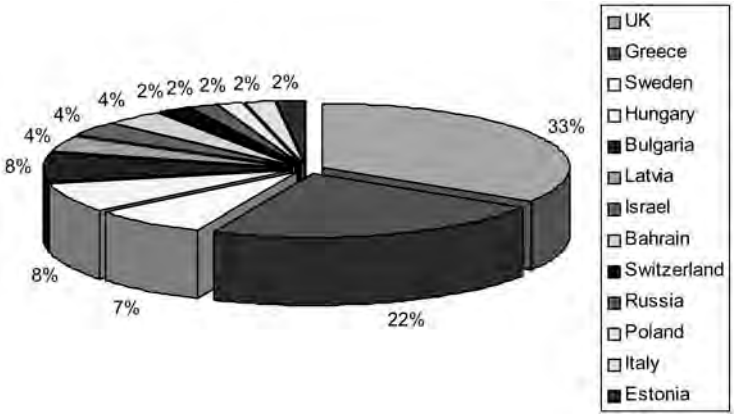


Figure 4. The distribution of the contestants per country of origin

All 250 contestants were granted free access to the Liverpool Telescope for one year, as recognition and reward for their effort. The 19 persons comprising the 11 winning teams (5 students below 15, 12 students between 15 and 18 and 2 adults) were all invited to participate to the SkyWatch final events in Athens during the European Science Week 2005, where they exhibited their work and were awarded personal telescopes from the SkyWatch team (Figure 5, 6).

Figure 5. The SkyWatch contest exhibition

Figure 6. The SkyWatch contest exhibition and awards ceremony

From May until November, 29 "Science Days" have been realised within the framework of the SkyWatch project. 24 of them have been realised in several European schools and institutes, while 5 were carried out during SkyWatch's final events, within the European Science Week 2005. These events are briefly presented in the following table:

Science Day description	**Date**	**Country**	**Participation**
Sun observation	12-05-2005	Greece	70 (students)
Sun observation and science experiments	22-05-2005	Greece	200
Presentation of the SkyWatch Project	23-05-2005	Greece	80 (students)
"Living in Space" lecture	31-05-2005	UK	50 (6-10 years old)
"The Dynamic Universe" lecture	30-06-2005	UK	120 (students)
"Astronomy with Robotic Telescopes" lecture	01-07-2005	UK	100
"Deep Impact" lecture and observing	05-07-2005	UK	40
"The Dynamic Universe" lecture	07-07-2005	UK	130 (students)
"Explore the Universe" lecture	08-07-2005	UK	100 (students)
Presentation of the SkyWatch Contest	12-07-2005	UK	180 (students)
"Astronomy with Robotic Telescopes" lecture	14-07-2005	UK	80 (students)
Presentation of the SkyWatch Project and Contest	15-07-2005	Bulgaria	50 (students)
"The Dynamic Universe" lecture	20-07-2005	UK	60 (students)
"The Dynamic Universe" lecture	21-07-2005	UK	100 (students)
Presentation of the SkyWatch Project and Contest	22-07-2005	Bulgaria	50 (students)
"Journey into space" lecture and observing	9-08-2005	UK	40 (6-10 years old)
Perseids Shooting star observing	13-08-2005	UK	30
"Rocketry" science experiments	30-08-2005	UK	30 (6-10 years old)
The Observatory Science Centre Astronomy Festival	9/10/11-09-2005	UK	80 (adults)
Annular Solar Eclipse observation	3-10-2005	Greece	100 (students)
"The Dynamic Universe" lecture	10-10-2005	UK	50 (students)
"The Dynamic Universe" lecture	15-11-2005	UK	30 (students)
"Astronomy with Robotic Telescopes" lecture	23-11-2005	Greece	50 (students)
Hands-on Astronomy	24-11-2005	Greece	30 (students)
Science experiments	25-11-2005	Greece	40 (students)
Sun observation	26-11-2005	Greece	30 (students)
SkyWatch exhibition and workshop	26-11-2005	Greece	300
"Explore the Universe" lecture	9-12-2005	UK	70 (students)
"Explore the Universe" lecture	5-1-2006	UK	40 (students)

All the above indicate that the publicity of the project was very fruitful, both in terms of wide and disperse dissemination, as the project reached both genders in several countries, age groups and educational levels, as well as in terms of direct impact to the communicated parties.

Activities after the ESW 2005

The main objective of the SkyWatch project is to develop an innovative pedagogical framework that attempts to blend formal and informal learning, proposing an educational reform to science teaching. The scope of SkyWatch is to consolidate this framework by continuing its activities even after its official closing.

Under this scope, SkyWatch has been in close collaboration with another Astronomy related project, which is based on the same framework. *The Discovery Space (D-Space)* project contributes to the access to and sharing of advanced tools, services and learning resources, not only between schools but also among science parks and research centres. The project aims at the deployment of a virtual science thematic park that will connect schools, universities, science museums and parks with a network of robotic telescopes around the world. It is building on this aim as it brings to students, teachers, researchers and individuals (amateur astronomers, visitors of science parks) all around the world the opportunity to use remotely controlled robotic telescopes in real time giving accessibility to unique resources. The D-Space service is already running through a web based tool (www.discoveryspace.net) that gives the opportunity to the user to utilise observations through the network of telescopes and also to get access to the D-Space data base (images, learning content, library etc.).

The D-Space service can be considered to be the basic infrastructure tool that the SkyWatch project was based, and expand the activities of it both in terms of the extent of the robotic telescopes network, as well as in terms of the fields of exploitation of the service as the SkyWatch could be consider as one of the services that the D-Space will provide. Through the D-Space service, the SkyWatch aims to communicate further the idea of the utilisation of international astronomy contests using robotic telescopes via internet in order to establish it in an annual basis. The results of the contest regarding participation and level of submitted projects were very encouraging, and it is the project consortium's belief that such an initiative will have even greater response and success as a confirmed annual happening.

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EUROPEAN NET-TRAINER – A EUROPEAN COLLABORATION ON TRAINING ONLINE TRAINERS

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Introduction

In this paper results and experiences from two European projects are presented, which were promoted within the framework of the Leonardo da Vinci II program. Both projects aim at the development, realisation and sustained establishment of a European training for online trainers, the "Net-Trainers training". The training is based on a common European job-profile and training framework developed by a partnership of 9 European countries and practises a model of European certification.

The paper describes the achievements of the first project as well as the aims and the expected results of the running project. It outlines the Net-trainers training with its European Dimension and focuses on the efforts taken to strike the balance between standardisation and diversity, when it comes to common guidelines and certification. Finally success factors of collaboration in European project teams are qualified.

The Net-Trainers Projects

The General Idea

On the Lisbon summit in the year 2000, the European Union heads of the government came to the conclusion that the future depends on the competitive ability of Europe, whether it succeeds carrying out new educational policies covering e-learning as well as lifelong vocational further education. The advancement program of Leonardo da Vinci II aims at increasing the quality of vocational education particularly by using new technologies.

The integration of e-learning into traditional training environments, however, requires trainers that are qualified in using new electronic technology to design efficient learning environments and to provide stimulating and facilitating support to learners. The project Net-Trainers focuses on the need to elaborate the vocational profile of trainers especially in the field of web based training.

The rare examples of training for online-trainers existing at the beginning of this century are neither subjected to a European harmonisation nor do they have any official validation based on a framework of reference of precisely defined competencies.

The general idea of the Net-Trainers projects is to develop a training for online-trainers that is (a) based on a precise framework of competencies and (b) derived from a job profile harmonised within different European countries. A common European certification developed in the first Net-Trainers project enhances the working mobility of trainers amongst Europe.

The Net-Trainers I Project

Eight partners from five different European countries formed the body of the first Net-Trainers project (October 2002 – March 2004). Three of the partners were intended as course providers, two other partners concentrated on evaluation of the project and the pilot course, one partner for dissemination and one technical partner.

The project was divided into three operating phases: (1) development of a common job profile and a training framework on the basis of a needs assessment (2) development and realisation of a pilot training (3) European certification.

The major results of this project were (1) a common job profile for online-trainers on a transnational level (France, United Kingdom, Germany), (2) a common training framework of learning objectives and training method for the net-trainers training on a transnational level, (3) contents and learning activities for the net-trainers training in three languages (French, English, German) according to the common training framework, (4) a common learning management system that enables learners to take the course and access different language versions, (5) development and the promotion of a European certificate for online trainers (European Net-Trainers Certificate, ENTC), (6) evaluation results of the pilot course and a revised version of the course according to these results, (7) set up the European Net-Trainers Association (ENTA) that delivers the European certificate, promotes the training and ensures its development.

Since the pilot training in the year 2003 the European Net-Trainers course was started already six times by the French and German partners. Numerous participants made use of the "Europath" that is they changed the national course provider during one course module. The European dimension of the course seems to be less attractive in Great Britain, where the course could be started only twice so far.

The Net-Trainers II Project

The Net-Trainers I project was very well evaluated by the European Commission and especially the efforts made in terms of achieving a European certification have been appreciated. Numerous contacts and inquiries of online course providers from other European countries underlined the need and interest in offering qualifications that are harmonised on a European level.

Due to these experiences the subsequent Net-Trainers II project was designed and started in October 2005. A goal of this project is the extension of the existing European Net-Trainers network, the adjustment of the job profile and revision of the training framework as well as the dissemination of the course to six new European countries and languages.

The Net-Trainers II project partnership consists of 15 partners from 13 European countries. The course providing partners from the Net-Trainers I project act as consultants for the new training providers from Denmark, Poland, Czech Republic, Italy, Spain and Bulgaria. The technical partner from Greece who has been already involved in the first project is hosting the common training platform.

Partners from Hungary, Romania, the Netherlands and Germany form the advisory board of the project.

The project is organised in four phases: (1) Broadening the frames of reference concerning the job-profile and the training of online-trainers according to the needs of the new countries involved, (2) Development of the Net-Trainers training in the 6 new partner countries, (3) Running the pilot training, (4) Evaluation of the pilot trainings and documentation of the transfer process.

The project partners aim at the following results: (1) Updated common job profile, valid in 9 European countries, (2) Revised training framework based on the job profile, (3) Contents and learning activities for the Net-Trainers training in six more languages (Danish, Polish, Czech, Bulgarian, Italian and Spanish), (4) Pilot training in the six new languages in parallel to the regular training of the three already existing versions, (5) Results of the evaluation of the pilot trainings and documentation of the transfer process, (6) European Net-Trainers Certificate that is based on national certificates from nine European countries.

The European Net-Trainers Training

The course 'European Net-Trainers' targets educational personnel in public and vocational training institutions. Trainers from the field of vocational further training and educational specialists from schools and universities are likewise addressed. The course is conceived in a way that most different professional fields are considered and participants are able to apply the acquired knowledge directly to their field of activity.

The Net-Trainers course aims to train and qualify online- and blended learning trainers. The trained trainers are able to develop, establish, manage and deliver online- and blended training.

Contents and Methods

The Net-Trainers training consists of 5 modules addressing the following topics:

Module 1 The first steps in Net-Training

Learners are introduced to the learning environment and the basics of online learning. They get to know each other and their tutors.

Module 2 Concept and challenges of Net-Training

This module explores the principles of Net-Training, considering how it can enhance the learning experience, and how e-learning models differ from other delivery models. Issues and challenges are explored, in the context of a changing world where technology and attitudes to it are changing fast.

Module 3 Tutoring Net-Learners

This module considers how the needs of learners are met when they are taught at a distance, using technological means. Participants gain understanding in the support of individual learners, and the management of online collaborative groups. Participants explore the policies and strategies needed to deal with particular situations – learners with special needs, discord within groups, unethical behaviour.

Module 4 Designing Net-Learning materials

This module focuses on how to collect, adapt, create and organise the different types of training materials that are necessary for Net-Learning. Participants are taken through the steps they need to take to develop an e-learning specification.

Module 5 Developing a Net-Training project

In order to develop e-learning that will work, it has to be properly resourced, and must have the support of others, including managers. This module provides a framework to enable participants to plan their implementation strategy and identify the resources – human and technological – they will need for the successful implementation of an online-learning project.

The training framework defines 7 key principles that are valid in each language version of the training: the course is delivered entirely online using mostly asynchronous communication to allow as much flexibility as possible. This is especially important to allow participation across national borders without expensive and time-consuming travelling. Learners are provided with intensive tutorial support to acquire the skills corresponding to the learning objectives. The training is based on a constructivist approach and applies methods like contract learning, experiential learning, project based learning and collaborative learning.

The European dimension of the training derives not only from its origin but is also an important offer to the participants of the training.

Providing Learners with a European Dimension

Two different aspects of the European dimension are especially interesting for future Net-Trainers: on the one hand employment chances can be increased by a qualification that is approved in different countries. On the other hand experiencing different ways of e-Learning accomplishment in other countries extends their personal instructional repertoire.

Learners experience the European dimension of the Net-Trainers training in different ways:

1. In a dedicated learning unit participants are provided with learning materials on online learning in different countries and compile a comparative overview.
2. In a discussion forum that is available to all learners of all national course providers (European Forum) the participants can get in contact with participants of the other national courses. They are invited to discuss topics related to online learning on a transnational level.

3. All national courses are implemented on the same learning management system and are accessible to all learners. Only the exchange within the national learning groups takes place in private forums.
4. Participants of a national Net-Trainers course are allowed to take one module with one of the other European course providers. The learner leaves his/her national group for the duration of this module and becomes a member of a learning group of the partner. Thus the participant experiences different ways of teaching and learning online. He or she gets a chance to collaborate with colleagues from the foreign country and to gather new professional impressions and perspectives.

The experiences made with the European learning path are very positive so far. The integration of the guest-learners into the new learning groups took place smoothly and was rated very positively by both sides. Participants who dared the step into a "foreign module", returned pleased and full of new impressions to their own learning group and reported on their experiences and observations. Also participants of the learning group that was hosting the "exchange student" were excited by the experience.

The previous experiences show that the decision to take the "European learning path" depends mainly on the learner's language skills. While numerous participants from France and Germany decided to take a module with the English project partner, the interest of British participants in participating actively in the Europath is very low. Nevertheless, British learners are highly interested in an exchange with "exchange students" they are hosting from other European countries. The European Forum is used equally by English, German and French learners.

Standardisation and Diversity

The European Union unites countries with different educational systems and educational traditions. Inevitably, learners have considerably different learning biographies and learning habits.

Striving for standardisation, comparability and more transparency in the training systems in the European Union is beyond doubt indicated. At the same time it is a challenge and a goal to preserve national and cultural diversity. Cultural differences should not be regarded as a deficit, that have to be eliminated, but as enrichment for a more general European culture. Coming from this self-definition both Net-Trainers projects try to strike the balance between standardisation and diversity.

Already in the first project the project partners agreed to standardise the following aspects:

1. The seven key principles of the training as a common guideline for instructional quality.
2. The job profile as a basis for common qualifications that allow for mobility of trainers between different European countries.
3. The training framework with its set of obligatory objectives to ensure mobility and methodological standards.
4. The definition of learning objects to facilitate exchange of learning materials between partners.
5. A common European certificate and equal award of ECTS-credit points in different countries to enhance transparency of certification.

Diversity on the other hand is enabled by the following decisions:

1. The openness of the training framework to additional objectives that allow national providers to address qualifications that are demanded in some but not in all countries.
2. Learning contents and learning activities may be translated from other partners if this seems suitable to the national course provider. In general, however, course providers are free to use learning contents and learning activities they feel are appropriate to enable their learners to achieve the respective learning objective.

3. Each course provider is free to realise tutorial support according to the standards of his/her organisation within a given set of rules for professional tutoring.
4. The administrative workflow and pricing of the course depends on the providers approach and conditions of the national market.
5. National certification is subject to national rules and regulations.

Collaboration in a European Project Team

A distinctive feature of European projects is the multinational and multilingual composition of project teams. As a result, motives and expectations on collaboration and project results, the understanding of key concepts and even working styles may differ considerably between project partners at the beginning of a project. Moreover, partners are integrated in different legal and administrative contexts. It is the challenge of the coordinating partner in European projects to enhance and facilitate purposeful collaboration under these conditions not only during the official and granted project time but also before and after this period.

Experiences of both projects have shown that in the pre-project period it was important to elaborate the detailed project idea together. It can be described as a dialectical process of adjusting the partnership to the requirements of the project on the one hand and revising the project ideas to benefit from the specific potentials of the partners on the other hand. This process turned out to be crucial for developing a common understanding of the key concepts and aims of the project amongst all partners.

Virtual collaboration between persons from different countries and vocational backgrounds is susceptible to misunderstandings. Therefore it is essential during the project duration to have regular face-to-face meetings and to visit as many partners as possible. Experience has shown that face-to-face meetings are the most reliable basis for trustful international cooperation. However the bulk of work is accomplished in virtual teamwork. To make virtual cooperation effective it is necessary to agree upon a set of binding communication guidelines and project management rules. It is crucial to stay in regular contact.

It is especially challenging to keep the partnership alive beyond the official end of a project. In the Net-Trainers I project this was made possible by the fact that the project resulted in a commercial product, the Net-Trainers course. This course is accomplished individually by each provider, the European learning path, however, requires co-operation amongst the partners. As being particularly important proved the establishment of a common controlling body, the European Net-Trainers Association (ENTA), which owns the Net-Trainers kite mark, is responsible for the development of the common training framework and the assignment of the common European certificate. The European Net-Trainers Association is viable without any funding and ensures the sustainability of the project results from both Net-Trainers projects.

Currently ENTA is in contact with four more national providers who want to provide the Net-Trainers training in their countries after the successful end of the Net-Trainers II project: Greece, Romania, Slovakia and Hungary. ENTA will then be able to apply the “lessons learned” and the transfer guidelines from the Net-Trainers II project to go on with the successful extension of the consortium.

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INTERACT – THE DEVELOPMENT OF A SUCCESSFUL ADULT LEARNING MODEL AND INTERNATIONAL COLLABORATION USING AN ONLINE LEARNING PLATFORM

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InterAct – Developing new basic skills at the workplace through the Use of Internet-based problem solving role-play, a Leonardo da Vinci Project

InterAct is a Leonardo da Vinci project co-ordinated by the Norwegian Institute for Adult Learning (VOX), with a partnership from Norway, Romania, Spain and United Kingdom. In each country, the project team is made of an educational institution on one side, and companies representing Tourism&Accommodation and Health&Care on the other side. The project focuses on developing, testing and releasing a didactic model for improving the New Basic Skills at the workplace: language and communication skills, teamwork skills, ICT skills and familiarity with the internet, intercultural awareness, along with entrepreneurship and motivation. The target groups from the two sectors are represented by working people who need to improve such skills in order to avoid/overcome marginalization and advance in their carriers – unqualified/less qualified workers, immigrants etc. The project started in October 2004, and its planned activities cover two and a half years.

At the moment, the InterAct team have already developed the model and tested its applicability in both sectors mentioned above. The intermediate results are extremely encouraging and the conclusion half way through the project is that the team have actually developed two successful models of international collaboration through the use of an online learning platform: the collaboration model of the target groups and the collaboration model of the project team. Both models and their benefits are presented below.

InterAct – the benefits of international collaboration through online problem-solving negotiation for workers needing to improve their New Basic Skills

The InterAct model

The model of role-play simulations has already been proven effective in classroom based education. InterAct imports it and adapts it to adult learning at the workplace and at an international scale. Groups of beneficiaries from different countries, accompanied and guided by InterAct tutors, are given a role and are presented with a problem relevant to their field of activity. Together, using an internet-based online platform they must work together and reach a solution. The online platform used is a simple tool, which allows for mail conferences, creation, organization and exchange of documents, selective reading/writing rights to the various users, staged release of information etc. In principle, a "simulation" round is designed to take one working day/week for 5 weeks and is structured as follows:

- Step 0: All groups meet each other online and are presented with a role. They learn how to use the platform for communication, creation and exchange of documents, they introduce themselves and start interacting at international level, they become a team by developing their role through national-based negotiations and using information/images found searching the internet.
- Step 1: The national teams are presented with a situation and are given the task to produce a set of national-based results to be uploaded on the platform for the other teams to consult and comment on.
- Step 2: The national teams are given the task to work together as one international team and produce a common result starting from the previous productions.
- Step 3: The international team are presented with an unexpected problem and are asked to negotiate among themselves in such a way as to reduce their production by a given quantity (which is never a multiple of the number of national teams, thus stressing even more the negotiation component).

- Another version for negotiation is to ask the international team to produce a power point presentation of the final product, but each national team must present another national team's work and not its own.

- Step 4: Each group must evaluate and rate the work of the other groups as contestants in a competition (e.g. the best power point presentation). They also give each other feedback.
- At the end of every step, there is usually a debriefing session where the participants reflect on what they have experienced and learnt that day. The online platform represents a record of the work, the communication and the debriefing.

To exemplify from the InterAct test rounds so far, the Health&Care participants from the four countries had to develop together a European campaign to educate parents how to take better care of young children's diets. The Tourism&Accommodation participants from the same countries worked together to develop a joint team-building package for a group of imaginary tourists. In both cases, the participants got so involved in the activities that they often forgot they were solving a simulated situation. The work and communication were intense both within each national team and internationally, made possible by the use of the simple online platform allowing for basic mail conferences, creation and exchange of documents.

The benefits of the InterAct model for the participants

The InterAct "simulations" are designed in a way that allows for the practice a wide range of skills. The uniqueness of each individual is a key consideration in the model – the teamwork allowed for each participant to contribute with their strong points and to work on their weaker ones. At the same time, the specificity of each team's cultural background and work situation was addressed, as the tutor in each team had the freedom to adapt the national activities to suit the relevant context, while making the international collaboration under a common denominator possible. Thus, one of the strongest points the model can be credited with is its flexibility. The following skills were practiced and improved by each participant in varying combinations specific to both their individual and their cultural profiles:

- Language skills: use of English, language appropriateness (register and style), language mistake as communication blocker vs. communication strategy;
- Communication skills: offline and online communication, negotiation strategies;
- ICT skills: how to create a word document, an html and a PowerPoint presentation, how to search the internet, save, copy-paste, upload/download, how to organise files in folders, how to check/write/reply to mail, how to use an online platform and give selective reading/writing rights to other users;
- Teamwork skills: complementarity and inclusiveness, sharing the workload, leadership control;
- Intercultural awareness: to notice and decode how different people from different countries live, think and feel through how they choose to express themselves;
- (Self-)assessment: how to evaluate, reflect on and comment on the learning that has taken place, both individually and as a group (the online platform providing a very useful record of what was said and done);
- Motivational: empowerment, involvement, entrepreneurship and motivation at the workplace, creativity and imagination (fostered by a safe degree of anonymity), having fun while learning and working.

As results from the test rounds until now, from the record of communication provided by the platform (especially the debriefing mail conferences), from the evaluation questionnaires and focus groups, the beneficiaries were greatly pleased with the whole experience, with their productions and with their learning curve. Many participants had a hard time rating what was most important to them, but generally it seems that the intercultural component was one of the main motivating factors. All the participants had a good time and were sorry when the scenarios ended. It is perhaps relevant to stress here that, although such scenarios can be easily set up at a local scale, the use of an online platform is essential at international level.

The potential of the InterAct model for further learning and international collaboration

In light of the InterAct experience so far, the model seems to have great potential in the case of institutions and companies where workers need the opportunity to develop their New Basic Skills, to improve their team work and to generally build an atmosphere of entrepreneurship and creativity at the workplace. The choice of the online platform to be used may vary depending on complexity, costs, etc., and the InterAct partnership in now exploring the use of the more and more popular free platform Moodle.

Concurrently, the model and the use of an online platform can be used by institutions and companies to set up both learning and business partnerships across borders. Employees who, for various reasons, have not had the opportunity to develop these skills increasingly important nowadays could become more involved and contribute at the workplace in a more empowered and motivated way. Moreover, the same model can be applied to inter-disciplinary, cross-sectorial collaborations – as the InterAct partnership already illustrates (Education + Tourism&Accommodation, Education + Health&Care; state-governed institutions + non-governmental organizations + private companies). Finally, the actual themes and content of the communication and work may go beyond the learning scope of a fictious scenario, but be anchored in real life and work situations as well.

InterAct – the benefits of the online ICT component for international collaboration in terms of project management

The InterAct project started as many projects do, with the writing of a proposal, its approval and then a kick-off meeting organized by the project co-ordinators. However, from the beginning of its implementation, it has become evident that a successful model of international collaboration was being developed. At the 4th project meeting (in Sweden, January 26-29, 2006), the ingredients of the InterAct teamwork were discussed in relation to the online component of the collaboration.

Consequently, the following aspects are worth mentioning:

- The online platform greatly eased the implementation of the project, making the project stages easier to undergo, follow, quantify, document and report. The project team used the mail conferences and the document sections to negotiate and create together the didactic model and the scenarios to be tested. All the documents relevant to the project (proposal, budget, calendar, etc.) were handily uploaded on the platform and referred to whenever necessary. Conventional e-mailing was generally used for administrative issues, leaving the core of the content-based communication to be done on the platform. Thus, it has been much easier for the team members to go to the platform rather than search through inboxes filled with emails on many differing issues;
- The constant online communication and creation of documents, combined with the face-to-face meetings twice a year helped to continue and to build the relationships started at the kick-off meeting and enhanced the friendly atmosphere, which, in turn, made the communication easy and the work pleasant. Work on the platform also helped to create a sense of collective creative buzz and a sense of identity as the “InterActors”;
- The online platform facilitated a project leadership founded on inspirational role-modelling and became the framework of a decision-making process based on democratic inclusiveness and sense of responsibility;
- The existing platform and developed scenarios were first tested by the project team themselves and adjusted accordingly before applying them with the beneficiary participants. (Also, the used platform was proven very flexible in terms of organising files and folders, organising topics for communication, creating user accounts with selective reading/writing rights.)

To sum up, the introduction of the online ICT component as a part of the actual project work made it possible to better focus on bringing a common vision to life while enjoying an excellent working relationship based on flexibility and creativity. The development of such a collaboration model in the InterAct project encouraged the project partners to proceed with a similar approach when embarking on future projects.

Final remarks

InterAct offers both a didactic model of adult learning for improving the New Basic Skills and a model for teamwork at an international level. The target for the didactic model is represented by those people who are not proficient in English, ICT skills, use of internet, intercultural awareness, etc., but who could and, if given the chance, would contribute creatively at their place of work. The learning and collaboration aims are achieved through the use of a simple online platform connecting the players from the various countries. Concurrently, the same online platform is proven to be highly instrumental in the implementation of such an educational project. To conclude, it seems that the latest developments in technology, namely the development of ICT and online platforms, make new, innovative approaches in adult education and international co-operation not only possible, but very efficient, bringing people together and enhancing both their motivation and their ability to work together creatively.

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A STUDY FROM RUSSIAN FEDERATION: THE OPEN AND DISTANCE LEARNING COMPONENT IN "DEVELOPMENT OF EDUCATIONAL LINKS AND PROFESSIONAL AND HIGHER EDUCATION INITIATIVES – PHASE II" (DELPHI II)

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Delphi II and the Open and Distance Learning Component

"I took a speed-reading course and read *War and Peace* in twenty minutes. It involves Russia" – so goes the joke by Woody Allen. With this mind, and not trying to fit in 6 small pages all the activities, results and success stories of the EC-sponsored Delphi II project in the Russian Federation, the author will describe (no speed reading required) the main highlights of the project's Open and Distance Learning (ODL Component) and, by doing so, perhaps elicit interest amongst EDEN audiences to find out more about Delphi II and its future possibilities.

The following text is divided into 5 parts: the background or Delphi II; some of the problems the Component encountered; the achievements – in particular regards competency systems and sustainability; room for improvements; and, final remarks.

Background

Delphi II (Development of Educational Links and Professional and Higher Education Initiatives – Phase II, project number 2002/031-818), a 36-month initiative contracted from December 2002 till December 2005, operated in Moscow and 7 Russian regions (Komi Republic, Novosibirsk, Samara, St Petersburg, Sverdlovskaya Oblast, Volgograd, and Voronezh). British Council led Delphi II Project management and all actions by the international consortium, involving the Open University of Catalonia (Barcelona, Spain) and Fontys (Netherlands).

Delphi II's wider objective was: "To bring the supply of education and training closer to societal demand by developing continuing training and pursuing quality in and access to, the Russian education system, notably in the fields of VET, management training and open and distance learning." The specific objectives of Delphi II ODL Component are described below.[1]

"Five previously established Regional Centres for ODL have become a resource for widened access to continuing training and methodological development. Policy recommendations relating to key areas of ODL and stemming from the implementation of Delphi are made to the Ministry of Education and Science". The complex set of outputs included:

- Development of marketing plans for the 5 Regional Resource Centres (RRCs)[2] that focus on the needs of individual RRCs and reflect the need to sustain the RRC network after the Delphi II project has finished.

[1] The other *three Components/objectives* were: A) *Policy Component:* Policy of the Ministry of Education (MoE) of the RF integrates innovative practices at regional and federal levels in the field of Competence-based VET, relations between companies and training institutions developed, sustaining ODL resource centres and social dialogue: B) *Management Training Component:* Local management training institutions have diversified and modernised their portfolio of high quality post-experience management training services in line with the needs of the business community: C) *VET Component:* A partnership develops between the education sector and social partners so as to ensure an outcome and competence-oriented modernisation of vocational education and continuing training at federal, regional and school levels has been established.

[2] The RRCs in each region are: 1) *Samara*: Region: Samara Information Technologies Lyceum, Samara Region Vocational Education Center, Samara State Aerospace University; 2) *Saint Petersburg*: North West Polytechnical University; 3) *Novosibirsk*: Novosibirsk State Technical University; 4) *Sverdlovskaya Oblast*: Ural State University, 5) *Komi Republic*: Syktyvkar State University; 6) *Voronezh*: Voronezh Institute of High Technologies; 7) *Volgograd*: Volgograd State University; plus cooperation with *Moscow*: MIEM Distance Learning Centre.

- Improvement of the strategic, developmental and methodological capacity of the RRCs to be recognised as state of-the-art ODL institutions in their regions and beyond.
- Beside the horizontal dissemination activities, identification of two new institutes/centres (one in each of two new regions) for inclusion, as appropriate, in the dissemination of the Delphi process, know-how and developments.
- Completion of the competence-based profiling of ODL specialists according to internationally comparable criteria and, as appropriate, the dissemination of information on this area to the wider Delphi stakeholder group, and the making of policy recommendations at a federal/regional level.
- Delivery of advice to policy-makers at federal level aimed at assisting with the issue of the protection of intellectual property rights.
- Creation of links between Delphi and other relevant projects to ensure that the lessons learned from Delphi are incorporated into other projects being implemented in the field of ODL/e-learning.

Problems

But complicating these already challenging set of project objectives were difficulties at the RRC level, namely: the time gap between the end of Delphi I and the beginning of Delphi II (almost 2 years) resulted in a loss of project continuity; in addition, some RRCs underwent changes in key personnel and host university direction, which constrained both the RRCs' Human Resource capacities and the kind of RRC offers that could be developed for the region.

At a macro level, there were problems developing an ODL system in Russian Federation: on the one hand, existing licensing regulations, accreditation requirements, quality evaluation procedures for institutions of higher education did not contemplate ODL; on the other hand, the changes in public administration personnel and ministry leadership tended to compound the tendency for preferring top-down, normative-based, supply-driven solutions to education and training problems.

The following describes more specific challenges to build RRC sustainability during the project's lifetime:

- After series of technical audits and analyses of the differing situations and capacities in each region in 2003, questions were raised how RRC sustainability could be achieved. Sustainability was not going to be accomplished if each RRC were to work separately at the cost of leveraging human resource capacity through a network.
- The focus on quantities in the RRC's portfolio of resources (20 publications, teaching aids, courses…) worked against the longer term goals of sustainability: to produce one-off content (12 courses) would spread resources too thin and any EU-led training to improve the strategic, developmental and methodological capacity of the RRCs would likely remain superficial.
- Terminology/Attitudes: there was not a clearly articulated or understood definition of two terms – "Open and Distance Learning (ODL)" and "e-learning" and this led to confusion among participants and stakeholders about what a Regional Resource Centre, focusing on ODL, is and does. RF legislation referred throughout to "distance learning", which does not cover the complexity of the topic, and instead helped produce unintended consequences such as creating RRC dependencies on international vendors that sell IT training courses and platform solutions for e-learning. In addition, a) the RRCs and stakeholders too often underestimated the use of appropriate technologies, such as TV and radio and print, and too often equated complex and costly technological delivery with a more sophisticated, modern and effective education and training process; b) the perceived costs involved in setting up an ODL program were therefore already too high to begin with for stakeholders, and so the chance for establishing demand-driven social partnerships (embedding ODL in regional development) suffered. The result – negative attitudes towards ODL perpetuated themselves: ODL is too pricey, too high tech and is still a second class option compared to those available in the current RF higher education and training system.

Achievements

The Component unfolded in 4 stages: 1) 2003 – April 2004, with technical audits and assessment of training needs in each region; 2) May – December 2004, with EU-led training on building network capacity, marketing, and virtual work group processes: key inputs here were a series of 7 EU-led training sessions and a two-week study tour in UK; 3) January – June 2005, with RF ownership over the results becoming internalized through learning by doing experiences, opportunities for attitudinal change, and inter-regional collaboration; and 4) July – December 2005, with the RRCs finishing all work through peer review, revision, and the extraction of best practice using a range of communication techniques, including virtual work groups and 2 videoconferences.

Highlighted in continuation are the ODL Component's main project results, which together have paved the way for post-Delphi II RRC sustainability:

Marketing plans

A roadmap for post-Delphi II sustainable Regional Resource Centers was developed, based on 5 individual RRC marketing plans, which pinpointed the key management and marketing success factors and showed the steps for developing high quality, demand-driven education and training resources, and support services.

Strategic, developmental and methodological approach improved

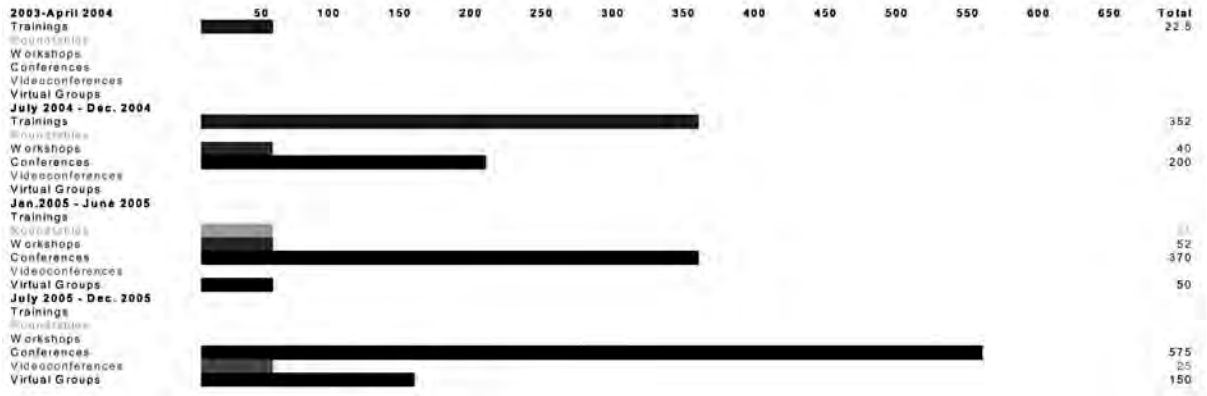
These results include best practice and specifications on: 1) *ODL for Diverse Audiences* (methodological mix); 2) the *Strategic Management of Electronic Resources* (digital libraries); 3) the joint repository of RRC resources; 4) the development of a electronic portal of VET resources, in synergy with the VET Component, showing the results of the bottom-up approach for building modular-based content that relates to sector-evaluated competencies;[3] 5) improvement of ODL and e-learning skills thanks to the virtual work experience; 6) and a replicable set of good practices and quality approaches, complemented by over 20 publications, teaching aids, and 5 advisory services (where each RRC contributed its "parts" to the network "whole", thus avoiding duplication of work).

Induction of two new RRC centres into the network and dissemination of Delphi process and know-how

Not only did the 2 new regions – Volgograd and Voronezh, after joining the network in December 2004, participate in all Component work in 2005, both amplified the results of Delphi II throughout their regions. Plus, there was strong dissemination at relevant forums, seminars, conferences, including the Final Regional Seminars in all 7 regions, as well as ongoing promotion of results on the Delphi II website at http://www.delphi-project.ru.

Below is a table showing Delphi II participant workdays by ODL event and by period, which reflects the shift from an input-driven Component to one where RRC ownership over the results led to increased dissemination, inter-regional collaboration, and engagement with stakeholders.

[3] The VET school teams (including key social partners) initiated a modular, competency-based curriculum in the following sectors: Lift maintenance; Blacksmith; Cooks; Electrical/electronic projectionist & multimedia; Engineering Tech; Gas welding - building construction, welding, turning; Chemical analysis; Garment manufacture; Automotive servicing; Retail service (clothing & design); Catering , table service & communication; Construction wall finishing.



Completion of work on ODL Competencies

The RRCs developed a replicable process for identifying, describing and assessing 7 competency-based job profiles in the ODL and e-learning fields in RF: tutor, content developer, project development adviser, technical support administrator, marketing manager, specialist in quality control and staff development, and student support service administrator. Policy Recommendations, based on peer review and testing among ODL practitioners, were also drafted and delivered to regional and federal authorities.

Basing their work on international good practice and professional standards, the RF team were careful to adapt these international definitions to fit the specific RF system, with its differing accreditation and assessment norms, and its differing set of professional standards and nomenclature for jobs. Each unit of competency, with 3 levels of mastery (basic, advanced, proficiency) in each, plus the corresponding assessment criteria, were reviewed and tested by an inter-regional team of specialists. The result, which also includes a step-by-step Best Practice for taking this work further, outlines recommendations for developing modular courses that match the units of competency in each job description.

Delivery of advice to policy makers on IPR

Policy recommendations were delivered to federal and regional authorities on protection of Intellectual Property Rights. This ground-breaking document, which also contained a practical user's guide, explored three inter-related dimensions: 1) the current legislation on the topic in RF; 2) the cultural awareness level – the need to create a culture of IPR respect in RF, building common ground opinion among providers and end users, accompanied by practical steps for policy makers to help find ways bridge these conflicts of interest between them; and, 3) the need to keep abreast of international movements and trends, adapting good practices and initiatives to the specific RF situation.

Establishing links with other relevant ODL and e-learning initiatives

The RRCs established fruitful links with the large World Bank project called E-learning Support Project, UNESCO, and the Siberian Open University (a network of over 30 universities), pointing the way for future collaboration. Over 3500 other specialists and potential RRC clients were informed and trained by the RRCs themselves. 2 international videoconferences and 8 conferences spotlighted the results of the Component, engaging regional and international audiences to generate strategic relationships and sustainable working practices.

Room for Improvement

As with any project of these dimensions, and balanced against the significant achievements made, there is always room for improvement (these are cited as opportunities for international collaborators to contribute to the modernisation of the RF education and training system):

Competency System

It is clear that post-Delphi II efforts will be needed to revise the proposed system and explore the full range of challenges ahead, among them: sharing best practices, engaging policy leaders on the recommendations, and sensitizing institutions as to the needs for recognizing these ODL and e-learning jobs and accrediting the necessary curricula.

Terminology

Current Russian legislation needs revision so that terminology can facilitate clear, action-enabling, and context-setting definitions for all interested parties, keeping in mind that:

- Definitions should be broad enough to accommodate the many different types and uses of technologies – including open source resources – for ODL and e-learning that higher education and training institutions decide to adopt in their respective missions.
- Overly narrow definitions run the risk of reducing the diversity of ODL and e-learning approaches that can be adopted by the education and training institutions, including virtual universities or corporate universities.

ODL-VET Portal

The Delphi II VET-ODL portal can, with expertise in communication behind it to drive it, become an information marketplace for government, large industry and SMEs, sector advisory councils, content providers, training institutions, and all potential users. The portal can include sections that a) widen access to Delphi II results; b) allow for the deepening and expansion of Delphi II processes on competency-based modular resource development, management approaches, and quality frameworks with IPR provisions; and, c) provide a dynamic space for stakeholders to share supply and demand information on policy at regional and federal level, salary and employment statistics by job, labour market trends and skills shortage forecasts, career guidance information, sets of relevant fact sheets, information on technological and professional standards, links to related networks, and a subscription-based newsletter.

Strategic Resource Development

Building on the successful Delphi II work practices, RF should support the creation of micro-projects and/or laboratories to explore and test strategies and practices for a number of areas: a) trends and opportunities for modernizing libraries, databases, repositories and resource banks for learners and educators; b) the development of user interfaces before computers and other ICTs, taking into account the sensory impaired; c) guidelines for designing competency-based modular resources; and, d) embedding ODL and e-learning resources in curriculum development with the assistance of market stakeholders.

Repository

Though a prototype specification was designed and implemented, further investigation and testing are called for on:

- Granularity of resources at the moment, all resources are at the course “size” despite the large volume of available tests and texts, graphics, simulations, and other multimedia resources;
- Certified conformance with international specifications and models (SCORM, CORDRA...); the pros and cons involved in setting up and managing repositories, whether centralised or distributed;
- Recognition of prior learning and competencies: helping the RF education and training system integrate into the Bologna Process;
- Research and application of learner-empowering pedagogical principles given diverse RF teaching and learning situations.

Final Remarks

In many ways, Delphi II has helped to create a viable and functioning RRC ODL network and sparked opportunities for post-project success. Attitudes are evolving: ODL and e-learning are on the radar screens of education and training systems, in particular in the VET sector. But in many ways, the RRCs and the network remain vulnerable to change. RRC management and marketing skills need improvement, and ODL and e-learning champions need to step forward to help the RRCs develop strategic footholds with regional stakeholders, fundamental for sustainability.

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MOTIVATIONAL CHARACTERISTICS OF E-STUDENTS

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Abstract

This study reveals more information about motivational goal orientation of students in e-learning enviroment, as well as the correlation between motivational goal orientation and variables of academic performance. Students who score higher on mastery goal orientation scale consider their college subjects more interesting and useful, report of getting valuable knowledge, find professors more interesting, competent and righteous, and are more satisfied with the quality of lectures and materials, as well as with general choice of university. Students who are learning with combination of traditional approach and e-learning are more satisfied with their studies, have better grades, and more often attend classes then their peers who learn in a traditional classroom.

Introduction

The progressive rise of modern technology left its impact on education as well. E-learning with all its benefits are applied more and more in classrooms worldwide. Some authors call this phenomenon "the learning revolution", emphasizing concepts like independent, active, and self-directed learning [1]. In the sea of information reachable by a touch of a fingertip, the teacher takes on the role of a mentor and focus shifts from the content of the teaching materials to the question of motivation and self-regulated learning skills.

Research conducted at 87 American universities that use distance learning showed that 85% of institutions report that their students learn as effective as those in traditional classrooms [2]. This "No Significant Difference phenomenon", as Thomas Russel after comparing 355 studies called it [3], actually supports power of e-learning, proving that, with all its benefits, this way of education brings the same results as the traditional one.

However, other studies showed significant difference between e-learning and the traditional classroom approach. Gold and Maitland [4] in their overview of 70 research studies reported that e-students are more satisfied with teaching and have more positive feelings and attitudes toward their learning experience. Results of studies conducted at the University of California showed that e-students have a higher grade point average and better academic performance than traditional ones [2].

Motivation is defined as an internal process that starts, guides, and maintains behavior toward certain goal within a given timeframe. Psychologists differ between two main groups of motivational goal orientations – mastery and performance goal orientation. Students with mastery orientation have the goal to achieve knowledge and skills by itself, while students with performance goal orientation behave in a way that demonstrates their competences in order to be acknowledged by others and/or to avoid failure [4].

We claim that the constructivistic environment of distance learning completely relies on intrinsic motivation and provides a good environment for the development of mastery goal orientation. Nagel [5] in her research showed that the variable of goal orientation can discriminate a group of students who finished an e-learning course from those who gave up.

The above mentioned results support the important role of mastery motivational goal orientation, making it one of the significant predictors of successful performance in e-learning.

Zagreb School of Economics and Management (ZSEM) is currently the only higher-education institution in Croatia which requires from its students the regular use of the WebCT software package

for distance learning in their education. All teaching materials, work books, presentations, and tasks are available on-line, as well as discussions, comments, and examples of previous tests. Students of this school learn through combination of the traditional classroom approach with distance learning [6, 7].

ZSEM students (N=154) are compared with a sample of students from the Economic Faculty of J. J. Strossmayer at the University in Osijek (EFOS, N=160), evaluating their satisfaction considering general conditions of studying, as well as 8 choosen subjects which are identical on both faculties in order to avoid possible effect of content of material on student's satisfaction. All students also filled out questionnaire that measured motivational goal orientations [8].

Research will show if there is significant statistical difference between e-students and traditional ones considering grade point averages, class attendance, satisfaction toward studies, and motivational goal orientation. Students with higher scores on mastery goal orientation scale will be analysed by their academic performance, class attendance, and attitudes toward professors, subjects and general satisfaction toward studies.

Results and discussion

Table 1 shows that e-students are statistically different then their peers in traditional classrooms considering general satisfaction toward studies ($t=20.81$, $p<0.01$), average grade by subject ($t=4.73$, $p<0.01$), as well as current overall grade ($t=4.97$, $p<0.01$) and class attendance($t=4.35$, $p<0.01$). E-students have higher average results in all mentioned variables, which means that they are more generally satisfied with studies and have better grades, as well as higher class attendance. These results support previous research on the same topic [2, 3].

Table 1: Group differences among ZSEM and EFOS students considering satisfaction, academic performance, class attendance and motivational goal orientation

	WebCT	**M**	**F-value**
General satisfaction toward studies	"rare"	/	1.836
	"often"	/	
	"always"	/	
Satisfaction with professors and subjects	"rare"	/	1.937
	"often"	/	
	"always"	/	
Current overall grade	"rare"	2.9	8.665 *
	"often"	3.3	
	"always"	4.1	
Mastery motivational goal orientation	"rare"	3.4	3.341 **
	"often"	3.7	
	"always"	3.9	

* difference is significant on level $p<0.01$

But when we looked at the level of satisfaction with specific subjects and professors, there was no significant difference found between e-students and traditional ones. No significant difference is found among groups of e-students and traditional students considering mastery and avoiding failure goal orientation. However, significant difference ($t=2.68$, $p<0.01$) is found when comparing results on the scale of demonstrating competence goal orientation.

To see how do e-students differ within themselves considering frequency of the WebCT use, and to strengthen some of the assumptions, ZSEM students are divided into three groups of students who use WebCT "rarely", "often" and "always" and comparisons are made. Table 2 shows that these students do

not differ from each other considering general satisfaction toward studies, nor in the satisfaction with specific professors and subjects. However, they significantly differ considering current overall grade (f=8.665, p<0.01) – as expected, students who "always" use the WebCT have better grades (M=4.1) then those who use it "often" (M=3.3) or "rarely" (M=2.9). There is one more interesting result that Table 2 shows – significant statistical difference of the mastery motivational orientation goal (F=3.341, p<0.05) which shows that e-students who are more regular users of WebCT score higher on mastery goal orientation, as some research studies have already shown [5].

Table 2: Group differences considering satisfaction, grades and mastery motivational orientation among students with different frequency of WebCT use

	faculty	N	M	SD	t-test
General satisfaction toward studies	EFOS	159	2.4	0.53	20.81*
	ZSEM	153	3.6	0.53	
Satisfaction with professors and subjects	EFOS	121	3.8	0.49	0.61
	ZSEM	160	3.8	0.68	
Average grade by subject	EFOS	160	3.1	0.65	4.73*
	ZSEM	137	3.6	0.92	
Current overall grade	EFOS	159	3.0	1.01	4.97*
	ZSEM	149	3.7	1.41	
Class attendance	EFOS	160	3.8	0.89	4.35*
	ZSEM	141	4.3	0.87	
Mastery goal orientation	EFOS	155	3.6	0.71	1.70
	ZSEM	142	3.8	0.66	
Demonstrating competence goal orientation	EFOS	154	2.6	0.79	2.68*
	ZSEM	144	2.9	0.90	
Avoiding failure goal orientation	EFOS	157	2.5	0.74	1.25
	ZSEM	142	2.6	0.86	

* difference is significant on level p<0.01

** difference is significant on level p<0.05

Table 3 shows correlations between results on scales of motivational goal orientation and attitudes of students toward satisfaction with subjects, professors, and general study conditions. Results show that students who score higher on mastery goal orientation generaly consider subjects more interesting and useful then their peers who have higher results on performance (demonstrating competence and avoiding failure) orientation scales. Mastery goal oriented students consider that in classes they got valuable knowledge that they will use in their profession and would take the same subject again if they had a choice. They evaluate professors as more interesting and competent, have better opinion on their presentation skills and ability to motivate students, find them more fair while giving grades and assigning tasks. These students are more satisfied with the quality of lectures and teaching materials, as well as with their general choice of college.

Conclusion

Results showed that e-students statisticaly differ from their traditional peers in a direction that they are more generally satisfied with their studies, their overall grades are higher as well grades of specific subject, and they attend classes more often. There is no difference in mastery goal orientation between e-students and traditional ones, but a difference is found within groups of e-students, and results showed that students who use the WebCT regulary have higher scores on mastery goal orientation scale. In general, in both groups students with mastery goal orientation consider their college subjects more

interesting and useful, they say that they get valuable knowledge at school that they will use in their future profession, find professors more interesting, competent and fair, and are more satisfied with the quality of lectures and materials, as well as with their general choice of university.

Table 3: Correlation between motivational goal orientation and items of questionnaire of attitudes toward satisfaction with studies, subjects and professors

Questionnarie items	Mastery goal orientation	Demonstrating competence orientation	Avoiding failure orientation
"Subject was interesting for me."	0.344(**)	0.095	0.085
"I consider the subject as useful."	0.355(**)	0.051	0.056
"I gained valuable knowledge on this subject."	0.329(**)	0.095	0.097
"I will benefit from this subject in my profession."	0.324(**)	0.037	0.100
"I would take the subject again if I had the opportunity to choose."	0.242(**)	0.086	0.136(*)
"I consider the professor interesting."	0.259(**)	0.077	0.098
"I consider the professor competent."	0.209(**)	0.062	0.012
"I consider the professor patient."	0.088	0.126(*)	0.159(**)
"I consider the professor available."	0.167(**)	0.174(**)	0.181(**)
"The professor's relationship with students."	0.196(**)	0.141(*)	0.155(**)
"Presentational skills of the professor."	0.265(**)	0.197(**)	0.168(**)
"Ability of the professor to motivate students l."	0.186(**)	0.105	0.115(*)
"The professor is fair in evaluating students."	0.192(**)	0.087	0.077
"The professor gives adequate tasks."	0.224(**)	0.065	0.018
"I am satisfied with the quality of lectures at my school."	0.254(**)	0.166(**)	0.157(**)
"I am satisfied with the professors who are teaching at my school."	0.242(**)	0.191(**)	0.150(**)
"I am satisfied as a student on this school."	0.270(**)	0.195(**)	0.172(**)
"I am satisfied that I choose this school."	0.356(**)	0.109	0.078
"I am satisfied with the content of the materials that we learn from."	0.288(**)	0.214(**)	0.175(**)
"I am satisfied with the way the materials are presented in class."	0.241(**)	0.201(**)	0.132(*)
"Courtesy of the employees at the student office."	0.069	0.166(**)	0.090
"Availability of the employees in the student office. "	0.086	0.143(*)	0.114(*)
"Time needed to get information from the student office."	0.149(*)	0.152(**)	0.125(*)
"Working hours of the student office."	0.070	0.123(*)	0.100
"Classrooms where lectures are held."	0.021	-0.049	-0.027
"Technology that is used during lectures."	0.139(*)	0.184(**)	0.117(*)

* correlation is significant on level $p<0.01$

** correlation is significant on level $p<0.05$

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CORRELATION OF THE E-LEARNING STRATEGIES AND THE COGNITIVE STYLES OF THE STUDENTS

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Preamble

The requirements of knowledge-based society significantly verified the prestige of learning in the last decade. In September 2005, our country has accepted the LLL strategy in a governmental decision. It was declared that one of the conditions of equal-opportunities is access to training services. This approach makes a new situation in education and the world of training. In the last 10-15 years e-learning was applied in formal systems and higher training levels. In the future we have to make the training services available for everyone who choose any form of education from any segment of the society, from any geographical unit of the country.

The primary aim of the research is to work out a psychological indicator to measure learning-centered e-learning tools. This indicator is applicable to map the outcomes of information technology and pedagogy.

People exhibit significant individual differences in the cognitive processing styles that they adopt in problem solving and in other similar decision-making activities. While adapting to the world, people apply certain procedures. These procedures are named ego-controls. Adequacy of the ego-controls influences the perception. The perceptual attitudes are one of the adaptation requirements for ego personal outlook. The method by which people sense the world has never paralleled the original stimulus which reached our organs.[1]

In our research we tend to develop a new indicator for cognitive style. When we use this indicator we will easily and dependably classify persons into groups.

It can be inferred that cognitive style is an important factor in individual differences. Therefore, the instructional adaptation and design of e-learning to the students' cognitive styles appear more important than it is in traditional classroom education.

Based on the results of the research, we assign types of curriculum for these groups. We are able to define which curriculum is learned easiest, which curriculum is the most appropriate for the students and which type of curriculum helps to acquirement.

Importance of this correspondence between curriculum and cognitive style is in accordance with fundamentals of e-learning: cost-efficiency and time-saving.

Research methodology

In the examination we used two questionnaires. One of them was the MBTI.

The Myers-Briggs Type Inventory (MBTI)[2] is a more complex way of looking at cognitive styles. This model recognizes four dimensions: extroversion-introversion (E/I), sensing-intuition (S/I), thinking-feeling (T/F), and judging-perceiving (J/P). Most people are closer to one or the other end of each of the ranges. Extroversion means being active and outwardly-directed, while introversion is the opposite. In this model, sensing refers to sensory perception, while intuition is a kind of inner perception or reflection. Thinking-feeling and judging-perceiving are self-explanatory. The MBTI is

[1] Halász L., Hunyadi GY., Marton M. (1979) Az attitűd pszichológiai kutatásának kérdései, Akadémiai Kiadó, Budapest

[2] Quenk, N. L. (2000) Essentials of Myers-Briggs Type Indicator Assessment, John Wiley, &Sons Inc.,New York

based upon Carl Jung's notions of psychological types. The terms 'introvert' and 'extrovert' are referred to as attitudes and show how a person orients and receives their energy. In the extroverted attitude the energy flow is outward, and the preferred focus is on other people and things, whereas in the introverted attitude the energy flow is inward, and the preferred focus is on one's own thoughts and ideas.

Sensing and Intuition are the perceiving functions. They indicate how a person prefers to receive data. These are the non-rational functions, as a person does not necessarily have control over receiving data, but only how to process it once they have it. Sensing prefers to receive data primarily from the five senses, and intuition prefers to receive data from the unconscious, or seeing relationships via insights.

Thinking and Feeling are the judging functions. They both strive to make rational judgments and decisions using the data received from their perceiving functions, (see above). Thinking uses logical "true or false, if-then" logical connections. Feeling uses "more or less, better-worse" evaluations.

Judging and Perceiving reveals the specific attitudes of the functions. In J-types, the judging function (T/F) is dominant, and will be directed inward or outward in accordance with the E/I preference. J-types tend to prefer a step-by-step (left brain: parts to whole) approach to life, relying on external rules and procedures, and preferring quick closure. The perceiving function (S/N) is the direct opposite to the judging function. On the other hand, in P-types the perceiving function is the stronger, and follows the E/I preference, whereas the judging function is auxiliary.

Although the above explanation of *Judgement and Perception* is logically sound and is closer to Jung's definition of J and P, MBTI definition of J and P is different. The MBTI Judging type is not the type with the dominant Judging function and MBTI Perceiving type is not the type with the dominant Perceiving function. MBTI definition of J and P reads like this: "The Judging type is the type that has their strongest Judging function extroverted and the Perceiving type is the type that has their strongest Perceiving function extroverted".

Another questionnaire is Silverman – Felder Learning Styles Inventory. Richard Felder and Linda Silverman[3] developed a similar type of model that partially overlaps the MBTI. Their set of ranges includes active-reflective (corresponding to extroversion and introversion), sensing-intuition, visual-verbal, and sequential-global.

The concept of dividing students into verbal or visual learners is particularly useful, as is the global-sequential distinction. Some people learn best by looking at the big picture first, while others like to work through a logical sequence of steps. Technology offers new opportunities for reaching learners across the spectrum simultaneously. This questionnaire measures four dimensions.

Everybody is active sometimes and reflective sometimes. A balance of the two is desirable. If you always act before reflecting you can jump into things prematurely and get into trouble, while if you spend too much time reflecting you may never get anything done.

Everybody is sensing sometimes and intuitive sometimes. To be effective as a learner and problem solver, you need to be able to function both ways. If you overemphasize intuition, you may miss important details or make careless mistakes in calculations or hands-on work; if you overemphasize sensing, you may rely too much on memorization and familiar methods and not concentrate enough on understanding and innovative thinking. Visual learners remember best what they see – pictures, diagrams, flow charts, time lines, films, and demonstrations. Verbal learners get more out of words – written and spoken explanations. Everyone learns more when information is presented both visually and verbally. Many people who read this description may conclude incorrectly that they are global, since everyone has experienced bewilderment followed by a sudden flash of understanding. What makes you global or not is what happens before the light bulb goes on. Sequential learners may not fully understand the material but they can nevertheless do something with it since the pieces they have absorbed are logically connected. Strongly global learners who lack good sequential thinking abilities, on the other hand, may have serious difficulties until they have the big picture. Even after they have it, they may be fuzzy about the details of the subject, while sequential learners may know a lot about

[3] Felder, R. M. and Silverman, L. K. (1988) Learning and Teaching Styles in Engineering Education, Engr. Education, 78(7), 674-681

specific aspects of a subject but may have trouble relating them to different aspects of the same subject or to different subjects.

Besides we used *electronic log-utilities*. On the basis of theoretical knowledge we made three dimensions of the type of pupils. In the ends of three types of pupils are visual-verbal, active-reflective, and sequential-global types. We examined with electronic log utilities which units and possibilities of the framework learners used in the meantime electronic learning. We controlled these items with electronic log-utilities.

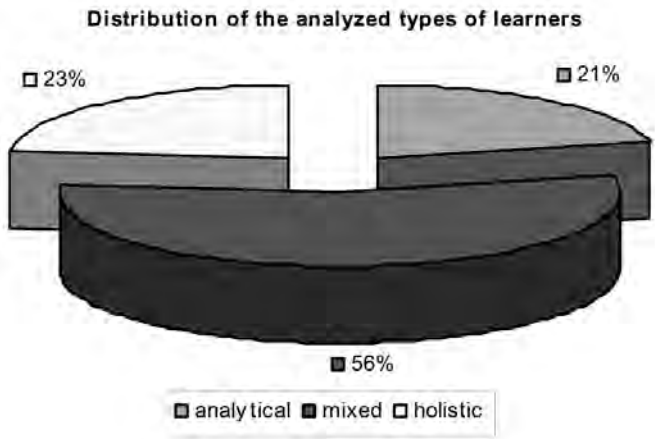
The sample

We made the research with sophomores of Corvinus University of Budapest. They are students of International Studies. The research was made during the first semester of the academic year 2005/2006. They studied a subject entitled "Theory of psychology". The students studied this subject on lectures and seminars. We used the seminars like consultations. We examined 125 students.

Results

To identify the type of learners that we identified by questionnaires we made statistical methods with the help of SPSS. We made cluster and principal component analyses. However the results did not justify our hypotheses: the results of the log-files did not lead us identify the learner-types which we supposed earlier. So we have to say, that we are not able to classify the supposed three types of dimension. (Visual-verbal, active-reflective and sequential-global types)

At this moment we made other statistical procedures as well. As a result of these procedures we identified three types of learners: analytic, holistic and mixed types.



The analytical type is logical, reason-oriented; his/her behaviour is mediated by conscious appraisal of events. They encode reality in abstract symbols, words, numbers, and as a result their information-processing is slower. They are oriented toward delayed action. They are in control of their thoughts and their change depends on the speed of thinking. Their information processing system is highly differentiated and integrated, they prefer cross context processing, active and conscious experiencing. They require justification based on reason and evidence. They are active and experiences-oriented in e-learning.

The mixed type looks irrelevant in e-learning; we supposed they are averse from this type of learning. We are going to examine the attitudes of this type towards e-learning.

The holistic type is affective: they are pleasure and pain-oriented, they prefer associationistic connections, their behaviour is mediated by "vibes" from past experiences. They encode reality in concrete images, metaphors, narratives, therefore their information processing is more rapid. They are oriented toward immediate action and they change only with repetitive or intense experience. As a result of more crudely differentiated system they have broad generalization gradient, stereotypical thinking,

emotional complexes, context-specific processing. They are seized by emotions and they experience passively and preconsciously. Justifications should be self-evidently valid for them: "experiencing is believing". This type of learner is more active, he/she makes effort to get to know the subject as a whole.

Type of learners	**Solomon – Felder questionnaire**	**correlation**	**P**
Type 1 analitical	active	0,264	0,049
	reflective	-0,264	0,049
	MBTI	**correlation**	**P**
	sensing	0,430	0,001
	intuitive	-0,445	0,001
Type 2 mixed	**MBTI**	**correlation**	**P**
	feeling	-0,299	0,025
Type 3 holistic	**Solomon – Felder questionnaire**	**correlation**	**P**
	visual	0,320	0,016
	verbal	-0,317	0,017
	sequential	-0,313	0,019
	global	0,313	0,019
	MBTI	**correlation**	**P**
	perception	0,274	0,041

Our result seems to harmonize with EPSTEIN's (1994)[4] cognitive – experiential self-theory. According to Cognitive – Experiential Self Theory, people automatically construct an implicit model of the world ("theory of reality") that has two major divisions – a world theory and a self-theory – and connecting propositions. It is assumed that there are two major systems by which people adapt to the world: rational and experiential. People have constructs about the self and the word in both systems.

The experiential system is assumed to have very long evolutionary history. At its lower levels of operation, it is a crude system that automatically, rapidly, effortlessly and efficiently processes information. At its higher reaches, and particularly in interaction with the rational system, it is a source of intuitive wisdom and creativity. Although it represents events primarily concretely and imagistically, it is capable of generalization and abstraction through the use of prototypes, metaphors, scripts, and narratives.

The rational system, in contrast, is a deliberative, effortful, abstract system that operates primarily in the medium of language and has a very brief evolutionary history. It is capable of very high levels of abstraction and long-term delay of gratification.

Our results match the results of Riding (1991)[5]. Riding have grouped a number of cognitive styles into 'families' of cognitive styles labelled Wholist-Analytic and Verbaliser-Imager. The Wholist-Analytic

[4] Epstein, S. (1994) Integration of the cognitive and the psychodynamic unconscious, American Psychologist, 49, pp. 709-724

[5] Riding, R. and Cheema, I. (1991) Cognitive Styles-an Overview and Integration, Title of Educational Psychology, Vol. 11. Nos. 3 and 4, pp. 193-215

dimension distinguishes between Wholists who are individuals that process information in wholes as opposed to Analytics who process information in parts. The Verbal-Imagery dimension distinguishes between Verbalisers who are individuals that 'think' in terms of words as opposed to Imagers who 'think' in terms of mental pictures. Each of the cognitive style dimensions is a continuum, and they are independent of each other, in so much as position in one dimension does not influence position in the other. In our results Riding's Verbaliser – Imager dichotomy is not sharply dissociated. These types melt into the analytical dimension. It suggests that our questionnaires are insensitive to the Verbal – Imager dimension.

Interpretation and process of results

We assigned the most suitable curriculum to different types of learners. As a result of this research we analyzed two types of learners open to learn in electronic framework. In accordance with our results we make following proposals:

- A curriculum rich in visual and verbal units is suitable for the *analytical type.* This type likes possibilities and exercises that require analyses. Simulations, models, videos help them understand and comprehend the curriculum. It also helps them if they have possibility to annotate and rearrange the curriculum by their own principle.

- A curriculum linking up memorized units and parts of curriculum is suitable for the *holistic type*. This type likes connecting parts together, prefers experience, particular cases and exercises (compilation, thesaurus, collection of curiosity, suggested reading) which have effects on their emotional and motivational systems. The features of the contents are also crucial for this type to comprehend the curriculum as a whole.

In the framework of research we tried to analyze and formalize different, methodological expectations during acquiring curriculum. In this way we can eliminate impersonality of e-learning.

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DOES PLACING LECTURE NOTES ON THE WWW AFFECT STUDENT LECTURE ATTENDANCE?

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Abstract

There is much debate about the affect that placing lecture notes on the WWW has on student lecture attendance. This paper analyses data collected from 574 third level students over the seven year period from 1999 to 2005. This paper provides strong evidence that placing lecture notes on the WWW does not affect student lecture attendance. This paper also provides evidence that students regard WWW lecture notes as an addition to, rather than a replacement for, normal lecture attendance.

Introduction

Many papers have shown that attendance does affect student learning and academic outcomes. Petress discusses various arguments in favour of and against class attendance and concludes that class attendance does contribute to better student learning [1]. Ledman shows that class attendance has a direct affect on subject understanding [2]. Ledman tested his students' knowledge of course content by getting them to take unannounced tests, which they had not studied for. Ledman found that those students who had the best attendance demonstrated a greater understanding of the course material.

There is evidence that student attendance is on the decline [3] and [4]. Many academics fear that placing lecture notes on the WWW will worsen the situation by providing students with an additional reason to skip class. However, several researchers have shown that the reasons why students do not attend classes predate the use of the WWW. Gump found that students are motivated to attend class if they consider the instructor or the lecture material to be interesting [5]. Gump found that 85% of students stated this to be a reason why they attended class. This compared with only 67% saying they would attend classes if they were given credit for attendance. Walls agrees with this position, stating that effective instruction promotes student enthusiasm and involves high levels of student engagement [6]. Petress looks at attendance from a different angle, suggesting that students believe themselves to be customers and that lecturers should be obliged to make their classes more appealing to them [1]. Elliot suggests that two major reasons for students not attending lectures are: (a) they do not understand the subject and (b) they have too great a workload [7].

Of the students who do attend class, many have difficulty transcribing and organising their lecture notes. This can lead to feelings of not understanding the subject, which in turn leads to student absenteeism, as suggested by Elliot above. Realising this to be a serious and widespread problem, several practitioners, such as Pauk, have developed methods to help students transcribe and organise their lecture notes [8].

Placing lecture notes on the WWW can be of substantial benefit to those students who do attend class. Having a complete set of notes on the WWW removes the chance that students will incorrectly transcribe or organise their notes. Rather than having to concentrate on the mundane task of note-taking in class, students are now able to listen to and interact with their lecturer and fellow classmates. If a student does miss a class, having the lecture notes readily available means that they have a better chance of catching up with their work.

It is not only the students who benefits from lecturers placing their lecture notes on the WWW. Witt argues that most lecturers who place their lecture notes on the WWW feel that the goals they set for their websites have been entirely or largely achieved, and most believe that their websites are now essential to successful course design [9].

WWW Notes Overview

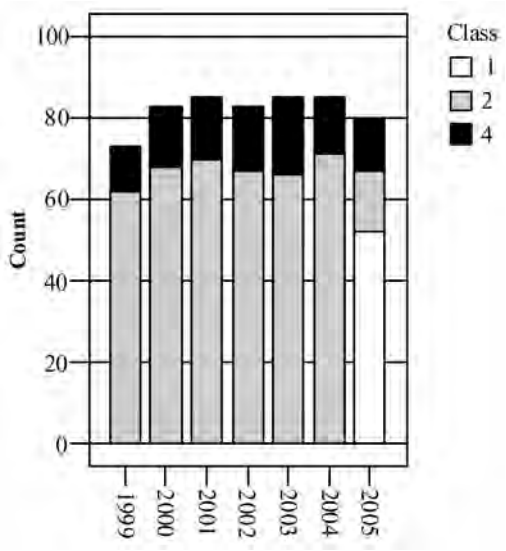
Throughout the seven year study, the main purpose for placing lecture notes on the WWW was to allow students to print their lecture notes for off-line study. The website's layout was purposely kept simple. Its interactivity extended to being able to run demos of the various code examples found within the website. There were no end-of-section interactive quizzes or forums that the students could engage in. The WWW notes lacked the snazzy graphics that might be found in professionally designed websites.

The WWW notes were used during lectures. Lectures were delivered by showing a topic's webpage on a screen. The lecturer would read aloud through the topic's contents, giving a brief summary after each section. Where code examples were available, these were run and explained. For some topics – such as *"user interface design"* in 1st year – the content of external websites was discussed.

Analysis

The data analysed in this paper was collected over a period of seven years. A total of 574 students took part in the survey. The students consisted of 1st, 2nd and 4th year computing undergraduate students at Dundalk Institute of Technology, Ireland. The breakdown of student numbers is shown below.

Student Numbers Breakdown



	1999	2000	2001	2002	2003	2004	2005
	Count	Count	Count	Count	Count	Count	Count
1							52
2	62	68	70	67	66	71	15
4	11	15	15	16	19	14	13

	1999	2000	2001	2002	2003	2004	2005
	%	%	%	%	%	%	%
1							65
2	85	82	82	81	78	84	19
4	15	18	18	19	22	16	16

During each semester, only one module's lecture notes was placed on the WWW for each of the classes surveyed. All of the surveyed students took five traditionally delivered modules during the same semester that they were taking their module that had WWW notes available.

Students were asked two questions relating to lecture attendance. The results from both questions were analysed by year and by class. Providing both year on year and class comparisons highlights the consistency of responses that exists in various years and between various classes.

Question 1

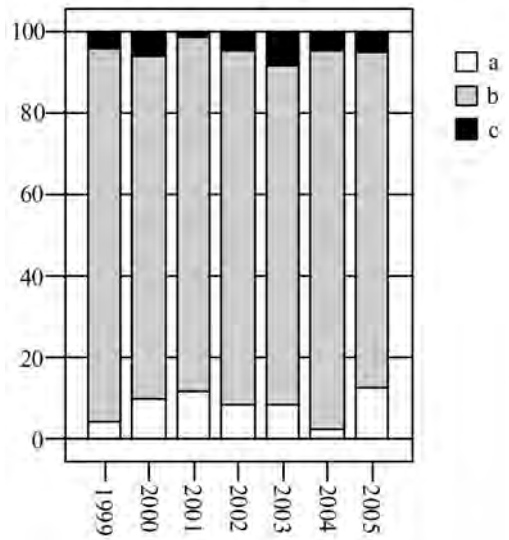
Do you attend this subject's lectures:

a. More than you attend most other subjects' lectures

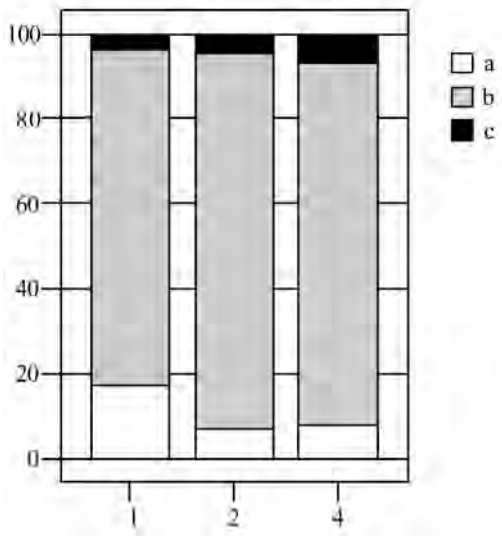
b. The same as you attend most other subjects' lectures

c. Less than you attend most other subjects' lectures

Year on year comparisons



Class comparisons



	1999	2000	2001	2002	2003	2004	2005
	%	%	%	%	%	%	%
a	4	10	12	8	8	2	13
b	92	84	87	87	84	93	83
c	4	6	1	5	8	5	5

	1	2	4
	%	%	%
a	17	7	8
b	79	88	85
c	4	5	7

The data shows that small percentages of 2nd year (7%) and 4th year (8%) students attended lectures that use WWW notes more than they attended other lectures. A surprising 17% of 1st year students attended lectures that use WWW notes more than they attended other lectures.

The vast majority (over 80% in every year and over 90% in two of the years) of students attended lectures that use WWW notes the same amount of time as they attended most other subjects' lectures. Clearly, the vast majority of students do not see having their lecture notes available on the WWW as a factor that influences their lecture attendance.

Students who attended lecturers that use WWW notes less than they attended other subject's lectures represent the smallest response group. Very small percentages (4%, 5% and 7% respectively of 1st, 2nd and 4th year students) attended lecturers that use WWW notes less than they attended other subject's lectures. These figures show that very few students will skip lectures because their lecture notes are available on the WWW.

The three sets of figures show that placing lecture notes on the WWW does not negatively affect student attendance. In the case of the 1st year students, the opposite affect seems to have occurred, where a large number of students attended lectures that use WWW notes more than they attended other lectures.

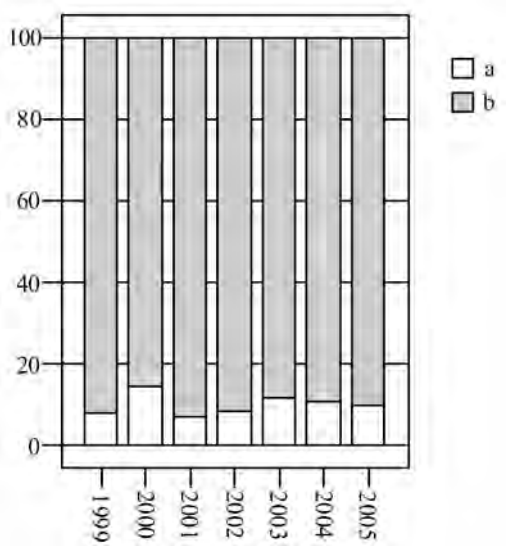
Question 2

Do you feel that the lecture notes website:

a. Means you no longer gain anything from attending lectures

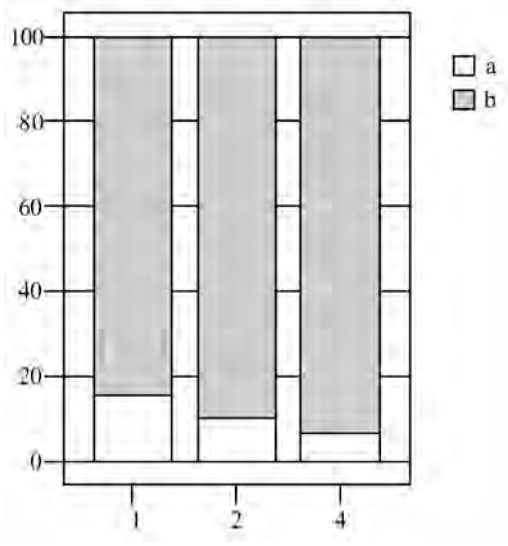
b. Is only useful when combined with attending lectures

Year on year comparisons



	1999	2000	2001	2002	2003	2004	2005
	%	%	%	%	%	%	%
a	8	14	7	8	12	11	10
b	92	86	93	92	88	89	90

Class comparisons



	1	2	4
	%	%	%
a	15	10	7
b	85	90	93

The data shows that the vast majority of students believe that having their lecture notes on the WWW is only useful when combined with lecture attendance.

The data shows that there is a small increase in the number of students who believe this to be true in the higher year classes (85% in 1st year, 88% in 2nd year and 93% in 4th year).

Conclusion

Placing lecture notes on the WWW does not negatively affect lecture attendance. Similar numbers of students attend classes whether or not their notes are available on the WWW.

Students who do attend lectures find that lecture notes placed on the WWW are best utilised as an addition to normal lecture attendance.

The literature also shows that lecturers who have placed their lecture notes on the WWW believe that their websites are now essential to successful course design.

Myths surrounding the potential negative affect that placing lecture notes on the WWW can have on class attendance are exactly that. They have no scientific basis. Lecturers should view the ability for them to place their lecture notes on the WWW as being just another useful tool in their armoury.

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EVALUATING LEARNING IN AN ONLINE COURSE: IS PARTICIPATION A MEASURE OF LEARNING EFFECTIVENESS?

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Introduction

What do we mean when we talk about 'learning effectiveness'? The dictionary definition of effective is 'successful or achieving the results that you want' (Cambridge Online Dictionary).

As a tutor, when assessing the effectiveness of your modules the only factor readily available is assessment – are students passing the module? Do they understand the outcomes after receiving your teaching?

On e-learning results remains the driver. However, it is important to look at the changing ways in which students are encouraged to learn, and see if there are additional ways in which the learning experience can be measured.

This paper focuses on the Graduate Development Programme, and looks at the students' engagement with the Virtual Learning Environment (VLE) to see if participation can be a measure of effective learning.

The Case Study

The College launched its Graduate Development Programme (GDP) in 2003. Previously the College had only offered the traditional form of distance learning – where the measure of learning effectiveness was taken purely on the pass rates for each module. The VLE was used as a bolt-on, where students were able to post messages on a general discussion board if they wished, or to access information online, but this was not an integral part of the course.

Mason (1998) defined this use of the VLE as 'the Content and Support model' where there is a 'rudimentary amount of collaborative activity' and students report conflict between the learning materials and participating in the online activities. Mason estimated that the online activity occupied 20% of the time.

The course design of the College undergraduate courses followed the linear model, as shown in Figure 1.

When measuring learning effectiveness, the amount of engagement in the VLE by the students was not considered.

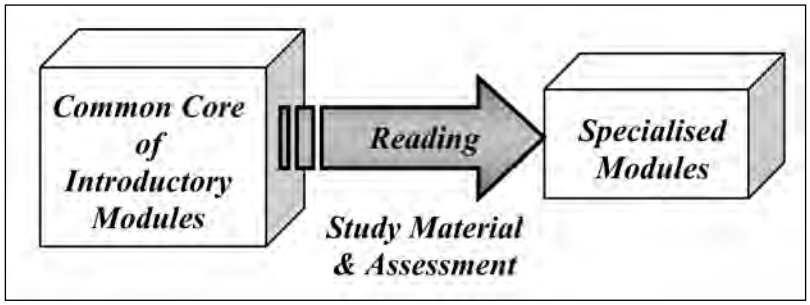

Figure 1. Linear – Directive Passive Learning

New Course Design

The aim of the GDP course was to change the VLE from being an additional extra on the course to becoming an integral part of the design, where it was central to the learning that students engaged with learning activities. This frequently required students to discuss with their colleagues asynchronously.

This is as described by Joliffe (2001): 'the learner is active and seeking to make sense of the world. This means that learning needs to be focused on problem-based scenarios, stimulations and the use of technology resources. It also means that learning tasks no longer occur in a linear fashion.'

The model for the course design moved from the linear to a spiral based model, as shown in Figure 2, where the practice of problem solving is core to the course, and the use of the different media, and primarily the VLE is central to the learning process. A student will move up and down the spiral using various activities, all designed to create active learning.

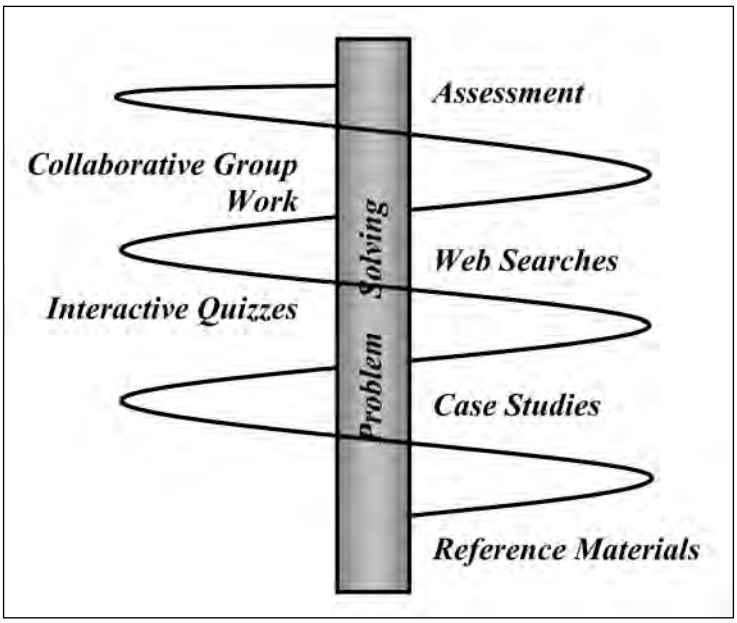

Figure 2. Spiral – Independent/Interdependent Active Learning

The course design has moved towards Mason's (1998) 'wrap-around model' where the course consists of 'tailor-made materials […] wrapped around existing materials' (in this case the study or reference papers). In this model Mason estimated that online interactions would occupy 50% of the student's time.

Central to measuring the learning effectiveness of the GDP course was therefore how much students engaged in the online debates.

Participation Levels

Focusing on the Part 1 module 'Information Management and Control', in 2004 we had an intake of 234 students, and in 2005 this increased to 450.

Looking at the theory of critical mass to achieve participation, it was decided to put students into groups of 25. Salmon (2002) suggests that 'less than 6 participants or more than 15 active participants is likely not to work well, depending on the online activity'. Although 25 students per group is higher than this recommendation, this level was decided upon due to the nature of the online activities and the backgrounds of the students. Many of our students work on construction sites or in offices, where it is not always possible or permissible to have access to the Internet during the day. A group size of 25 students therefore allowed for a proportion of the students to lurk on the discussion boards, while still retaining enough to form a critical mass.

Each group had its own online tutor whose role was to facilitate the discussion.

In 2004 the average number of postings per student was 5.1, with a total of 846 messages being submitted by students, and 410 by the tutors. The student statistic is influenced by some students posting many more times than others; however, on the access statistics only 5 students did not access the VLE.

Although students had engaged, the amount of learning through the VLE in terms of the amount of messages posted was not as high as had been expected, and as the students progressed through the activities the amount of participation decreased.

Pallof and Pratt (1999) stated that: 'The online environment is perfect for the development of collaborative skills. Students learn to work with and depend on each other to reach their learning objectives.'

However, this was not occurring on this module in 2004. For this reason, to encourage higher levels of participation and therefore increase learning effectiveness, a bonus mark for participation was introduced in 2005, to act as the 'carrot' for completing the activities.

This saw the amount of postings per student double, with 1742 messages submitted by students and 436 by tutors – equating to 11 messages per student.

The comparison between the participation levels in 2004 and 2005 is shown in Figure 3.

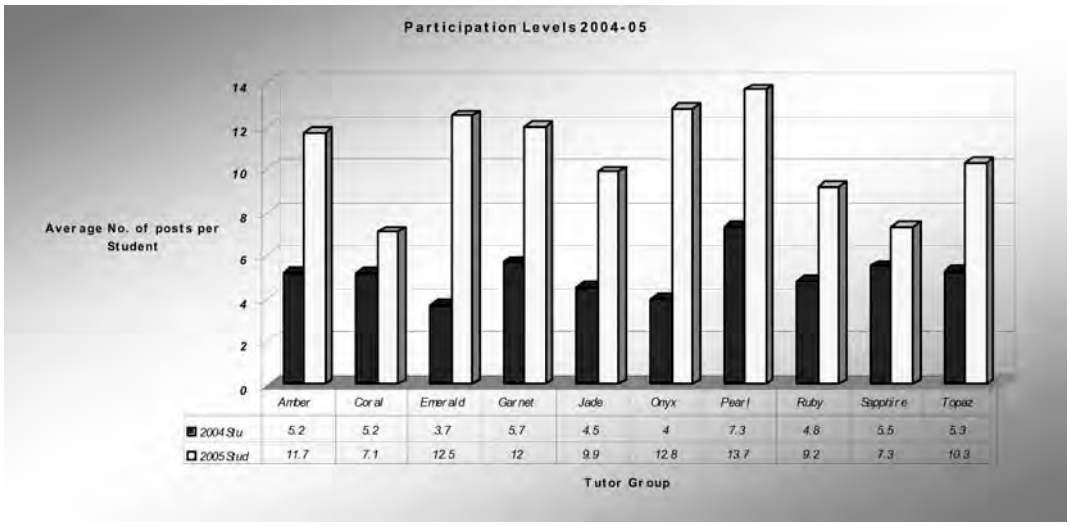

Figure 3. Participation Levels 2004-2005

In terms of the traditional methods of measuring learning, the module results show that there is also a marginal increase in the proportion of merits and distinctions in 2005 compared to 2004, as shown in Figure 4.

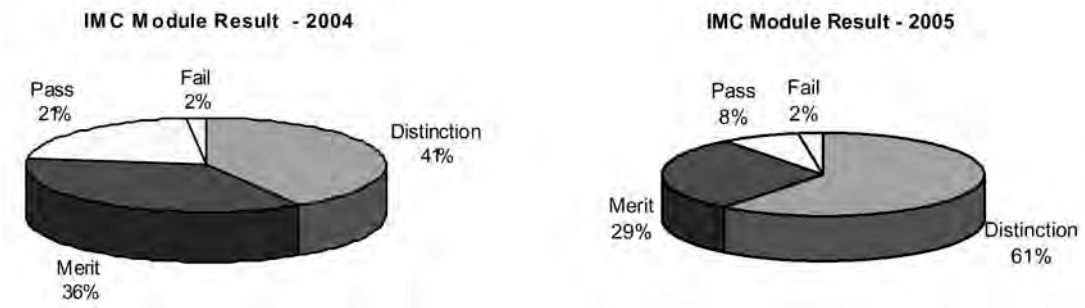

Figure 4. IMC Module Result 2004-2005

Whilst this increase in merits and distinctions could be partly credited to the option of gaining a higher mark through the participation bonus, there does appear to be an increase in those students meeting the learning criteria through participation.

However, to further see how participation can be a measure of learning it is important to look at the results to see if there is a clear correlation between those who participated, and the assessment mark that they achieved.

The following table shows the results of the data following analysis of the VLE course statistics for 2005 by students for the amount of times they accessed the learning activity forums, the amount of messages posted and their module mark.

Category of result	Average no. of times student accessed the Learning Activity Forums	Average number of messages posted by the student	Average module mark
Fail	34.1	1.5	15.1
Pass	60.9	3.2	53.3
Merit	107.0	4.9	64.5
Distinction	207.7	9.1	79.3

This demonstrates that there is a clear link between the amount of participation and the assessment results. The more a student has engaged on the VLE, either through accessing and reading messages or by contributing, the higher the average module mark was.

Student and Tutor Perceptions of Learning through the VLE

On this basis, then, the conclusion would seem to be justified that on the GDP course learning effectiveness can be measured by the amount of engagement with the VLE. This would follow Khan (1997), who stated that 'for learning to take place the learner must activitely process and make sense of the information presented. Generally speaking, an active learner will integrate knowledge more than a passive learner.'

The tutors on the course also felt that participation in the activities did increase the students' knowledge. One tutor commented: 'it is a pity more students did not participate on the VLE. It was fairly evident that those who did not participate did not learn.'

Similarly, those students who did not choose to participate frustrated some of the other students. 'The biggest problem I had was minimal online participation by tutors and tutor group members meaning feedback and sharing of ideas not gained […] I think therefore that the tutor groups should be changed so that people like me who do contribute are together rather than providing answers for students who do not participate.'

This student perceived that he had missed out on a learning opportunity because others in his group had not participated.

Learning online is about 'learning as participation. The process of being a member of a community' (Collis and Moonen, 2001).

When looking at the VLE course statistics for 2005 (table above), the access statistics were reviewed as well as the amount of messages posted. This was to see if the students failing or only passing the module had accessed the forums a proportionally high number of times, but had chosen to lurk rather than post messages. However, the statistics show that the highest access was for those achieving a merit or distinction, and those who passed the module had accessed the site 72% less than those achieving a distinction.

Therefore active participation can be defined as reading and reflecting on other students' messages as well as posting messages.

Whilst the participation through posting of messages is central in terms of building up a community online, a key part of the learning process occurs through reflection on what others have said.

This relates to the individual's learning styles. McVey Lynch (2002), when discussing teaching strategies for adult learners, recommends that as adult learners 'exhibit great variation in learning styles' the teaching strategy should 'use a variety of learning materials'. The Learning Activities on an online course should therefore allow space for the reflectors as well as the activitists and pragmatists, so that effective learning can occur through both types of participation.

Conclusion

The study of the Information Management module has clearly shown that participation can be used as a measure of learning effectiveness. This is demonstrated both by the improved module results in 2005 following increased participation in the forums, and by looking at the detailed results by students.

The students who engage in the activities and through this the VLE do learn more effectively than those who choose not to.

Whilst it is also important to recognise that the quality of the messages posted, and the interactions between the tutor and the group, will also be important in the learning process, participation is an effective initial measure on the GDP course.

It is planned to extend this study to look at participation for the 2006 cohort for this module, as well as to look at participation and assessment results across the rest of the course, and results will be published later this year.

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STUDENTS' OPINION ABOUT ELECTRONIC EXAMINATIONS BEFORE AND AFTER TAKING ELECTRONIC EXAMS

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1. Introduction

In the year 2004 54 students of the Faculty of Organisational Sciences, University of Maribor participated in the survey of students' readiness for e-examination. The results have shown that the majority of students would introduce e-examinations as fast as possible. The most important factors, which contributed to the positive relation towards e-examination, were immediate feedback and freedom of choice of place of examination regardless whether exams are running synchronously or asynchronously. Students also stated some negative opinions about e-examination mostly because they were afraid of technology and were not familiar with the methods of e-examinations. They had some doubts in time limitation and did not know whether it would be good or bad for them.

The survey was carried out again in the year 2005. 173 students of the Faculty of Organisational Sciences, University of Maribor participated. The results are shown later in the paper where also the comparison between the year 2004 and 2005 is made. Within the survey carried out in the year 2005 the same students were tested twice, before and after taking exams electronically. The comparison of students' opinion about e-examination before and after taking electronic exams is also presented in the second part of the paper.

Before carrying out the survey, the students were fully informed about this subject and explained by cases what is meant by e-examination. A presentation was prepared very precisely to avoid the differences in understanding of the survey among the test groups.

Next in the paper, the term e-examination is explained. Afterwards the methods of research are described. At the end the students' opinion about e-examination before and after taking e-exams is presented and the comparison to the last year survey is made.

2. The term 'e-examination' explained

Distance learning, based on interactive technologies, is an integral part of the modern educational process (Miloslavskaya & Tolstoy, 2005). Distance learning courses usually use the Web as the medium, and therefore Web site design and management becomes a necessary component of course development (Chung, 2005). At this point the term 'electronic' occurs. We are starting to talk about e-learning, Web-based learning, e-books and similar (Jereb & Šmitek, 1999; e-Learning Consultant, 2003). Closely connected to e-learning is e-examination, also known as computer-assisted assessment (CAA). E-examination can take place locally: in classroom or away from the examining institution. A remote electronic examination is conducted with candidates at a location separate from the examining institution using the Internet for communications. Candidates respond to questions by typing or dragging their answers into text boxes for uploading to the institution. In an asynchronous examination candidates download the exam paper from the web site, prepare their answers off-line, and reconnect to the examination web site at the end of the set time period. In a synchronous examination candidates remain connected to a server for the duration of the examination period (Thomas *et al.,* 2002). The last is also characteristic of the e-examination in the classroom at the examining institution.

With rising numbers of candidates to be examined, the prospect of grading the exams automatically promises faster, cheaper and more consistent grading (Shermis *et al.,* 2001). Even if automatic marking is not used, capturing candidates' answers electronically has potential benefits in legibility and comprehension for graders. There are advantages, too, in security, with papers being held electronically and only being released to candidates shortly before the designated start time of the examination. In a distributed system, as commonly found in distance education, electronic examination has the potential

for speeding up the whole examination process from the transfer of student answers to markers, standardisation of answers, to the consensus on the final grades.

We must be aware that all of knowledge cannot be examined electronically. In cases where students must master theoretical and practical knowledge and show some manual skills e-exams had to be combined with other types of exams or completely left out. For example brain surgery exam can be divided into three parts. In the first part where the theory is examined the e-exams could be used. The second part, where the students are confronted with a study case, also the computer assisted assessment can be used for simulation of solving the problem. And the third part, where surgery skills are examined, the students must be monitored in a study or a real situation. Of course we must not expect that all of the teachers are going to switch to e-exams wherever this is possible but it is necessary to support and motivate those who are willing to.

A common criticism of remote examinations is the difficulty of ensuring that cheating is minimised (Whittington, 1999). Therefore electronic examinations taken under supervised conditions have been implemented. But we are also interested in pursuing the use of examinations in less formal settings, particularly at home. Such environments are similar to those in which distance education students normally study and avoid the need to attend unfamiliar locations that increase student anxiety.

3. Methodology

3.1 Defining statements for e-examination survey

Readiness of students to take exams electronically was researched with the help of group decision support systems (GDSS) which is described by Kljajic *et al.* (2000). According to the study programmes renovation directives set by the Bologna Declaration we defined four possible alternatives for taking exams:

- No e-examinations. Examinations should be oral or written on paper.
- Use e-examinations for instant tests and classic tests for final exams.
- Combining electronic and classic examinations.
- E-examinations only. In classroom or remote, asynchronous or synchronous.

On the base of these alternatives the questions for the survey were gathered and categorized. The process was supported by GDSS GroupSystems (GroupSystems, 2005). GroupSystems solutions help teams accelerate the knowledge process and generate results faster. The software gathers implicit knowledge and enables productivity without information overload. To find out more about the used methodology see Jereb and Bernik (2005).

Table 1: Statements for e-examination survey

S1:	I would replace classic written or oral exams with e-exams.
S2:	Immediate feedback is one of the main advantages of e-examination.
S3:	E-examination is far more interesting than classic examination, it attracts and motivates me.
S4:	E-examinations should be time limited.
S5:	E-examinations ensure objective evaluation of results.
S6:	E-examinations require a high level of computer knowledge.
S7:	E-examination is straining, it would make me too tired.
S8:	One of the advantages of e-examinations is less possibility of cheating.
S9:	Knowledge should be tested instantly with help of e-examinations.
S10:	E-examinations could take place remote from the school.
S11:	E-examinations could be carried out anytime, according to individuals.
S12:	If I could choose between classic and e-examination I would choose e-examination.

Brainstorming was used to collect the questions, which would help us select the right alternative. Brainstorming stimulates creativity by passing ideas randomly and anonymously between participants, allowing them to add their own contributions as inspiration takes them. We raised the electronic brainstorming activity with next question: "Why would you like/dislike to have e-examinations in your learning process?" We received 83 answers and sorted them with the Categorizer function. Categorizer helps a group to sort ideas and descriptive comments. Ideas can then be easily and quickly sorted into categories. As a result of the categorizing activity, we got 12 questions. These questions were then transformed into statements for the survey. The answers to these statements should help us to choose the right alternative for taking exams (Table 1).

After the statements were set the survey among the students of Faculty of Organisational Sciences was carried out. First testing was performed in the year 2004 with students who did not take an e-exam yet. Second and third testing were carried out in the year 2005, one before and one after taking an e-exam. The e-examination was performed with the e-testing tool Perception. The methodology is briefly described in the section below.

3.2 The e-testing tool Perception

The e-testing tool Perception enables us to write, deliver and score different types of tests, assessments and questionnaires and is used by thousands of corporate human resources professionals, trainers and educators in more than 40 countries (Perception, 2005). Perception can be used for academic examinations and tests, attitude surveys, personnel evaluations, self paced study guides and gives us everything we need in order to author, administer and deliver computerized assessments.

Figure 1. How Perception works

Figure 1 presents the stages in the use of Perception. First stage is the Authoring stage. At this stage we composed a bank of questions and then selected appropriate ones for the assessment that was given to the students. The second stage is called Scheduling. At this stage we specified which students could take which assessments and when they could take them. The third stage is the Delivery stage. At this stage students received their assessments. Assessments were delivered from the Perception Server through to a Web browser, through the internet connection. The last stage is Reporting stage. After the participants had taken their assessments, we used the Web-based program Enterprise Reporter for reporting and analysing the results.

After the e-examination the students were asked to look through the 12 statements again. The results of the survey and comparative analysis between the year 2004 and 2005 are shown in the next part of the paper.

4. Results

4.1 Comparing the results of the year 2004 and 2005

In the year 2004 a total of 54 students (20 females and 34 males) participated in the study. Ages ranged from 21 to 44 years, with a mean of 27 years and 5 month (M=24,4 years for females and M=29,2 years for males).

In the year 2005 a total of 173 students (107 females and 66 males) participated. Ages ranged from 20 to 50 years, with a mean of 25 years and 6 month (M=26,4 years for females and M=24,7 years for males).

Table 2: Comparing results of the year 2004 and 2005 by statements

	Strongly Agree				→			**Strongly Disagree**		
	1		2		3		4		5	
	2004	**2005**	**2004**	**2005**	**2004**	**2005**	**2004**	**2005**	**2004**	**2005**
S1	48,1%	**42,2%**	35,2%	**30,6%**	11,1%	**14,5%**	1,9%	**5,8%**	3,7%	**6,9%**
S2	77,8%	**76,9%**	14,8%	**12,7%**	1,9%	**2,9%**	0,0%	**4,6%**	5,6%	**2,9%**
S3	29,6%	**31,2%**	46,3%	**35,3%**	11,1%	**12,7%**	3,7%	**12,1%**	9,3%	**8,7%**
S4	29,6%	**29,5%**	29,6%	**25,4%**	13,0%	**19,7%**	20,4%	**15,0%**	7,4%	**10,4%**
S5	42,6%	**37,0%**	29,6%	**21,4%**	14,8%	**22,0%**	7,4%	**13,3%**	5,6%	**6,4%**
S6	37,0%	**17,9%**	18,5%	**24,9%**	11,1%	**14,5%**	14,8%	**21,4%**	18,5%	**21,4%**
S7	9,3%	**4,1%**	1,9%	**12,7%**	14,8%	**10,4%**	20,4%	**21,4%**	53,7%	**51,5%**
S8	24,1%	**29,5%**	37,0%	**28,9%**	14,8%	**15,6%**	9,3%	**9,3%**	14,8%	**16,8%**
S9	40,7%	**42,8%**	29,6%	**24,9%**	13,0%	**13,9%**	9,3%	**11,6%**	7,4%	**6,9%**
S10	77,8%	**79,8%**	13,0%	**13,3%**	3,7%	**1,2%**	0,0%	**4,1%**	5,6%	**1,7%**
S11	72,2%	**72,8%**	16,7%	**14,5%**	1,9%	**5,2%**	1,9%	**4,1%**	7,4%	**3,5%**
S12	38,9%	**36,4%**	31,5%	**25,4%**	18,5%	**16,8%**	1,9%	**9,8%**	9,3%	**11,6%**

The results of both surveys made in 2004 (see Jereb & Bernik, 2005) and in 2005 showed that students are prepared to take exams electronically. The results are shown in Table 2 and Figure 2. There were no essential differences among the particular statements. Maybe we can point out the negative thinking about results evaluation objectivity (S5) and less fear of the computer technology (S6). The latter could also be the reason for growing interest in e-examinations. We assume that better presentation and explaining of e-learning and e-testing on the basis of the 2004 survey results also contributed to the growth of the interest in taking exams electronically. By that we specially focused on the technology, trust and knowledge capturing issues.

On the basis of the positive students' response we then performed a pilot e-testing. After the testing we checked the students' opinion again and compared the results before and after testing.

4.2 The comparison of students' opinions before and after taking e-exam

E-testing was preformed with a test group of 24 students (8 females and 16 males). Ages ranged from 19 to 23 years, with a mean of 21 years (M=21,13 years for females and M=20,94 years for males).

The students' responses were captured before and after e-testing. The students could see their tests results immediate after performing the test. The results are shown in Table 3.

The results before taking e-tests (see Table 3 and Figure 2) are statistically comparable with the results of the test groups of the years 2004 and 2005 (Table 2). Some minor deviations are probably the result of the low age of the last test group and their homogeneousness (the same generation and type of study).

Much more interesting are the results got after e-testing. It is obviously that the majority is enthusiastic about taking exams electronically (S1). Immediate feedback remains the main advantage of e-examinations (S2). After performing e-tests the students found e-examinations far more interesting and felt attracted to this kind of taking exams (S3). Students also stated that there is less possibility of cheating and that they believe in higher results evaluation objectivity (S8 and S5). It can be seen that students who first feared e-examinations and were anxious about the information communication technology (S6) found out that good prepared e-testing is relative simple. Students could focus on knowledge testing and had no problems with the computer technology. If we look at the statements S10 and S11 we can see that students who performed e-testing favour taking exams remote from school and anytime. The results of the last statement show that more than 62% of students would choose e-examinations in stead of classic tests and that no one would refuse it. Only by the fourth statement (S4) nothing has changed. The majority of students (75%) still think that e-exams should not be time limited. The differences about students' opinion about e-examinations of the year 2004 and 2005 and before and after e-testing are shown in Figure 2.

Table 3: Comparing results taken before and after e-examination by statements

	Strongly Agree				→		**Strongly Disagree**			
	1		**2**		**3**		**4**		**5**	
	Before	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**
S1	33,3%	**58,3%**	33,3%	**16,7%**	20,8%	**20,8%**	8,3%	**0,0%**	4,2%	**4,2%**
S2	66,7%	**75,0%**	4,2%	**4,2%**	12,5%	**8,3%**	8,3%	**4,2%**	8,3%	**8,3%**
S3	33,3%	**54,2%**	25,0%	**20,8%**	16,7%	**12,5%**	20,8%	**8,3%**	4,2%	**4,2%**
S4	25,0%	**25,0%**	16,7%	**25,0%**	29,2%	**16,7%**	12,5%	**16,7%**	16,7%	**16,7%**
S5	29,2%	**41,7%**	20,8%	**20,8%**	37,5%	**20,8%**	8,3%	**12,5%**	4,2%	**4,2%**
S6	12,5%	**12,5%**	16,7%	**16,7%**	16,7%	**0,0%**	16,7%	**8,3%**	37,5%	**62,5%**
S7	8,3%	**12,5%**	12,5%	**8,3%**	0,0%	**0,0%**	16,7%	**4,2%**	62,5%	**75,0%**
S8	33,3%	**54,2%**	8,3%	**12,5%**	16,7%	**20,8%**	33,3%	**4,2%**	8,3%	**8,3%**
S9	25,0%	**41,7%**	16,7%	**25,0%**	25,0%	**20,8%**	33,3%	**8,3%**	0,0%	**4,2%**
S10	45,8%	**66,7%**	12,5%	**16,7%**	20,8%	**8,3%**	4,2%	**0,0%**	16,7%	**8,3%**
S11	45,8%	**62,5%**	12,5%	**12,5%**	12,5%	**12,5%**	16,7%	**0,0%**	12,5%	**12,5%**
S12	33,3%	**62,5%**	12,5%	**16,7%**	25,0%	**16,7%**	8,3%	**4,2%**	20,8%	**0,0%**

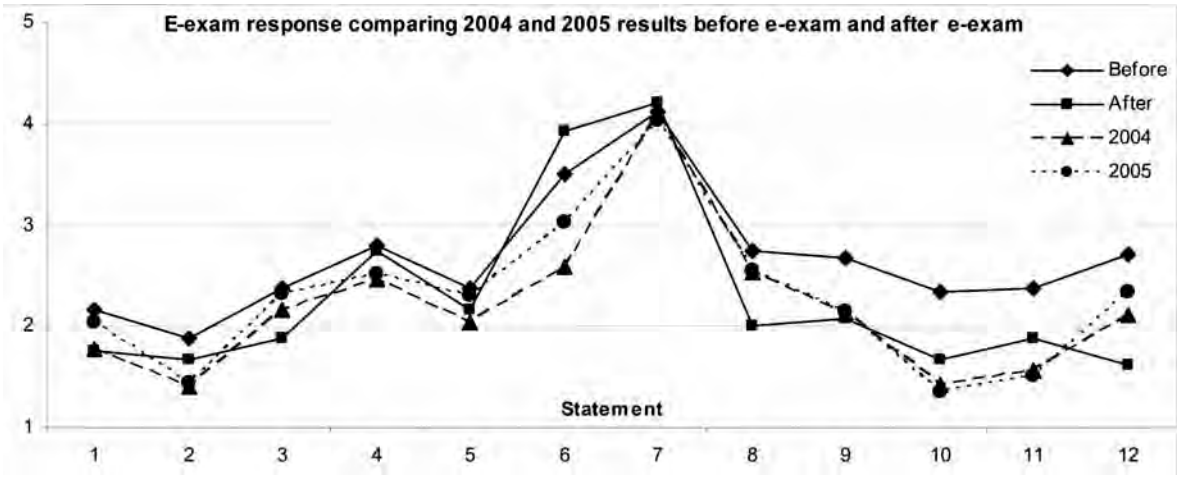

Figure 2. Comparing students' responses about e-examinations

5. Conclusion

The information-communication technology has a profound impact on our society and a great potential to enhance education. Students have the opportunity of studying at home or in a virtual classroom without time pressure; they can study at the time most appropriate for them. The feedback from the students involved in our survey confirmed the need for introducing electronic examinations whether in classroom or in remote locations, synchronous or asynchronous. At this time we are not yet familiar with all the effects of performing exams out of defined time and controlled location. So our further research will go in this direction.

The research showed that the majority of students support the aspiration for introducing e-examinations. Most of the problems arise on the side of teachers and institutions that are not capable of performing this kind of examinations because of insufficient knowledge and too little support. Therefore it is necessary to provide them technical support by preparing and performing electronic exams. With introducing of e-exams teachers will save on time. Students will gain on the objectivity because of the automatic test generation and institutions can assure the integrity of knowledge testing and reduce differences of testing in the scope of particular courses. That motivates students for learning and results in higher quality of educational process.

Motivated by the results we decided to use e-examinations by most cases where this is possible. To ensure the appropriate performing of e-exams and to reduce students' fear we will start with the combination of electronic and classic testes. By that we hope to increase students' trust in e-examinations and reduce fear from novelties and enable a fearless performing of e-tests also to those who are afraid of up-to-date technology.

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DESIGN FOR E-LEARNING: INTERROGATING THE DECISIONS OF TUTORS-AS-COURSE-DESIGNERS

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This paper is situated in a UK Higher Education context in which e-learning has become a locus of developmental activity. Two Masters programmes within the School of Education at the University of Manchester, the MEd in English Language Teaching (ELT) and the MEd in Educational Technology and ELT, both aimed at practising teachers of English to speakers of other languages, have been available to both onsite and distance participants for over 15 years. During that time the programmes have naturally evolved in various ways, not least in terms of how they are delivered.

As in many institutions, the discourse of e-learning is clearly associated with technological drivers. As a group of educators involved in distance learning, we have embraced the potential of such drivers, but are interested in questioning how we are using them to enhance the learning experience, this being even more of a focal interest for us since one of our programmes reflects on the use of educational technologies.

The term tutor-as-course-designer embodies a multi-faceted role. We are responsible for the study of particular subject areas; we are involved in decisions about how we teach our subject matter both online and face-to-face and about the assembly of learning resources for that purpose; we have a certain design autonomy, whilst working within institutional boundaries that influence the structure of programmes and the technologies available to us; we have also developed to varying degrees the skills required to realise design decisions in online environments and we are responsible for the production of our materials.

The programmes for which we share responsibility are informed by understandings of language teacher development needs. The individual components of the programme also share certain characteristics, in turn informed by understandings about distance education and online learning, but equally they differ in areas that have intrigued us. We are, therefore, interested in exploring what drives the decisions we are taking as we make increasing use of e-learning potential. What are the different decisions we take as designers of the various modules that make up the programme? How do we arrive at the decisions we take.

Shared ground

The MEd programmes are structured around 6 taught modules and a dissertation. The participants, who may be native or non native speaker teachers, have a minimum of 3 years experience. Their teaching contexts are worldwide and immensely varied. These basic characteristics are significant in informing a shared ethos behind the programme. They come armed with knowledge of and experience in their contexts which form the basis of teacher learning as an interpretative process [1]. We share a recognition of 'the importance of reflection on and inquiry into those experiences as a mechanism for change in teachers' classroom practices as well as a forum for professional development over time' [2].

The contexts in which the distance learners study are, in turn, characterised by very personal situational factors which we know 'can facilitate or impede the process of adjusting to distance learning' [3]. These include social and family factors, life events and work commitments.

Added to this picture of our learners is the technology scenario, which is varied. As course designers who have clearly accepted e-learning potential within our institution, we use a range of artefacts to construct the learning experience: a web-based learning environment; onscreen, hyperlinked texts; document downloads in various formats; digitised videos for example of lectures or classroom scenarios; synchronous and asynchronous computer mediated communications tools. For many of our teachers, navigating these as part of a learning context is a new experience and not without challenges both practical and cognitive. White [3] talks of 'environmental restructuring' which learners need to

carry out to prepare for distance learning. In an e-learning context, technology set-up is central not only in terms of where and when access is possible, but also in terms of equipment and how it matches the technological sophistication of any delivery decisions by the institution. However, equally important is learner disposition towards technology and the mediating role it might play in their learning. Learners report varied preferences in this respect.

Finally, significant to an interrogation of course design decisions in this particular context is the fact that the potential for distance and onsite communities to be united through technological provision has also been considered. As Collis and Moonen [4] identify, the possibilities of sharing learning resources across dual mode programmes (face-to-face and distance), creating larger learning communities, widening access, achieving economies of scale have begun to influence provision in contexts traditionally described as face-to-face. Our programmes illustrate different decisions about dual mode learning communities.

A tale of two tutors and two modules

For this paper we focus on two of the modules, each of which is taught by one of the authors of this paper, Diane and Richard. Drawing on interviews between us and our e-learning support officer, we identify salient features of the modules through descriptive and conceptual accounts of each. We then consider how the foregrounding of specific influences on our thinking results in different approaches to course design. We each recount what emerges from this interrogative process in our own voice.

Diane: Computers, Language and Context

This module is concerned with the interplay between the three elements in its title, with a strong focus on technology in context. I aim not only to develop participants' knowledge of research and current issues of debate surrounding the impact of technology on learning contexts, but also an applied understanding of working within online learning environments. These aims are articulated specifically in relation to the changing roles of teachers and the technology-driven or -facilitated educational scenarios in which they increasingly find themselves. The following summarises the main features:

Instructional approach	Experiential learning; a social constructivist underpinning sees interaction with peers as an integral part of the learning experience.
Artefacts	Web based space; instructional text provides synthesis of the topic area; links to further resources, reading, video; tasks to support the construction of knowledge and provide opportunities for collaborative practice (reading, reflection, pair and groupwork, forum contributions).
Interaction	Forum provides space for task-oriented discussion and learner-initiated contributions; synchronous seminars timetabled for certain topics; strong expectation of participation though regular not required.
Time and pacing	Release of content paced according to a pre-determined schedule; distance timescale the same as onsite.
Community	Distance and onsite learners participate as one community; onsite learners become 'distance learners' so that they fully situate themselves in an online learning experience.

It is a module I conceptualise using terms such as 'experiential,' 'social constructivist,' and 'participatory'. Critical reflection is a key outcome and I see this as being achieved through a 'situated, online learning experience'. In explaining this, I refer to the notion of loop input, a technique in teacher development which Woodward [5], describes as 'an alignment of the process and content of learning,' in this case learning *about* online learning *through* online learning.

Furthermore, the belief that the module outcomes themselves relate to experiential learning extends to decisions about how the onsite learners also engage with the content. In this respect, the distance module has influenced the teaching of the onsite group. The two communities are united in all respects:

as a single study group with a shared virtual study experience. This means that onsite learners 'become distance learners' with no face-to-face sessions. Whilst recognizing some tensions in pursuing these lines, related to programme schedules and indeed onsite student expectations, my concern for a course design methodology that provides for a situated experience for learners drives the decisions in terms of approach and use of the online environment.

When talking about content design, the interplay between the online, instructional text and the types of task are central to my view of knowledge construction. These tasks variously encourage practical engagement with exemplars, targeted reading prompting critical reflection, reaction and discussion. The forum provides the platform for such discussion, sharing and 'externalisation of thinking'. Some synchronous activity is timetabled for the group and may be arranged by pairs or groups independently. Learners, therefore, need to not only be able to access resources online but also need to *be* online for a good deal of the module's activities. However, here again I relate these decisions to a belief that my participants learn *about* online learning *through* both positive and negative experiences. I recognise that peer interaction in the forum is not unproblematic. There are those who participate and those who do not. The act of forum contribution should itself be a focus of introspective analysis on behalf of the learners. It raises questions about participation, community building and learning, about the dilemmas faced by an online tutor in designing and managing such courses. I want the module to encourage this critical engagement with the potentials and challenges identified by research into online learning. I want to put my learners in a position to debate the same dilemmas that I myself identify in my own decision making as an online course designer and teacher.

I illustrate this through talking about various episodes in the module. Of the challenges of collaborative tasks, I noted in the interview that:

> if I have got somebody in Hong Kong, Mexico City, Manchester, wherever, and they are having to collaborate on a web page together, they've got to decide where to put it, the design, share content. They don't fully appreciate the demands of trying to get that going until they do it themselves. As they do it they fill in diaries, logging their own experiences of actually carrying these things out.

I believe the module processes should be open to critical analysis. Referring to a specific example of a synchronous seminar:

> [The learners'] observations were very interesting, they were about my struggle to actually keep the group in order, which is what I want them to do. Their analysis was actually of me, and what I had tried to do, and the effect of having 4 people one night, then 10 Wednesday, 6 or 7 on Thursday. That was perfect, they could actually see the challenges of synchronous communication of different sized groups, and what an on-line tutor has to do, to actually make sense of a seminar like that.

It is important to provide access to a range of online learning opportunities and to reflect on the challenges as well as potentials of using virtual spaces to achieve what they know works in their more familiar settings, what constraints might inform their own practice. Their assignment further links content and process, requiring a review of an area they have explored through their reading and discussions, and a critical analysis of the online learning experience supported by data from their diaries and communication logs.

The module is not without its design dilemmas. I identify one such dilemma which relates to the learners' situational factors', that is whether to provide for a learner-paced approach, providing optimum flexibility in terms of when learners access the content, or to impose the pace by making content available to the group according to a specific schedule. Researchers have identified various sides to this dilemma. Imposed pacing can impact on retention, provide for social integration and support, and facilitate a conversational approach to learning [6]. On the other hand, self pacing responds to the autonomy that distance learners often seek [7]. My own learners also identify needs for autonomy in determining how they plan and manage their studies. This has resulted in a negotiation at certain points, with the content being 'released' to learners ahead of time to allow for personal pacing. Nevertheless, I still feel that a group pacing both facilitates 'timely' peer exchange, and provides the situated group experiences necessary for teachers to stand back and appraise for themselves how they

feel about key aspects of online learning processes. However, the tension between this aspect of my thinking and the learner experience remains unresolved to a large extent.

Richard: Intercultural Communication for Language Teachers

In this module I aim to explore the interculturality of language teaching and the role of being a language teacher. The focus is on the development of an understanding of the intercultural aspects of language education, language teacher education, and the teaching of cultural studies and intercultural communication training. The module is concerned with appropriate methodology and aims to arm the teachers with the knowledge and skills to be able to reflect critically on issues of appropriacy in their contexts. It can be briefly described as follows:

Instructional approach	Resource-based learning; learners provided with pathways through the territory via a guiding instructional text which provides a 'tutor voice'; the routes followed are determined by participants.
Artefacts	Web based resource bank; downloadable documents; some video and print materials posted.
Interaction	Module forum as a learner space to enrich experience of working in an intercultural community if they wish to use it, but participation not a requirement.
Time and pacing	Materials provided at regular points for autonomous, self-paced access; distance timescale the same as onsite so that learners can appreciate the wider intercultural community.
Community	Distance and onsite learners access same web area; invited to participate in forum exchange though predominantly used by distance learners.

I characterise this as 'a very large territory', taking the students into many different disciplines including anthropology, sociology, and psychology and I see my role as being to manage some of that territory, so that my students can make informed choices.

When talking about the module design, I talk of the module's 'ingredients' and describe it generally as 'resource-based learning'. These resources include a module web area, which I in turn describe as a 'module resource centre' with an assemblage of documents in html, Word and pdf formats; links to electronic papers; bibliographies; links to a forum space. Some documents are photocopied and posted to distance learners where online access is not possible. I provide pathways or a 'map' through these various resources. This is also a dynamic space, with resources added in response to participant suggestions.

I place importance on demonstrating 'areas of commonality' between onsite and distance cohorts and the module brings the two communities together through access to its resources, both online and print, within the same overall timeframe of one semester. I see this as enabling me to 'bridge the boundary that might otherwise be seen to be in place between the different modes of study or the different locations of study'. The two groups are serviced by many of the same resources, many of the same processes:

> I try and get a parallelism, so I can say yes, this student has had an equivalent learning experience, using the same kind of resources. Accepting there are certain constraints on that, I want to see that they are both as rich as possible and one is not an improvised version of the other.

I am not only concerned for parallelism of experiences but also for equity in the way in which I provide for learners' own preferences for learning. I relate this to issues of appropriate methodology. For example:

> People can participate in all sorts of ways, it's not just by talking; the subject matter being about appropriate methodology logically would suggest that I want a learning experience which is equally available to everybody. So their learning styles have to be

> accommodatable within that experience. So I don't insist all the on-site students talk, if they don't want to say things, I won't force them to say things. Equally if people don't want to participate in the forum, I won't force them.

Equity also relates to practical decisions about how I provide learning content for distance learners with diverse environmental situations. Learners must be able to access resources online but they are not required to be online for sustainable periods of time. They can engage with the content offline as they download, print, explore avenues independently. Documents created for onscreen access exploit the technology by linking to and helping to provide pathways through these various resources, and I describe these as allowing me to 'speak to the learners,' providing 'a commentary,' 'shaping their experience' in much the same way as the learning experience in my face-to-face classroom. It is with respect to these documents and my tutor voice that I refer to 'interactivity' and not the forum. This latter is a space which I acknowledge as potentially 'enriching the learning experience' but is not in my eyes the primary mode of interaction.

I am also conscious of potential challenges to the use of the forum and these relate again to my concern for equity. I am aware that the learners, who are not all interested in technological issues in their own right, may be inexperienced in and/or less disposed towards the use of such tools for learning. I know about some learner discomfort as courses have increasingly moved online. This has related to access, to understanding how tools work; to perceptions of the potential of such tools to add value to the experience, and to some learners' experience of forum communication as potentially intimidating.

Beyond seeing my role as one of 'managing the territory' for my learners; I respond to participants' interests and developing directions, reflected in the dynamic nature of the resource bank, through which I and participants continue to share what we find along the way. I also refer to myself as 'monitoring learning preferences' and am less comfortable with the term 'moderator' prevalent in much of the online learning literature [8]. Whilst I help learners to see the path through threads within the forum by weaving contributions as they emerge, but I do not step in to require contributions. I talk of encouraging learners to come in by 'providing signals', but I recognise that not all will wish to participate; I am uncomfortable with any notions of prescriptiveness that are counter to the course culture and indeed to an interculturalist view of language teacher education.

Influences on course design decisions

There are various areas of decision making in the design of any course. In the descriptions of our two modules, there is evidence of a rationale for our decisions with respect to:

- the design and delivery of the assemblage of artefacts that provide the learning experience (resource bank, onscreen instructional text, media types, task types, communication tools);
- interactions during the module either between learner and content, or learners and peers and tutor as exemplified in task design, tutor voice and tutor role;
- thresholds of access to the online environment (do learners need to *access* online resources or do they need to both access and *be* online at specific moments?);
- decisions about timescale, pacing, scheduling of content (lockstep or self-paced);
- decisions about dual mode teaching (onsite and distance communities; related issues of scheduling).

As Collis and Moonen [4] suggest, these decisions may be situated on a cline of flexibility, involving greater or lesser learner autonomy or tutor direction. However, accepting these dimensions of choice, interrogation of our own design decisions illustrates how the choices we make are informed by a number of influences that relate to our thinking about appropriate learning experiences. The specific decisions, as exemplified in the two cases, are influenced by our:

- views of our participants as teachers and as distance learners;
- specific views of teacher education;
- beliefs about how learners engage with and acquire knowledge of their subject area;

- views of our roles as tutors mediating the learning experience;
- views of knowledge acquisition and participation, and how these relate to beliefs about learning;
- views of learner communities and what different communities gain from each other.

However, to provide a listing of individual factors alone is too simplistic a picture. For each module, there is a dynamic evident that sees us foregrounding the drivers behind the design of their modules in different ways. We both talk about similar areas of decision-making; we both refer to a shared understanding of teacher education; and yet we talk about and realise our modules in different ways.

Diane: My belief is that the outcomes of my module are intrinsically related to experiential processes, and the various design decisions I take aim to work in tandem to create that experience: immersion in a context that sees *all* learners as part of a distance community; a content design that exploits hypermedia potential to construct knowledge through guided exploration; tasks that see a locus of knowledge construction as being through reflection and discussion; a pacing that aims to support the dialogue associated with a community of learners exploring the area together.

Richard: My beliefs are focussed by a concern for appropriate methodology, in turn a central precept of intercultural awareness that I encourage through my module. My reaction against prescriptiveness both derives from this position and informs design decisions within my module. My decisions about providing flexible resources, signposting pathways through the territory I describe but not requiring a specific direction, pacing and my foregrounding of the individuality of the learning experience are all consistent, I hope, with my concerns for my learners as a diverse intercultural group.

Our interrogation of our approaches to the design of our modules has surfaced some personal realisations of beliefs about e-teaching and learning, of the specific influences that result in the modules we describe, of the impact of our decisions on the learning experience. They suggest that exploring how the interactions between these inform course design decisions in an online environment is an avenue for further research.

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A PEDAGOGICAL FRAMEWORK FOR THE USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY IN INITIAL TEACHER TRAINING

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Abstract

This paper describes the initial findings of a longitudinal case study that investigates the use of e-learning and communications technology to enhance the placement experience for full time post graduate certificate in education (PGCE) students. It is a work in progress examining how a VLE might be used to support trainees while they are on placement. Geographically separated trainees can feel very isolated on placement. The purpose of the VLE site was to try to alleviate some of the loneliness associated with placement by offering a way for trainees to maintain contact with each other, and to offer mutual support for the work they were doing.

This paper describes the initial findings and analysis of the study, giving the depth and breadth of trainee usage of the site over the course of the academic year. The findings from the trainee evaluations of their use of e-learning technologies while on the course are also given. A preliminary analysis of the results is used to offer some insight into how this type of support might be improved for future students, and a minimum pedagogical framework is recommended for the implementation of VLEs for initial teacher training.

Introduction

This paper describes the initial findings and analysis of a longitudinal case study investigating the use of e-learning technology, specifically a virtual learning environment (VLE), to enhance the training experience of trainees on the professional year post graduate certificate in education (PGCE) their initial teacher training (ITT). The purpose of the research is to try to determine if the trainee placement experience can be enhanced by using the communication and collaboration opportunities provided by the VLE to negate the geographical isolation of students. The VLE is seen as an enhancer, providing further opportunities and alternatives, rather than as a replacement or substitute for face to face teaching and learning. The paper aims to present the preliminary findings of the study, and also to propose a minimum pedagogical framework for the use of VLEs in teacher training of this nature, based on the results of this initial analysis.

Context and background for the research

The research is grounded in theories of networked collaborative learning (de Laat and Lally, 2003, Jones, 2000), linked with socio constructivism (Dillenbourg, 1999, Kyriakicou, 1999, Vygotsky, 1978) and communities of practice (Wenger, 1998). Previous research recommends that trainees have equal access to the shared electronic resources, and that a sense of community is created between the learners in the group, giving them opportunity to structure the online experience for themselves. Research that has explored the 'connectedness' of the trainees who engaged with the VLE for the purposes of study, reports that there is a heightened sense of feeling connected as part of a wider learning community (Thurston, 2005). The forming of the sense of community is deemed to be a necessary initial step in online collaborative learning (Wegerif, 1998). Other research has identified key issues of access to the technology and support for teachers, amongst others, as being important to the success of the use of communications technology for teaching and learning (Abbott *et al.,* 2005). In other studies, research confirms that electronic conferencing can be used as a tool by which to enhance the learning and teaching of trainee teachers, but that its success depends on the nature interaction and level of collaboration among the participants (Kyriakicou, 1999). Research done in Northern Ireland has some

parallels with the work done here. This research reports that online discussion not only reduced the sense of loneliness often felt by trainee teachers when they are dispersed on teaching practice, but also helped to build a community of practice among them (Clarke, 2002). This study also aims to explore the potential of the discussion forums within the VLE to promote and support communities of practice (Wenger, 1998). The purpose of the study was to establish, over the course of a number of years, and through iterative practitioner led research, a pedagogical framework that utilised e-learning technology, and which would enhance the placement experience for trainees.

Methodology and methods

The approach taken for the study is that of an evaluative, longitudinal case study (Bassey, 1999, Yin, 1984), looking at how the technology might be used to enhance the placement experience for trainee teachers. The methodology is that of practitioner led action research, with the tutor as participant and researcher. It engages with both context rich qualitative and quantitative data collection and analysis, searching for themes within and across a distinct number of data sets. This provides methodological triangulation to the study and thus adds rigour to any conclusions drawn (Cohen and Manion, 1994).

Trainees start the one year Applied ICT PGCE in September of each academic year. During that time, the trainee spends approximately one third of their time at university, and two thirds of their time on two separate school placements when they are geographically isolated from each other. All the trainees in this study have a degree in information technology, (IT) and some also have either higher degrees and or work experience in this area also. All had access to a computer with internet facilities for the duration of the course. The VLE used for this research was Blackboard©, and a site was set up specifically for use by the Applied ICT PGCE trainees early on in the course (October). The site was set up to provide a place (or space), albeit virtual, where they could swap ideas, raise questions, discuss issues and experiences, and so on, despite their physical separation from each other. In addition to this, the trainees had received familiarisation sessions on the use of the VLE, and had also been given much group work in class, in order to get them working together as a learning community (Kyriakicou, 1999, Rovaii, 2001).

Consent was obtained from all participants prior to the start of the study. Over the course of the academic year, a total of six discussion boards were set up for use by the students. While the trainees were on placement, a number of synchronous chat sessions were also set up. A record of the use of, and access to the site was also obtained for the purposes of the study. An online survey, (accessible only from the site), was also completed by the students towards the end of their second placement (and academic year). The survey covered both their access to and usage of the site, and also their preferred learning styles. A group interview was also conducted with the trainees at the end of the course. This data was used to augment the data from the survey and the discussion boards. The interview was conducted for triangulation purposes, to clarify issues emerging from the other data sets. All the data sets were collated and analysed for themes within, and across them (Table 1), and this is described in the following section.

Results and findings

This section describes the results for each of the different data sets obtained from the study, and also gives a comparative analysis of the data from all the data sets.

Discussion board data analysis

Table 1 gives a summary of the usage and access results from the site.

Synchronous chat sessions

The synchronous chat sessions were conducted in November and December as previously stated. A total of four trainees participated in the first one, three male and one female. The session was very friendly and informal, and the participants covered a wide range of topics relating to their teaching experiences. The archive from the November session is summarised in Table 2. When asked if they had found the session useful, there were positive responses from the students:

"[...] better than nothing but I do prefer face to face"

" but at least it is a form of real time communication"

" yeah some good ideas"

" yes [tutor's name] definitely useful"

The second chat session was terminated early because of technical difficulties with the site that prevented access to the 'chat room' for some participants.

Group interview

The whole PGCE cohort, (a total of 11 trainees) participated in the group interview held at the end of the course, 10 male and one female. A summary of what was said is given in Table 2. Some trainees found the documents on the site useful, and some found the discussions useful, but, 'only if they got going'. Trainees also mentioned problems with technical issues and familiarisation as being issues for non participation.

Preliminary comparative analysis of data

It is beyond the scope of this paper to fully document all the data from the study. A summary of the data from the separate data sets, for comparative purposes, however, is given in Table 1.

Table 1: Summary of all Data Set Findings

Data Set	**Summary of findings**
BlackBoard© site usage	There was low usage of the discussion boards throughout the duration of the course. Teaching Practice 1 (TP1) discussion board was the most used, followed by Teaching Practice 2 (TP2), Assignments, Urgent and Interviews. TP1 had the most participants the other discussion boards had similar lower numbers of participants. The data also showed that the tutor engaged significantly with most of the boards, (placing at least 20% of the messages on all boards) in order to respond to any questions set and to encourage further usage of them. The total number of hits tailed off as trainees entered the final phase of the course and move to full timetables in placement two around the end of March, beginning of April. Site usage dropped off significantly over those months, particularly at the very end of the course when trainees have completed their second placement at the end of May.
Synchronous chat session	Low participation rate. Very friendly and informal. Lots of topics covered. Very practical help offered. All participants found it useful.
Questionnaire	Low time spent by trainees per week on. Mostly accessed for reading. 60% of the group made regular contributions. No real difference in use on/off placement or between TP1 and TP2. 80% of the group happy/satisfied about amount read and contributions of tutor. Trainees were less than happy with the level of their own contributions. 60% of the group said it enhanced their ITT but that the discussion boards were dominated by a few. Ideas for improvement and use of site were given. Trainees said that the use of email as communication far outweighs the site. Learning styles indicated are those of a preference for learning with and from others, interactions with others were given as important (except family). They like to participate, discuss, reflect and learn with and from others.
Group interview	All agreed that was a low priority and a comfort blanket at the start of TP1 only. Site needs to be available from the start of the course, and to be the main point of contact to increase usage and thus to make the discussion boards useful.

A comparison of all the data sets, given in Table 1 shows that the low participation rates observed for the site and the synchronous chat session, are supported by the responses to the questionnaire and the group interview. Low participation rates are also reflected in the interview comments and questionnaire returns, which show that the discussion boards are dominated by a few participants, and that the trainees preferred to use email rather than the discussion boards to maintain contact with each other.

The trainees indicate, in their responses to the learning styles part of the questionnaire, a preference for socio-constructivist type learning. That is, learning through interaction with others. The responses showed a preference for participation, discussion, and reflection with each other. This preference for interaction with others as a way to learn on the course is something, however, that is not reflected in the use of the site. This preference for socio-constructivist type learning may be something that may not be transferable from face to face to online situations, as indicated by the low participation rates. The comments made at the group interview support this data, and also give some indications for improvement of the use of the VLE for future groups. These are discussed in detail in the following section.

Discussion and analysis

In this section of the paper it is intended to present ideas on what the findings of the study might mean, and also what they offer in terms of recommendations for future work in this area. A minimum pedagogical framework is also proposed for the implementation of VLEs in initial teacher training.

Data from the study indicates that the VLE was, at best:

- An enhancement only.
- Useful for information but not really used significantly as an interactive and collaborative tool.
- A comfort blanket at the start of placement only.
- A low priority.

As with other studies (Galanouli and Collins, 2000), this study found that the frequency of communication falls off during school placement, though not due to network access, but more because of the reasons stated above. A balance is required of time spent by tutor against benefits to students, and it may be more appropriate to look at alternatives to running an interactive VLE for ITT (Angier, 2004), even if this means going against the tide of pressure to use interactive, collaborative, electronic resources across all education sectors DfES (Kelly, 2005).

Trainees on such an intensive course as ITT, need to make rational workable decisions about what to spend their time on, and how to prioritise tasks. In doing so, they tend to look to where they will get the most benefit for the least effort, because their time is both very precious and very limited. There is still much to be learnt about the way trainee teachers perceive the benefits of using e-learning tools while on placement. For some the cost of time is a prohibitive factor when so many other pressures challenge their daily routines. The intention, therefore, is to ensure that the VLE is implemented on initial teacher training in such a way so as to make the best possible use of their time. It can provide the support that they need when they need it, as they need it, most effectively, through the use of discussion boards and synchronous sessions, if these have been put into practice using the pedagogical framework described in the next section of this paper as a basic set of conditions for this type of course.

A minimum pedagogical framework for the implementation of VLEs in teacher training

From the analysis of the initial findings of this study, a pedagogical framework for the implementation of VLEs for ITT is as proposed as follows:

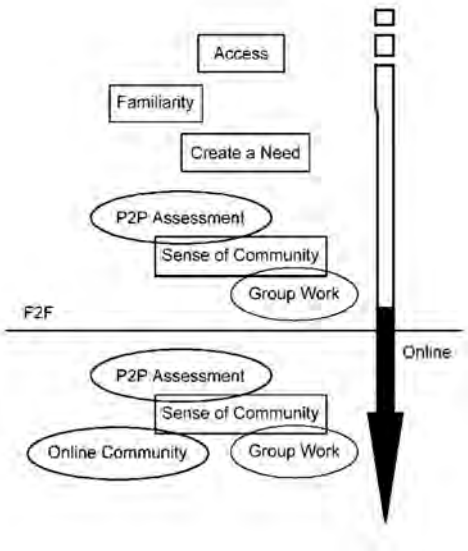

Figure 1. A pedagogical framework for the use of VLEs in initial teacher training

1. Ensure that trainees have access to the site and are familiar with it.
2. Engender/encourage the trainees to become a face to face learning community prior to the geographical separation of placement, including the use of peer to peer assessment, and also using collaborative exercises to build their confidence in, and respect for each other. Embed the use of the site in the face to face sessions to model good practice, for example, using the site to access course information and link to other useful sites.
3. Make the site the focus of communications on the course – give them a need for it.
4. Provide online peer to peer collaboration exercises that can only be done via the VLE.
5. A critical mass of active participants – pivotal to the success of this type of online learning and participation.

From the results of this study, the most crucial aspect for the success of the VLE is the number of students. Thus, even if you put the framework in place, without a critical mass of trainees to participate, to interact on line, the potential benefits of the VLE to the trainees might be lost – or simply just not gained. The paper has presented the findings of this study as a work in progress. It proposes a minimum pedagogical framework for initial teacher training in order to enhance the placement experience of geographically isolated students. The practical steps taken to improve and enhance the experience of trainees on placement will be reviewed and investigated over the coming months.

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UTILIZATION OF ICT IN THE TEACHING OF ECONOMIC SUBJECTS IN SECONDARY EDUCATION

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Introduction

Education has an immense economical value, due to its determinative contribution in the economical development of people and societies (Athanasoula – Reppa, Koutouzis, Maurogiorgos, Nitsopoulos and Halkiotis 1999, Commission of European Communities 2001, Mankiw 2001). Teaching on the whole, as part of the educational process, aims to aid the trainee in accomplishing those changes that have been set out by the aims of teaching in a learning, sentimental and psychokinetic level. Inextricable part of the teaching-learning process constitutes the evaluation, that is to say, the systematical process of determining the accomplishment of the educational targets (Vergidis, Lionarakis, Makrakis, and Martalis 1998, 1999, Demunder 2001, Dimitropoulos 1999, Papanastasiou 1993).

One of the aims of the educational systems is the efficient adjustment of the citizens of tomorrow in the social, cultural and economical environment. In the last decades the development of ICT has brought radical changes in the developed and under-developed societies, influencing most of the sectors of human activity and creating demands for the adjustment of the educational system in the development of technology and the demand for utilization of ICT in the teaching of subjects (Vrizas 1990 Kalavasis and Meimaris 1997, Fesakis 2003). Various attempts of involving ICT in the teaching process were made and are being made by teachers. The object of the research that is being presented here was the evaluation of the contribution of ICT in the teaching of Economic Subjects that are being taught in Secondary Technical and Professional Education (ICT).

Instructional Utilization of ICT

In the teaching of Economic Subjects, various techniques can be used: lecture, question expressing and brainstorming, team assignment, study cases, simulations, research assignments etc., as well as various audio-visual means: pictures, cartoons, photographs, maps, posters, transparencies, slides, video (Whitehead and Makridou-Mpousiou 2000). Contrary to the abundance of methods and techniques and the ascertained belief that the means and techniques offer the opportunity to every teacher to increase the students' interest for the teaching object, the teaching of Economic Subjects are dominated in a high percentage by the method of the lecture (Becker and Watts 1996, 2001, Makridou-Mpousiou and Tirovouzis 2002). The ICT contribute in the preparation and transaction of a more desirable form of lesson and create the preconditions of improvement in communication of the teacher-tutelages.

The teacher's role during the teaching process with the use of ICT is encouraging and advisory in the course of self-learning. The implementation of ICT in schools aims at the promotion of new forms of learning and the creation of preconditions of their utilization in all subjects (Kontakos 2002, Raptis and Rapti 1998). Advantages of the usage of the ICT in the teaching process are: multiple ways of presenting and approaching the same information, reduction of the time for gaining knowledge, simulation of real situations, creation of a co-operative environment, etc. (Kokkos, Lionarakis, Matralis, and Panagiotakopoulos 1998, 1999). The European Union considers that ICT can contribute positively in the implementation of active pedagogical methods and in the improvement of teaching quality and to play a catalytic changing role (European Union 2000, Commission of European Communities, 2000a, 2000b).

Research Questions

Based on the issues that were put forward above, the following questions are being investigated:

- to what extent the teaching of Economic Subjects with the use of ICT makes learning more efficient and helps students improve their performance, and

- has the use of ICT in teaching got more effect on boys or on girls as far as effectiveness of learning and improvement of performance are concerned?

Methodology of Collecting Information

The object of the research was to evaluate experimentally the contribution of ICT in the teaching of Economic Subjects. This constitutes a relation of the cause (teaching method) – result (learning effectiveness). The quantitative research methods refer to: the search in relation of the cause – result, in designing and usage of standard means for the carrying out of the research and in processing information with the techniques of statistical analysis which are very useful when the aim of the research is to compare the grades of people, as well as, performance or behavior under different conditions. The traditional experimental approaches of educational research use the quantitative means and the findings in order to examine the contribution of various factors in the under study behaviors (Bird, Hammersley, Gomm, and Woods 1999, Faulkner, Swann, Baker, Bird, and Carty 1999).

Research Process

The research was conducted in two phases: experimental – teaching interventions and progress tests. The sample was divided into two teams, experimental (Experimental Team, ET) and evaluation (Team of Evaluation, TE), by chance, not reestablishment. A particular chapter of the lesson "Principles of Economic Theory" was taught by the same teacher to all students. To the students of ET a method with the use of ICT was used, whereas, to the students of TE a traditional face to face teaching method was used, with the help of lecture. Following that, all the students filled the progress test.

For the teaching in ET, the computer laboratory of 2nd Technical Vocational Education School (TVES) of Rhodes was used. The presentation of the chapter was carried out with the use of the Power Point and Excel programs. In the implementations of Excel, the students had the ability of intervening and changing the data. The teacher had the ability of intervening in the computer of each student with the program PC-Anywhere. Furthermore, he was intervening with short lectures, taking up the role of the coordinator of learning whereas, the students, with the help of ICT "discovered" the new knowledge through testing.

Gathering Data Tool

The present research belongs to the prognostic researches (organized evaluation of the effects that a particular prediction will have, or a set of predictions, Faulkner *et al.,* 1999), aiming at the evaluation of the effects of teaching with the use of ICT in the effectiveness of learning. As a gathering tool of the necessary information, an objective-written test was used with prearranged and particular answers, independent of the subjective judgment of the evaluator, common for both teams, which substitutes the most important means in the evaluation of a student (Dimitropoulos 1999). It included questions which needed a true/false answer and questions of recalling development and production (exercise) and had as an aim the evaluation of succeeding in learning and the investigation of students' ability, following the teaching of the particular chapter, in order to use the knowledge they gained in solving simple practical problems.

Sample

The sample of the research consists of 62 people at the age of 17-18 years old, 36 male students (58%) and 26 female students (42%) of the First Class of the 2nd Circle of Studies, specialty Assistants Of Economic Services of the Sector of Economy and Management, of the 2nd TVES of Rhodes during the school year 2004-2005. In the ET 16 boys (52%) participated and 15 girls (48%), whereas in the TE 20 boys (64%) participated and 11 girls (36%). In the present research the contribution of ICT in the teaching of Economic Subjects was studied experimentally, with the use of a symptomatic sample. The conclusions from such a sample can then be generalized in populations with similar characteristics with those of the sample (Bell 2001, Cohen and Manion 1994, Faulkner *et al.,* 1999, Paraskevopoulos 1980).

Findings

The statistical analysis of the data was carried out with the Microsoft Excel 2002 program. The study of statistical importance was carried out with the t-criterion. Two measurements were used: before and after. As a measurement before, the students' progress in the written examination of the second term of the school year 2004-2005 in the subject of Principles of Economic Theory was considered whereas, as counting after, the grades that the students obtained in the progress test was considered. The averages of the progress (in the 100th grade scale) before and after according to the team appear in Figure 1.

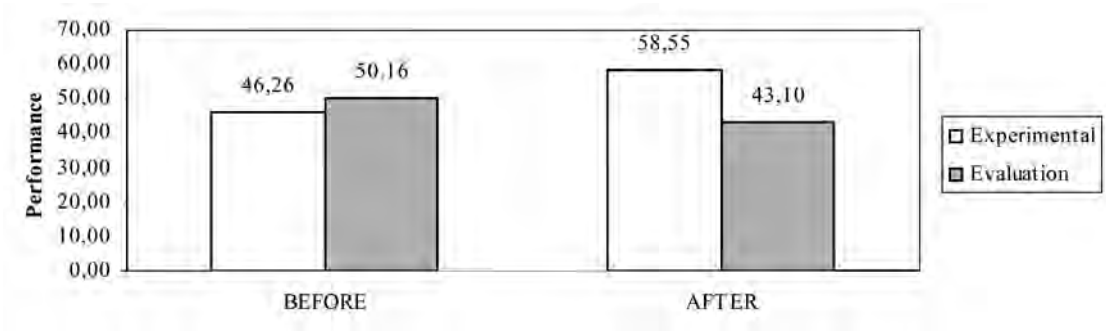

Figure 1. Averages of performance before and after according to team

The alteration in the average of the experimental team by 26.57% (an increase from 46.26 up to 58.55), is statistically important ($p<0.01$). On the contrary, the alteration of the average of performance of the evaluation team is not statistically important ($p>0.05$). Furthermore, there is no statistically important difference ($p>0.05$) in comparing the averages of performance of both teams in the measurement before the didactic intervention. The comparison of the averages of performance of both teams after the didactic intervention is shown in Figure 2.

Figure 2. Averages of performance before and after according to team and sex

The average of performance of the experimental team (55.55) is higher ($p<0.01$) than the average of performance of the evaluation team (43.10). From the analysis it appears that the boys of the experimental team after the didactic intervention with the use of ICT in the teaching of the lesson, improved their average performance by 57.70% (an increase from 37.13 to 57.44), a difference that is statistically important ($p<0.01$). On the contrary, the change of the average performance of the girls of the experimental team (from 56.00 to 59.73) did not occurred from the analysis that was statistically important ($p>0.05$). Furthermore, no statistically important change occurred ($p>0.05$) for neither boys nor girls of the evaluation team. As a conclusion it appears that the use of ICT in the teaching of Economics was found to have an effect in boys but not in girls, as it aided the boys to improve their average performance in the particular subject, soothing which did not occurred with the girls.

Discussion

The results of this research appear to confirm the important role that the ICT can play in the teaching of Economics, helping the students to improve their performance dramatically in Economics. In this particular case the use of ICT and mainly the use of the Excel program, contributed in learning, functioning interactively and giving the opportunity of testing and altering to students. The increased motives that the technologically supported environments offer and the coordinating role of the teacher in the way towards discovering knowledge, have led to the students' improvement of performance. Furthermore, from the research's point it appears that the use of ICT in teaching has an effect more in boys but not in girls. Other researches have reached a similar conclusion (Vrizas and Tsitouridou 2002). According to children's and teenagers' conceptions, the Computer is the mean that contributes more in learning than any other means. The sex is related to the preference of Computer and, in particular, the boys prefer the Computer more than girls. The boys show more positive attitudes than the girls towards the Computer (maybe because the world of Computers is more directed towards the boys), whereas the girls, more than the boys, towards the book and writing (Roe 2000, Millard 1997, Morley 1986).

The purpose of the didactic utilization of the ICT is to impinge pedagogically, too. Their influence is apparent in the teaching and arises from their presence only (Kontakos 2002). Teaching with the use of ICT, in contrast to the traditional teaching, offers the opportunity of interactive and combinative use of various means, static (presentation programs) and dynamic (interactive applications). The didactic utilization of the ICT can contribute in the transformation of learning in a more self active and effective process, whereas the main target of introducing ICT in schools is the promotion of new forms of learning and the creation of preconditions of their utilization in all the subjects (Kanakis 1989, Kontakos 2002).

The use of the ICT in the learning process does not bring about automatically its improvement. In order to offer the expected the learning dynamic of the ICT, particular cognitive, encouraging and occasional circumstances are pre-required from the student's side so that he/she can make him/herself able to appropriate it (Kontakos 2002). The educational research at this point is called to play a role of essence, highlighting multilaterally the chances, the capacities and the problems that are created by the incorporation of ICT in the learning process and at the same time offering the appropriate scientific frame for pedagogical dialogue (Anthogalidou 2001, Baylor and Ritchie 2002, Vosniadou 2002, Gialamas and Kasimati 2001, Chen and Huntsberger 2001, Kelesidis 1998, Makridou-Mpousiou and Tirovouzis 2002, Pelgrum 2001, Tzimopoulos 2002, Raptis and Rapti 1998).

The effective use of ICT in teaching Economic Subjects (but generally of all the subjects) requires a series of interventions: (a) basic teacher training in ICT and their updating for the targets of education in the frame of the Society of Learning, so as to use the ICT in order to make the students capable of learning by themselves, to learn how to learn; (b) support of the use of ICT by the administrative school mechanism, continuous upgrading of the school equipment, appropriate technical support; (c) restructuring of the curriculums and didactic manuals (Anthogalidou 2001, Vosniadou 2002, Raptis and Rapti 1998, Tzimopoulos 2002, Fesakis 2003).

Conclusion

The didactic utilization of ICT in the teaching of Economic subjects contributes to the more effective learning and to the important improvement of students' performance. However, a series of changes and interventions are required for the introduction of ICT in the teaching of other subjects apart from Computing. These are detected mainly in teacher training, the adjusting of the Curriculums, change of didactic manuals, the equipment and the technical support of schools and finally the support of the venture by the administrative school mechanism. In the case of manifestation of the above, the utilization of ICT in the didactic process will contribute to the more effective learning and the teacher's role will change to that of the "pilot" in technological learning environments and the students will learn how to learn.

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FROM CONTENTS TO COMPETENCES THROUGH LEARNING DESIGN: THE CASE OF DATA MINING

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1. Introduction

Fostering the key competences that are required by each and everyone for their personal development, for their social and professional integration and for acquiring entrepreneurial skills in a knowledge-based society is consequently a matter of priority in the educational sector. Nowadays, e-learning is one of the most promising and growing issues in the information society. The growth of the Internet is bringing online education to people in corporations, institutes of higher education, the government and other sectors (Rosenberg, 2002), and both the growing need of continuous education and the inclusion of new multimedia technologies become crucial factors for the expansion of lifelong learning.

Some of the professions that are evolving at a faster pace are those who are linked to the use of the Information and Communication Technologies (ICT). In the field of data engineering, and in the data mining field in particular, an interdisciplinary working team is needed because, depending on the application context, professionals from different fields must work together: economists, market experts, biologists, computer engineers, mathematicians, etc. It is also necessary to acquire competences in a continuous training approach to be up-to-date about the current market tools, and to be able to deal with the huge amount of information that is available on the net as well as on the companies in itself. In this scenario, lifelong e-learning could be the key, and virtual learning is improving the acquisition of new competences through the use of a virtual campus that allows the use of new tools related to ICT, collaborative work and competence development. This complex teaching and learning scenario needs powerful tools for describing all the interactions between learning resources, activities, development of competences, learning goals and so. Therefore, we promote the use of the IMS-LD standard for designing the new educational organization of the data mining subject according to the new directions given by the upcoming Bologna process.

This paper is organized as follows: Section 2 describes the services offered by the virtual e-learning environment of the Universitat Oberta de Catalunya, and the particularities of the students which are enrolled to the data mining course. Section 3 describes the new needs and trends of the data mining field, and a proposal for adopting the directions from the Bologna process, reviewing the contents, learning goals and competences is also outlined, using the IMS-LD standard. Finally, the conclusions of this paper and the current and future research lines are summarized in Section 4.

2. Context

Universitat Oberta de Catalunya, UOC – in English known as Open University of Catalonia (Sangrà, 2002) is a completely online university which offers 20 official degrees, several graduate programs and post-graduate studies, and a doctoral degree, with more than 35000 students and more than 1500 people including instructional designers, teachers, tutors, academic and technical staff, and so. The UOC virtual campus is an integrated e-learning environment which allows users to communicate with other users using a mail system with complete timetable independence, using an asynchronous approach, and includes an agenda, a news service, virtual classrooms and laboratories, a digital library and other e-learning related tools. UOC has a student centered pedagogical model that ensures a guided learning path through the use of selected learning resources, according to the experience of a team composed of instructional designers, usability experts and, of course, teachers.

Within the UOC virtual campus, each subject has a virtual classroom with all the needed elements for the development of the teaching and learning process: e-mail, access to documentation, the activity based teaching plan model, access to evaluation results, access to the teacher board, forums, debates, etc. The virtual campus classrooms are the meeting point of the different learning activities. The teaching plan is a document which summarizes all the learning activities the students must carry out in

order to follow the proposed learning path, helping them to achieve the learning goals and competences developed by each subject.

2.1 Student particularities

It is worth to take into account the particularities of UOC students. The most common profile is an adult with a full time job, and with an average age between 30 and 40 years old, married and with children, and mostly has got already a previous degree, but wants to be updated and improve his or her knowledge, either for personal or professional reasons. A study about the satisfaction of graduated students shows that they chose the UOC for the learning model as the main reason, because it is a fully distance online system that allows them to study from anywhere at anytime, and it is very flexible. Lifelong learning is also important, as 38% of graduated students have also chosen the university because they wanted to improve their knowledge, and 44% of graduated students have chosen a degree related with their job because 28% of students wanted to improve in the exercise of their professions.

In the case of the Computer Science degree, the data mining subject is available as an optional course, but it is also a free choice election for the students coming from other degrees offered at the university. Therefore, students taking the data mining course come from different degrees, such as Economy or Research in Market Techniques. Furthermore, this particular subject is also available to students from other universities, as part of an intercampus programme. Most of them chose this subject because of the real possibilities of immediately applying the acquired competences into their jobs. This diversity must be observed in order to ensure a correct integration of student backgrounds, particularities and goals.

2.2 The case of data mining

The data mining field is in a continuous growing process because it follows the increasing usage of information technologies and Internet (Goebel and Gruenwald, 1999). Data mining techniques and methods are needed to process this great amount of data (web server logs, database operations, etc.) and to obtain valuable knowledge from it. Similar things are also happening in companies and organizations in every working environment related to the Information Society. According to these parameters, it is necessary to help professionals to know the available tools and to acquire the ability to process data and to manage information. Due to these facts, there is a great formative demand about data mining.

Since five years ago, UOC has been offering a data mining course, for which at present there is a big demand from a great diversity of people with different origins, backgrounds, motivations and goals. In a certain sense, this course can be considered in itself as a paradigm of a large diversity of learner profiles combined into interdisciplinary work teams. The course aims to provide an introduction to the basic principles, methods, and applications of data mining. Students will gain knowledge on how data mining techniques work, how they can be applied across different domains by using these methods. This course combines the application of the previous knowledge that the students have learned in Statistics and Databases, with the presentation of new concepts and techniques. A set of methods coming from the Artificial Intelligence field, which constitute the main core of the data mining subject, are presented. The statistical concepts are very useful in this subject and will allow to better evaluate some of the techniques that will be studied. Although there are no formal pre-requisites, a basic knowledge of Statistics, Probability, Databases and Programming is expected.

The course is designed to provide a broad background in the design and use of data mining algorithms, usage of open source and commercial data mining tools, and specialized expertise in applying these ideas into a real situation. The aim of the course is to provide students with the experience of working with methods for analyzing new, complex data, and arriving at reliable and detailed summaries of such data. Students learn to identify a problem underlying through selected data examples, and to address this problem with a complete analysis stage and extracting the appropriate conclusions. The main goal of the data mining course can be decomposed in the following objectives:

- to know the data mining process and its different phases;
- to learn the main models that can extracted from the data;
- to know the techniques that allow constructing such models: when they can be applied and under which conditions, which kind of results do they provide, how the data must be preprocessed to be able to use it, and how its quality can be evaluated and compared;

- to learn how to choose a data mining task and model that best fits a concrete practical problem and to learn how to evaluate the results obtained;
- to use a commercial and open source software suite that implements some of the methods studied during the course, and to develop small applications for specific purposes.

Pursuing the future implantation of the Bologna process, it is necessary to work for the introduction of competences and for including the aspects more related with the student's needs. It could be possible to design more personalized and flexible formative itineraries, which give answers to the different professional careers, depending on the new advances of each new application of data mining techniques in the Information Society.

3. Adopting the Bologna process

Nowadays, with the creation of the new European Higher Education Area, also known as the Bologna process, it becomes necessary to shift from heavily content-based courses to others where the activity is the key concept. The activities and the competences developed by such activities will become the focus of any formative action. It is also important to promote the formal acknowledgement of skills, knowledge and competences gained through work experience, informal training and life experience, for prior learning recognition purposes. From the Bologna Declaration (Ade *et al.,* 1999), *"A Europe of Knowledge is now widely recognized as an irreplaceable factor for social and human growth and as an indispensable component to consolidate and enrich the European citizenship, capable of giving its citizens the necessary competences to face the challenges of the new millennium, together with an awareness of shared values and belonging to a common social and cultural space"*, thus lifelong learning becomes a clear objective, using a competency-based approach for designing personalized formative itineraries and promoting collaborative work.

3.1 Data mining course structure

Attending the different student profiles enrolled to the data mining course, and taking into account the previous knowledge that students need to have in Statistics and Databases, it is necessary to homogenize such background during the first phase. The need to homogenize profiles and the future professional harmonization in interdisciplinary teams determines that it is necessary to apply certain personalization for learning resources, and performing specific activities in order to promote the knowledge of data mining techniques for each application field chosen by students. In short, it is necessary that a learning system is based on the student profile, how they learn and how they use the acquired knowledge. Nevertheless, it is not necessary to open a wide range of possibilities because the experience of previous semesters shows that most students fall into a few fields of application (namely market analysis, user modeling and life sciences).

In a first step, it is necessary to arrange the subject contents for giving answers to these possibilities, in order to promote the acquisition of specific professional competences. This must be addressed according to two parameters: on the one hand, foreseeing the future implantation of the Bologna process, approaching the subject towards the professional competences, adapting it also to the new ECTS system; and from the other hand, defining adaptive formative itineraries (both contents and activities), as shown in Figure 1. The second step is to provide a common background for all student profiles, previous to a third step for developing specific competences depending on user profile.

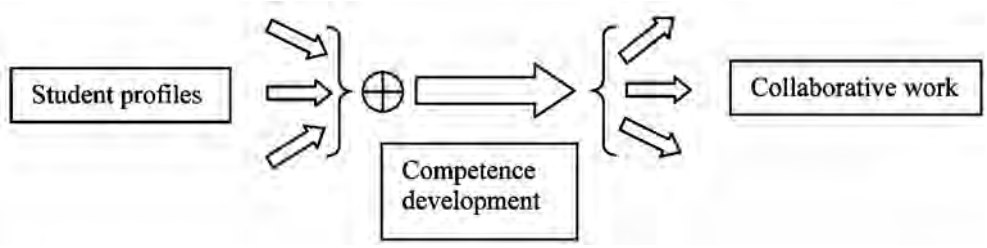

Figure 1. Adaptive formative itineraries for homogenization and specialization

3.2 Towards a competence based learning design

The first phase towards a competence based course is to identify the desirable learning goals that students should be able to achieve when they complete the course. The previous basic competences required for studying this subject are a medium knowledge of Statistics, and a general knowledge of Databases and Artificial Intelligence. This is addressed in the first step of homogenization.

In the second, competence development, phase, and according to the Tuning Project (González and Wagenaar, 2003), there are six main general competences to develop:

- the general knowledge of the data mining process;
- the ability to recognize the tasks that the data mining process requires;
- the capacity to apply the acquired knowledge in real-life practice;
- to select and manage the appropriate information sources for each case;
- to be able to retrieve and analyze the learned concepts and apply them in different situations;
- the ability to work in an interdisciplinary team in different application work environments;
- the ability to solve problems related to the application of the data mining process.

In the third phase, there is a final practical activity which pretends to execute a real data mining process and to apply it in different work environments, using a collaborative work approach. The specific competence to acquire is to be able to design a data mining project and to manage it according to each case and its particularities, and to be capable to retrieve data for producing and applying knowledge. Multidisciplinary teams are created based on student profiles and preferences.

The innovation of this proposal lies in the creation of adaptive itineraries since the first day, in order that students get more involved in the subject. Obviously, it is known that every student has different levels of previous knowledge and his or her own learning pace, and also every student has his or her main interests in a particular application area. The use of adaptive formative itineraries is interesting for both homogenization and specialization, but maintaining a common core of competences. The idea of promoting personal learning itineraries, attending the different profiles and knowledge levels, reinforces the idea that a personalized process of teaching and learning is needed, and that it could be the way for reaching the main common competences and assuring the acquisition of the course goals.

Finally, and regarding implementation issues, it is essential to think about the new design by means of a formal description based on competences, and also in the adaptive itineraries that can be followed by the students. In order to do so, we propose the use of the IMS-LD standard.

3.3 Modeling with IMS-LD

The IMS-LD standard (ADL, 2002), which is based on EML (Hermans *et al.*, 2004), tries to describe the aspects more related to the learning process in itself, such as sequencing or role playing, that is, the second level of description as aforementioned. It seems clear that all this information cannot be stored in the learning objects, but in a higher semantic level. Although the IMS-LD standard may seem to be too complex, its flexibility and multilevel description capabilities allow the specification of any learning process ranking from simple educational itineraries to complex learning processes including personalization and collaborative working capabilities.

Following the recommendations from the IMS-LD best practice and implementation guide, the data mining subject will be devised in three parts, reflecting the three different learning design schemas provided by the IMS-LD specification. To facilitate both the production of the specification and its subsequent implementation, IMS-LD has been divided into three parts, known as Level A, Level B, and Level C. Separate XML schemas are provided for each level, with Levels B and C each integrating with and extending the previous level. At least, we will need to address Level B in order to include personalization, and Level C to include collaborative work, but Level A is enough to describe the basic core of the data mining subject. The first step in preparing the design of the data mining subject as a unit of learning (or a sequence of them) according to the IMS-LD recommendations is to specify all the roles in the scenario defined by learning process. There are two main roles: learners and staff. In a first stage, all learners will share the same role (i.e., no subroles are defined yet), while staff is partitioned

in three subroles: tutors, teachers and managers, following the UOC pedagogical model. With the introduction of collaborative work, though, it will be necessary to define subroles for the student role. As Williams (2003) stated in his study, there are some skills related to different roles, thus different roles and competences can be established according to such skills. The second step is defining the activities performed by all the roles and subroles defined in the previous step. Currently, the teaching plan is the document in the UOC pedagogical model where most of this information can be found, but there are also a lot of hidden interactions between all the subroles (specially the staff subroles) that must also be thoughtfully described in order to simplify the learning process and ensure its complete tracking. The next step is defining the environment (or the structure of environments) where the learning process occurs, that is, the virtual classroom within the virtual campus framework, which includes other resources such as the digital library or the agenda, among others. All the available learning resources are defined in this section. It is important to define here the variables which will be used for categorizing students, especially those which measure the navigational patterns followed by the students along the academic semester (Mor, 2004). Finally, all the relationships between roles, activities and the environments are defined as methods, which include activity structures, play roles and conditions (for personalization purposes).

In order to ensure a competency based approach for the new design, it is necessary to establish the complete taxonomy of required and desired competences related to the data mining subject. These competences will determine the activities and, therefore, have roles and conditions. On the other hand, in IMS-LD competences are formally described in the "Learning-objectives" within an "Activity", but using a more textual approach. Each learning objective is described using, at least, two basic fields, a text based description and a type, which can be one (and only one) of the following: skill, knowledge, insight, attitude, competency and other. This might not be enough to fully describe all the competences and their implications in the learning process (as triggers of activities or dependences for personalization), so an appropriate extension must be devised to overcome this possible limitation (Guerrero, 2006). Nevertheless, the IMS-LD standard seems to be the appropriate choice for describing a complex scenario such as the data mining subject described in this paper, as it covers almost all the needed aspects.

4. Conclusions

With the creation of the new European Higher Education Area, also known as the Bologna process, distance and open education is changing the followed approaches until now. As the UNESCO has enunciated, *"Universities are important stakeholders in lifelong learning. Their role could evolve, and the link between the learner and the university could become a lifelong link, both to constantly disseminate the knowledge and to develop the networks and communities. E-learning should be encouraged and trained to acquire and further develop their e-competences"*. E-learning courses should guarantee high quality standards, achieving an equal acceptance of skills as those acquired via classical learning, to be attractive for professionals.

We have presented a practical case, a course about data mining in a virtual e-learning environment, which shows the relationship between theoretical and practical tasks related with the subject, as part of a set of competences that must be acquired by the students. These students show different profiles, so their background must be first homogenized, then a set of common competences for collaborative work in the data mining field is developed and finally, each student specializes its professional career through a specific set of competences depending on hisr or her original background. In this proposal we have tried to standardize the data mining subject according to the IMS-LD standard, and concluding that this standard is an appropriate choice for describing such a complex scenario. Using the IMS-LD standard, the aspects more related to the learning process in itself, such as sequencing or role playing in terms of competences can be described. IMS-LD opens new research lines for creating a formal definition of competences, studying also the possibilities to generate adaptive learning itineraries for personalizing both content and activities in any formative action.

Current and future research in this subject include the complete formal definition of the data mining scenario using the IMS-LD standard, and the creation of several ontologies for incorporating all the possible extensions needed to cover all the standard drawbacks, such as a formal definition for competences, for example.

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NETWORKING OR NOTWORKING? BUILDING SOCIAL PRESENCE INTO DIGITAL LEARNING ENVIRONMENTS

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Introduction

Since the inception of interactive digital technologies, distance education has been rapidly transformed from an independent study experience into a highly interactive networked learning opportunity for millions of students worldwide. Interactive digital technologies, from Audioconferencing via telephony, through to digitally based intelligent computer networked environments, are now in regular use within most of the world's leading universities. However, technology engenders problems as well as solutions.

The problem with Digital Learning Environments…

There is a popular belief amongst academic managers that digital learning environments can reduce costs, such as travel, resourcing for real estate and lecturer salaries. This belief holds that the delivery of learning materials to distributed students is essentially more cost effective than traditional methods of education. In some contexts the economies of scale required do in fact steadily reduce costs over a period of time, but this is rare. For most universities, the long lead in times required to develop reliable, intelligent and accessible digital resources often thwart any hopes of cost saving, and invariably create stress and higher workloads for academics and support staff alike. For others, the implementation of technology supported distance education can be increasingly costly, and ultimately may reap few dividends.

Arguably, economic and logistical issues are not the most important issues to address in the large scale implementation of digital networked learning environments. In this paper, I wish to draw attention to the human, and particularly the psychological issues that emerge invariably in such situations. The action of interlacing digital technology with human intelligence tends to produce problems that are often unforeseen.

Human Issues

It is generally accepted that a large proportion of students who study at a distance tend to experience social isolation, technical problems which lead to demotivation, and a lack of focus or impetus, if left with no direct or regular contact with their tutors and peer group (Rovai, 2002). It has been argued that the most effective technology supported distance learning environments are those where social interaction is a predominant feature of the successful online learning experience (Muilenberg & Berge, 2005). Furthermore, interaction is an important factor if students are to value their studies and perceive satisfying outcomes. Interestingly, Anderson and Garrison (1995) suggested that sustained interaction between students and tutors might not be essential in all learning situations. They qualified this statement however, by showing that students' perceptions of quality and value were enhanced when opportunities for learner-teacher dialogue were increased. Links have been established between student perceptions of negative experience such as social isolation and high dropout rates in e-learning (Carr, 2000).

Another factor for successful implementation of digital learning environments is the need to design and present navigable and accessible spaces within which students can individually and corporately explore, create and communicate. The relationship between academics (content creators) and web designers (content managers) is a vital one, second only to the tutor's relationship with students (content consumers).

Perhaps the most important human issue to impact upon the success of digital learning environments has always been the ease with which distance learners can have access to, and communicate with their tutors. Without this capability, distance learners will often founder, become increasingly frustrated, and ultimately fail. Student dropout can be in excess of 50 per cent (Simpson, 2004), a statistic that would be completely unacceptable in most conventional educational settings. In the user led economy that is distance education, such magnitude of failure is alarming.

Historically, distance education is littered with significant failures at an institutional and even national level, and these often result from a combination of poor planning, ignorance of the needs of distance learners, or a shortfall in resourcing (Garland, 1993; Cegles, 1998). In the United Kingdom, the loss of £50 million and the subsequent closure of the British Government's flagship UKeU (United Kingdom e-Learning University) is a classic example of spectacular failure at an institutional level due to poor conceptualisation and marketing of innovation. In short, it appears that many forms of networked learning do not appear to be working at all.

Social Presence Theory

The concept of social presence was first identified by Short, Williams and Christie (1976) who defined it as the perception that one is communicating with people rather than with inanimate objects despite being located in different places. The ability of people to work together effectively in groups is central to social presence theory, so the model is of great interest to distance educators (Stein & Wanstreet, 2003). According to Short *et al*., when social presence is low, group members feel disconnected and group dynamics suffer. Conversely, when social presence is high, members tend to feel more engaged, and are motivated to participate in group processes such as collaborative learning. Stein and Wanstreet (2003) suggest that if social presence is high in a group, the group will be better placed to substitute technology mediated communication for face to face communication.

These findings may be of interest to teachers who aim to deliver dual-mode or blended educational programmes. Similarly to Short *et al.*, Garrison (1990) believes that social presence is the extent to which remote communicators can project themselves to others using any given technology or medium. Tutor interpersonal skills and adaptability are therefore vital ingredients for the promulgation of social presence within digital learning environments.

Recent Research Findings

From recent studies we have learned that there are several useful strategies that can be employed to obviate most of the problems identified in this paper. Willis, for example, claims that: *"High student motivation is required to complete distant courses because day-to-day contact with teachers and other students is typically lacking. Instructors can help to motivate students by providing consistent and timely feedback, encouraging discussion among students, being well prepared for class, and by encouraging and reinforcing effective student study habits."* (Willis, 1993, p 20) Willis expects that student attrition can be reduced if the above teacher activities are maintained, and support is given through these means.

Student attributes and attitudes also play an important role in ensuring success in e-learning. Those who are proactive in learning, such as the strategic or autonomous learner (Entwistle, 1988) tend to succeed more often and are likely to persist in their studies more than those who adopt a surface approach to study. This is a critical feature in e-learning, where students are deprived of a great deal of the social contact enjoyed by their traditional counterparts. Students who are tenacious in their approach to study tend to overcome or circumvent problems faced in digital learning environments through creative problem solving and active expert help seeking.

Tammelin (1998) found that the personalities and individual communication styles of students participating in online discussion groups brought colour and vitality to what would otherwise be an uninspiring, text based discussion. This kind of social presence improved student perceptions of the value and agency of their studies. Wheeler and Reid (2005) showed that student attributes such as strategic or deep study approaches could ameliorate the effects of social isolation whilst social presence

effects such as immediacy of dialogue between tutor and student enabled the latter to appreciate a richness of social presence.

Significantly, such recipes for success are premised on the quality and provision of the delivery technology. In correspondence courses, technology failure is limited to an interruption in the delivery of mail. Where digital learning environments are employed, technical failure can be multifarious and complex, from simple but frustrating slow file download or connectivity problems, or intermittent server failure, through to more intractable firewall and accessibility issues, or even insidious problems such as virus attacks, denial of service and disruption caused by the malicious activities of malware writers and hackers.

Students, particularly those who are less autonomous, need to know that the delivery system they are using is reliable, has around the clock support, and can provide them with access to online resources, services and learning facilities when they need it, where they need it, and at a pace that suits their lifestyles (Townsend & Wheeler, 2004). Without this provision, technology supported distance education loses its advantage over conventional education. It is also worth considering that students who rely exclusively on digital technologies to study are vulnerable when technology fails. For some, it is the equivalent of suddenly going blind and deaf.

The Role of 'Organic' Technologies

Perhaps one of the most exciting recent developments in digital learning environments is the emergence of 'organic' technologies. The use of the term 'organic' indicates that such applications rely on growth to maintain their impetus and currency, facilitated through active engagement on the part of the user or user group. Wiki based communication in a hybrid of information and communication centred technologies. Wikis enable users to post a subject and then evolve it over a period of time either as more information is added by users, or knowledge increases around the subject. The powerful nature of such applications in embodied in the idea that many users, through consensus and mutual knowledge construction can create and maintain digital artefacts to represent these forms of activity. This excerpt from a wiki site illustrates its potential social application in education:

> *"A Wiki can be thought of as a combination of a Web site and a Word document. At its simplest, it can be read just like any other web site, with no access privileges necessary, but its real power lies in the fact that groups can collaboratively work on the content of the site using nothing but a standard web browser. Beyond this ease of editing, the second powerful element of a wiki is its ability to keep track of the history of a document as it is revised. Since users come to one place to edit, the need to keep track of Word files and compile edits is eliminated. Each time a person makes changes to a wiki page, that revision of the content becomes the current version, and an older version is stored. Versions of the document can be compared side-by-side, and edits can be "rolled back" if necessary."*
>
> *(Source: http://scienceofspectroscopy.info/wiki/index.php?title=Using_wiki_in_education)*

Another example of the organic technology is the 'blog or web log. Generally, these are less collaborative than wikis, but still have the power to challenge perceptions and create environments that are discursive and constructive for distributed learners. Asynchronous threaded discussion groups or chat systems attached to the 'blogs can provide a dynamic and extended forum for discussion and debate. Such organic technologies have the potential to increase social presence capability for online learning needs and will no doubt become more important to the e-learning technology mix as time goes by.

Conclusion

In conclusion we have seen that digital learning environments can be adapted and designed to facilitate a number of social presence features. Students studying at a distance need support in a number of areas, and it is incumbent on the distance educator, instructional designer and programme manager to provide such features. Recent research indicates that without social presence being built into digital learning environments, students often struggle to maintain their focus, lose their study impetus, and sadly, often leaving a course before completing. Social presence is thus a vital component of success in any digital learning environment and should be a priority for all distance educators to consider.

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CHARACTERISTICS OF TEXT BASED COMMUNICATION IN VIRTUAL LEARNING ENVIRONMENTS: THE CONTEXT OF LEARNING MOTIVATION AND SUCCESSFUL COMMUNICATION

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Abstract

To support and continue the motivation of participants in virtual learning environments, it is important to reach them on a personal level. Therefore, it is necessary to perceive the personal needs and emotions of the participants when conversing with them. To achieve a successful learning atmosphere, the deficits of text based communication have to be compensated by the b-trainer. The coding and encoding of purely, text based language requires an enormous compensation accomplishment with regard to the absence of all verbal means of communication. Reception and production of text based communication in virtual learning environments is the theme of this study. The objective of this survey is to define characteristics of text based communication which gives an indication about the condition of the participants of virtual learning environments.

1. Text Based Communication in Virtual Learning Environments

How does the b-trainer convey in purely, text based virtual learning situations not only in the subject matter and on a specific level of competence, but also how to succeed in getting through to the participants on a personal level?

Many studies show evidence that in face-to-face communication, over 80% of the recipients reactions were triggered off by the non-verbal area of communication. However, the most important element of communication is the inner attitude towards your conversation partner, which is expressed through the ability to show empathy (Kallmeyer, 1996). Empathy is essential for satisfactory, interpersonal communication (Laver, 1994 / Wintermantel, 2000). This means that a person has the ability to listen to others, take notice of their feelings or to inform itself about the emotions of other people.

In any non-virtual learning environment it is difficult to achieve a pleasant atmosphere and to continually reach the participants on a personal level (Lehnert, 1995). Apart from the methodical/didactical and technical competence, the b-trainer must be additionally able to adapt their emotional abilities to the conditions in a virtual learning situation (Kiesler, 1984/ Walther, 1996). An encouraging smile, supportive body language and direct eye contact can not be shown in text based communication. A lack of understanding, perplexity or annoyance can not be promptly recognised. A possible impairment to one's motivation to learn is first recognised when the impairment has become manifest and is expressed within the written interchange.

In regard to the learning atmosphere and motivation in virtual learning situations, the possibility to reach the participants personally and to motivate them are considerably restricted. The coding and encoding (Günther, 2000) of purely, text based language therefore requires an enormous compensation accomplishment with regard to the absence of all non verbal ways of communicating (Walther, 1996). The social competence of e-trainers in a virtual environment is subject to entirely different challenges to those of a non-virtual environment, and therefore raises many questions.

How does the b-trainer know whether the partner is unsure in the virtual conversation, whether or not he/she did not understand a specific aspect, or if the person becomes annoyed? How can an accordant inquiry be interpreted? How would the participants like to be addressed? Do women interpret and react to text based communication differently than men? How do you accomplish the "tight rope walk" between precise technical verbalisations and the creation of a personal and pleasant communication culture?

2. The Evaluation: Approach and First Results

The answers to these questions are provided by a study within the framework of a dissertation to the following theme: Reception and production (Gottburgsen, 2000) of text based communication in virtual learning environments. In a questionnaire (based on the continuum model of Fiske/Neuberg, 1990, 1999), 256 students from different faculties who attend blended learning seminars are asked about their impressions within text based conversations of a virtual learning environment. The objective of this survey is to define characteristics of text based communication which give an indication about the condition of the participants of virtual learning environments. The question was: "Through which written characteristics was information conveyed about the existential orientation or other qualities of the sender?" On the basis of examples, students were asked to use keywords elucidating how the characteristics were interpreted (negative, positive, etc.).

The gender, order and number of entries, as well as the examples, are interpreted in the analysis of the questionnaire. We are then able to weigh each characteristic of written language by the given examples and frequency of certain entries. Furthermore, these characteristics are then able to be linked to verbal techniques of expression. In addition to this, possible gender related differences in the perception and interpretation of certain characteristics can then be detected.

In several samples, 56 verbal characteristics were explicitly named, which could be assigned to 4 areas of text based communication.

Language Area A: The outside appearance of the message

The Variables which are directly related to the immediate visible appearance of the text were assigned to "The outside appearance of the message", and leave an impression on the reader when they simply glance over the text. This area is relevant to the behaviour of the reader and will be expressed, as well as interpreted, rather implicitly.

Language Area B: The Syntax

The syntactical language area consists of the characteristics of constructions of sentences and different sentence types. This takes into account the length and the structure of written sentences. The use of main and subordinate clauses along with their construction and combination also seem to be relevant.

Language Area C: The Vocabulary

This area is comprised of characteristics which refer to the use of words and vocabulary. Neologisms and abbreviations are especially important in text based communication, not only because they are methods of fast communication but also as a characteristic of modern expression or as a factor of belongingness to certain groups. Specific short hand expressions, or the creation of new words, are therefore variables to gain access into certain social fields, in which the expressions are used as an inside language of affiliation and recognition.

Language Area D: The Empathetic Communication

Characteristics which directly assist in the conscious sending of unspoken, extra messages are assigned to the area "Empathetic Communication." This describes non-verbal communication which is turned into written form e.g. a laughing smiley face, which was sent deliberately and consciously as additional information, instead of real laughter in a non-virtual learning situation. Also assigned to this area is "Compensated Phonology," which includes all variables that compensate the acoustic characteristics of ordinary communication. This incorporates words which describe actions and sounds that contain non verbal, additional information. Sounds (e.g. "sniff", "weep" and "slurp") which would result from actions (sniff, weep and eat) etc., can be verbalised through written words.

Table: Distribution of the Written Characteristics between Language Areas (Stokar von Neuforn, 2005)

Characteristics	Language Areas			
	Appearance	**Syntax**	**Vocabulary**	**Empathy**
	Address	Sentence Structure	Modern Language	Personal content
	Subject Title	Sentence Length	Formal Language	Address Formally/Informally
	Discharge	Questions	Complementary statements	Omissions
	Length of the answers	Grammar	Making nouns	Emoticons
	Layout/Paragraphs	Spelling	Writing as you would speak	Emphasis
	Capital/Small Writing	Chat Language	Codes	To comply with
	Colours and Pictures		Subjunctive	Foregoing themes
	Type style		Insider Words	Asking for personal themes
	Standing until answer		Nicknames	Only factually content
	Content		Foreign Words	Excuses
	Signature		Fillers	Foundation of a mail
	Time/hour of the mail		Neologism	Punctuation Mark
	Attachments/links		Play on Words	Asterisks
	Answer within the mail		Word Choice	Jokes
	Unsought mail		Empty Phrases	Phonology
			Bad language	Irony
			Iterations	
			Metaphors	
			Quotation	
			Eloquence	

Due to the additional, individually different example entries of the sampled person, it was possible to assign the initially, ambiguous written linguistic characteristics to the individual language areas. Apart from the quantitative analysis, a qualitative approach helped to obtain information, about the discrete written linguistic features.

Example 1: The Length of the Message

Students assess the length of emails, as the first, visual, accessible statement (Language Area A) over their medial conversation partner. However, the length and evaluation of the message differ from gender to gender. Men find short messages to be terse, goal orientated, practical and in the first place, typically male. Women acknowledge this impression, by interpreting long messages as a predominantly, feminine style of communication. From a females point of view, short messages give a negative first impression (unfriendly, stressed, uninterested and as if the person is short on time). Long answers are assessed by women as a sign that their correspondent shows interest, whereas men consider long answers to be excessive and long winded.

Example 2: The Address and Discharge

The greeting at the beginning of an email is generally (Women 65%, Men 50%) an essential criteria to the assessment of virtual conversation partners. Irrespective of gender, the difference between “friend” and “enemy” is clear from the first glance. An absent greeting would only be accepted from a friend, and not from a trainer. In this case, a negative evaluation would immediately follow e.g. he/she is probably annoyed, furious or unfriendly. The discharge at the end of a message is especially essential for students (Women 51%, Men 16%) in relation to the assessment of the conversation. Formal empty phrases, e.g. “Yours Sincerely,” would be perceived as unfriendly and unimaginative, a complete

mistake of the discharge and would be judged as simply impolite. The more personal that the discharge is formulated, the more likely it is that the conversation partner will show emotional interest.

Example 3: The Sentence Length

Do you think that by using short and terse sentences you will appear competent and businesslike? The recipient often receives a whole different image. While the male students did not even mention the sentence length as an interpretable characteristic, 37% of female students found short sentences to be an indicator for a lack of interest or a bad mood. Similar to their opinion on the length of a message, female students interpret the use of short sentences as a rather manly conversation style.

Example 4: The Inquiry on an Interpersonal Level

The inquiry after the well being, feelings and opinions of students is generally considered to be the most important indicator when interacting personally. The interesting thing at this point is that the inquiry and emails are expected from friends and fellow students and not necessarily from trainers.

Example 5: Punctuation Marks

The use of punctuation marks as an onomatopoeic form of transmitting emotions (to give the written word lively characteristics) was named, particularly by female students, as one of the main factors in assessing the conversation situation. According to this, the absence of punctuation marks (e.g. commas or exclamation marks) is considered to be a sign of hastiness, or even reluctance. The use of numerous exclamation marks is seen as an expression of a rather private interaction (e.g. many exclamation marks after an important statement).

3. Outlook

The above conclusions are only a few trend statements from the current research. However, the practical significance of the e-trainers' daily job, in virtual learning environments, can already be anticipated at this point in time. So far, a few of the important characteristics of test based language can be drawn from the research. These characteristics enable us to make statements about the information content of a text based message on an interpersonal level.

The above mentioned examples already outline how high the empathetic competence standards are for trainers in virtual learning situations. As a result of this, a conscious perception of text based communication styles can help to recognise and regard the interpersonal aspects of sent messages. As a consequence of these research results, first operational manuals for the daily job of an e-trainer, in virtual learning environments, can be formulised:

1. Take your time communicating with participants in your seminar. A quick and short reply to a question, or short feedback as a result of a lack of time, can possibly be sensed rather negatively as showing a lack of interest. The own situation have to be shown through short information (e.g. "…am in a hurry").
2. There is also worth placed on the interaction form in text based communication, which goes way beyond the nitty-gritty details of ordinary chats. Presence, and the way someone address and discharge the conversation partner through e-mailing, is registered by the virtual partner and can signalise appreciation.
3. Factual information and questions about the content of the seminar should be complemented with personal questions. This shows a level of interest in the feelings and opinions of participants, and supports the general atmosphere within the seminar (and therefore the motivation to learn).
4. It is important to look out for the general sentence length in the messages. Short sentences are better suited for the presentation of factual information, but on the other hand, they create a frosty and impersonal atmosphere. However, it is possible to compensate the unkind character of short sentences by placing a personal question at the beginning or end of the message.

4. Summary

Fundamentally, mutual appreciation leads to successful communication which then ensures the motivation to learn. Sensitisation for the presence of personal and emotional information ("reading between the lines") can help to overcome the interpersonal barrier which arises from the reduction of the communicative options, or possibilities, in virtual learning environments (and not only there). The objectives and results of this research refer to the total context of virtual communication, even when the empirical material comes from the German language area. In this respect, a subsequent research could question whether or not the identified communication structures, within virtual learning environments, also exist in the English language area. The results could contribute to the design of communication which enhances learning motivation. This can be achieved through the explicit formulation of linguistic text characteristics, which are to be assessed as essential indicators for the interpretation of the interpersonal aspect within written linguistic communication. Nevertheless, the ordinary communication in your daily business and private life can profit from the sensitisation of the individually different compensation, of non verbal, additional information during virtual text based communication.

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ENHANCING THE MOTIVATION TO LEARN THROUGH DECODING TEXT BASED COMMUNICATION RECEPTION IN VIRTUAL LEARNING ENVIRONMENTS
CASE STUDY FOR THE ONLINE COURSE OF MEDIA INFORMATICS

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Abstract

The motivation to learn in virtual learning environments is based on successful communication between teachers and students, as well as professional implementation of methodical/didactic methods. This can be achieved through a good atmosphere, interest and esteem, along with communication and a good relationship – both of which are essential factors to succeeding in virtual learning. In regard to the coding and decoding of text based language, the compensation of the deficits from virtual communication requires a certain degree of social competence. In one study, essential characteristics of text styled communication, in the context of virtual learning environments, were identified to indicate the reception that written based language would receive. The results of this study give instructions in relation to the interpretation and production of written messages, as well as the implementation of measures which support the motivation to learn.

1. Introduction

Since 2001, the online study course for Media Informatics at the FH Oldenburg/Ostfriesland/Wilhelmshaven (Standort Emden) has been successfully established. With only three face-to-face lectures per semester, the majority of the course takes place in a virtual learning environment. As a result of this, the communication between teachers and students occurs predominantly through emails and is looked after through a first and a second level support according to the "Emder Konzept" (Thomaschewski, 2005). By implementing this teaching method in the communication between teachers and students, the time allocated to answering a question is shortened and the interaction becomes more effective. The question of how the text based communication can be succesfully designed is answered in a study about the reception of text based communication in virtual learning environments.

2. Question

Many factors which contribute to the motivation to learn in a virtual learning environment are fundamentally conveyed through communication (Kallmeyer, 1996; Euler 1989). The participants self assessment, which is either confirmed or denied by the respective conversation partner, the individuals well-being or the respective behaviours of the lectures are essential factors to the motivation to learn and are showed through communication. Successful virtual communication is however, subject to the considerable, different conditions because of the reduction on purely, text based language. The coding and decoding of purely, text based, written language requires an enormous amount of compensation in regard to the lack of all non-verbal ways of communication. In this study, it is assumed that a closer look at the individual reception of language can give evidence as to how communication within virtual teaching situations is received. We can only derive according instructions for written based communication if we have precise information about the reception of text based messages (Stokar von Neuforn, 2006).

3. Case Study

To evaluate written characteristics in the reception of speech a case study was carried out in the FH Oldenburg/Ostfriesland/Wilhelmshaven (Standort Emden) within the course of study "Media Informatics". During face-to-face lectures, students of this degree were asked, in an unbiased questionnaire, about the characteristics of text based communication in emails. Without being given examples (Lamnek, 1993), students were questioned about which written characteristics indicated qualities and the mood of their conversation partner. These characteristics were to be spontaneously recorded and, where possible, applicable examples or ratings were to be added. The goal of this research was to define verbal characteristics, which would then supply information relating to the interpersonal aspect of written messages. Examples were given and the students were asked to explain, in bullet points, how these characteristics were interpreted (eg. negatively, positively etc.). A different weighing and interpretation method was then assigned to the previously mentioned characteristics, by using the added examples as well as the frequency of certain references.

4. Results

17 female students and 78 male students participated in this case study. The average student was 26 years old, studying in their 3rd semester and gave 6 characteristics about text based communication. In total, there were 537 different points made by the students, which were sorted into 56 different characteristics and split into 4 clusters (A-D) of text based communication.

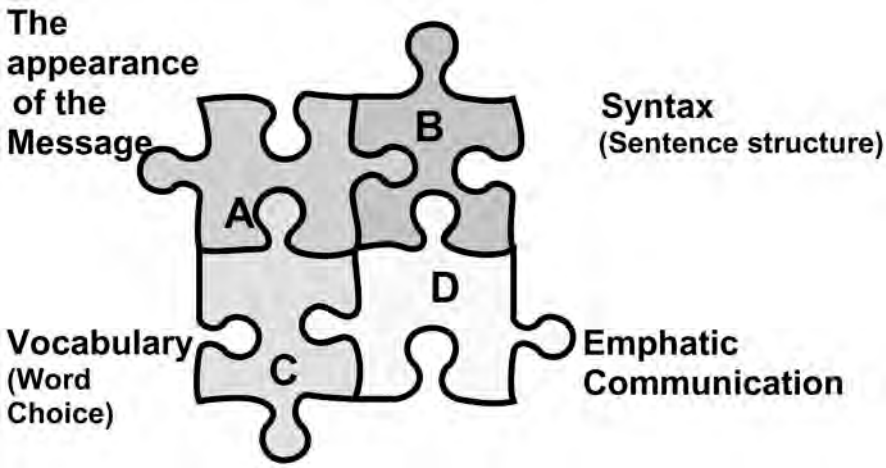

Figure 1. The 4 cluster of text based communication

In addition to the text based characteristics, the students also recorded examples and interpretations. These could then be evaluated, judging by their qualities.

Cluster A: The appearance of the message

The charateristics which relate directly to the appearance of the message, and allow us to receive a first impression of the purely visual observation of the message, were assigned to cluster A. However, this cluster already appears to be relevant to the individuals' behaviour and therefore is expressed, as well as interpreted rather implicitly.

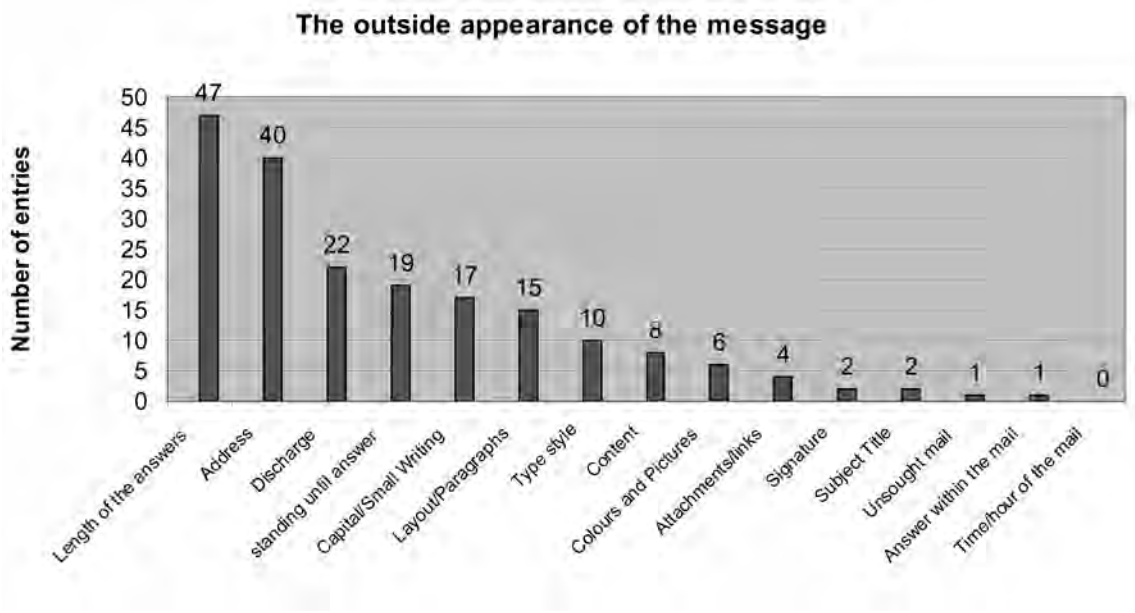

Figure 2. Textbased characteristics of communication in cluster A
"The outside appearance of the message"

The length of the message was generally named by the participants as a main, visually observable statement and indicated the mood, time spent and the interest level of the conversation partner. Short messages were negatively associated with the person being in a rush, a lack of interest or a bad mood. The greeting at the beginning of a message was also valued as an important tool in assessing the virtual conversation partner (approximately 42% of the surveyed participants). A conclusion about the mood of the conversation partner is definitely drawn by the first glimpse of the message. The lack of a greeting was generally viewed as a sign that reply had been written in a rush, or perhaps that the person was in a negative mood. However, the presence of a greeting can be differently interpreted. A simple "hello" can be associated with a negative mood, however "hi" refers to a friendly mood.

Cluster B: The Syntax

The syntactical cluster consists of the following characteristics: sentence construction, sentence structures and the different types of sentence variations (Figure 3). The lengths, as well as the construction of written sentences, are included in cluster B.

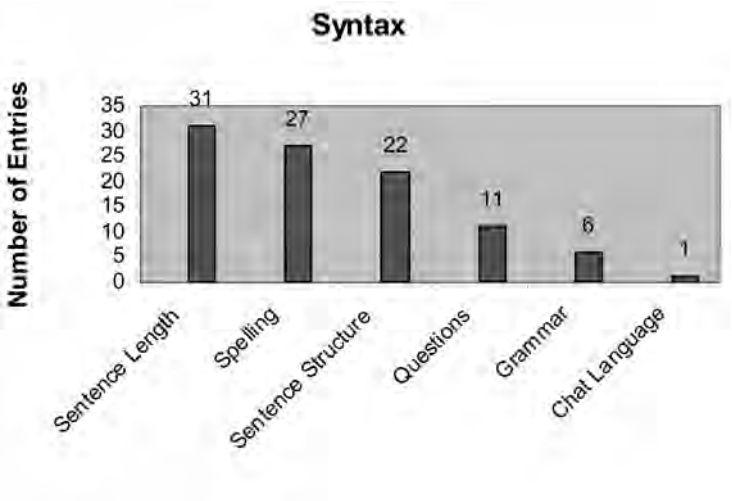

Figure 3. Textbased characteristics of communication in cluster B "Syntax"

The characteristic "length of a sentence" was an essential criteria in creating an impression. Short sentences were seen as a sign, that the person was in a rush or a bad mood, as was the length of a message. However, short sentences were also seen as being precise and accurate when conveying a point.

Cluster C: The vocabulary

This area is comprised of characteristics which refer to the choice of words and the vocabulary. Neologisms and abbreviations are especially important in text based communication, not only because they are methods of fast communication, but also as charateristics of modern expression, or as factors of allocation to certain groups. Specific short hand expressions, or the creation of new words, are therefore variables to gain access into certain social fields (Bourdieu, 1990), in which the expressions are used as an inside language of affiliation and recognition. In Figure 4, the text based characteristics of cluster C are shown.

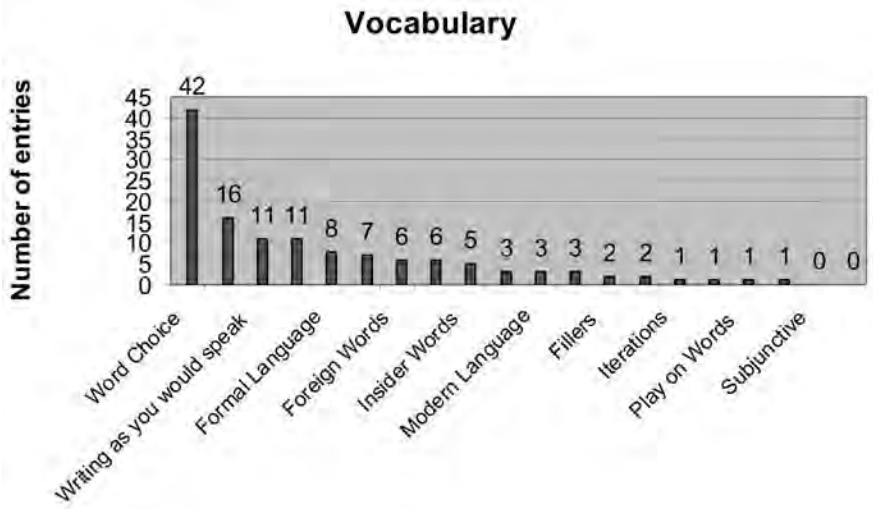

Figure 4. Textbased characteristics of communication in cluster C “Vocabulary”

One of the most important indicators in cluster C, when assessing your partner, was the language style i.e. the individual text style (over 44% of the surveyed participants) of the respective communication partner. The interpretation of the given examples, judging by the quality, allows us to conclude that an individually different text or language style is implied. This style can be seen, to a certain degree, as a personal, unmistakable expression. A certain choice of a word (e.g. “a distinguished choice of words”, “professors mainly look out for a polite and distinguished choice of words”) can act as a trademark for certain professors or lecturers. On the other hand, the relation between the conversation partners (e.g. private or official contact), or the ethnicity (“the way of expressing ones self gives information about their origin”) can be decrypted from the vocabulary. By taking all of this into account, we can determine that one’s text style is mainly judged in comparison to precious messages of the same sender. Through this, a type of recognition is created; through which certain people can be identifed. At the same time, small variations in a person’s text style, based on the background of previous experiences with this person, can indicate their mood.

Cluster D: The empathic communication

Characteristics, which directly assist in the conscious sending of unspoken extra messages, are assigned to cluster D “The empathic communication” i.e. those which indicate an active productin of speech from the sender. This describes non-verbal communication, which is turned into written form, e.g. a laughing smiley face, which was sent deliberately and consciously as additional information, instead of real laughter in a non-virtual learning situation. Also assigned to this area is “Compensated Phonology” (Stokar von Neuforn, 2006a), which includes all variables that compensate the acoustic characteristics of ordinary communication. However, punctuation marks (e.g. exclamation or question marks) are often repeated in order to emphasise statements, or to express a greater insecurity or lack of understanding.

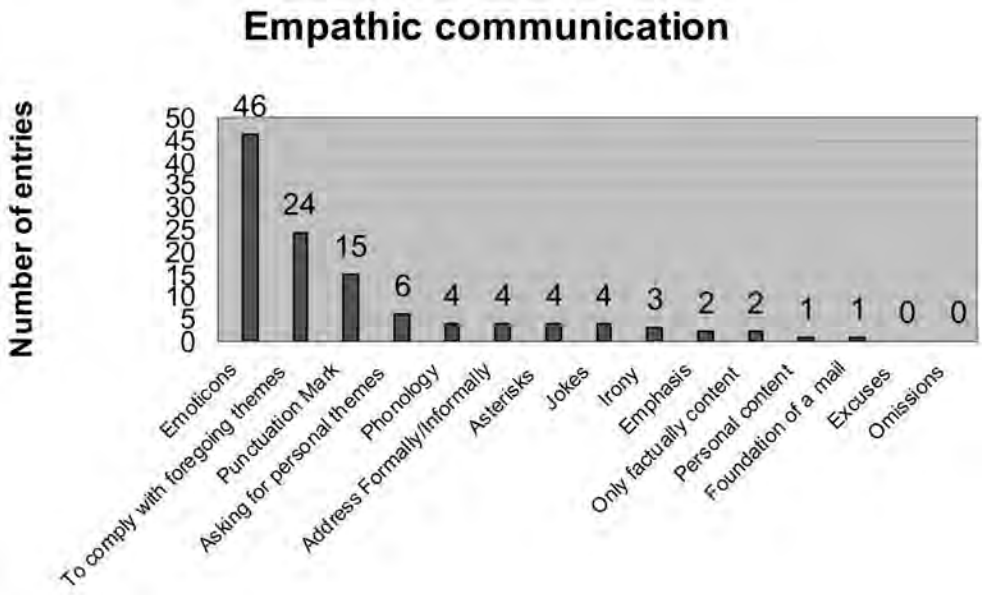

Figure 5. Textbased characteristics of communication in cluster D "Empathic communication"

The following characteristics were named by students as essential indicators when creating an impression: emotions, inquiry about previous topics-respectively questions (approximately 25% of the surveyed participants) and the use of punctuation marks. The evaluation of the given examples, judging by their quality, allowed us to draw a conclusion as to how the answering of questions, or the explaining of topics, was generally received. The personal attention towards a student shows appreciation, commitment and interest, and is therefore an essential factor to the motivation to learn. As a result of this, great attention needs to be paid to this point. The participants explained which communicative behaviour they considered to be positive or negative in regard to the answering or inquiry of questions. The following mistakes were seen as negative by students: ignoration of a topic, questions which do not relate to the topic, partly answered questions, only very shortly answered questions, no questioning of the questions, firing back a question, the reference to scipts, explanations only after repeated questioning as well as obvious annoyance when a question has been repeated. The use of emoticons (e.g. smileys or symbols) is sometimes seen as a childish or immature use of language, but as generally viewed as an acceptable method in transmitting ones mood in text based communication. Interesting at this point is that no single student had named negative aspects to do with emoticons. This form of empathic communication obviously belongs to the most essential aspects, which are used to assess the virtual conversation situation.

5. Summary

In the presented research it becomes clear that text based language contains a great deal of information about the relationship between virtual communication partners. Beside the written word, there is information hidden "between the lines", which is sent partly consciously (emotions) and partly unconsciously (length of the sentence). Text based characteristics as the length of a message, the presence of greetings or the answering of questions in short time are mentioned as indicators for the interest and the mood of the communication partner and in the same time a factor of individual perception of learning atmosphere. In the context of virtual learning environments, the relevant factor, for the success of the student, is what the student recieves and in which learning atmosphere he or she is currently in. The requirements of the trainer, in regard to his empathic competence in virtual learning situations, are extremely high when viewing the coding and decoding of text based messages. Therefore, conscious observations of text based communication styles can help to recognise and consider the interpersonal aspects of messages. Fundamentally, mutual appreciation leads to successful communication which then ensures the motivation to learn. Ensitisation for the presence of personal and emotional information ("reading beween the lines") can help to overcome the interpersonal barrier which arises from the reduction of the communicative options, or possibilities in virtual learning

environments (and not only there). This research can contribute to the design of communication, which supports the motivation to learn in virtual learning environments, by explicitly formulating text based characteristics which can be considered as essential clues in the interpretation of the interpersonal aspect within written communication. In the ongoing evaluation of the research results, the positioning of the named characteristics in the questionnnaire should give us a further outlook on the importance of certain characteristics in regard to their timely relevance (Fiske/Neuberg, 1990, 1999). Furthermore, the existence of gender related differences in the reception of speech can be investigated, in order to gain information about the differences according to gender, in the reception of the learning atmosphere.

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PERCEPTIONS OF INTERACTION AND LEARNER AUTONOMY A CROSS-CULTURAL INQUIRY INTO DISTANCE LEARNING EXPERIENCES IN THE CONTEXT OF THE UK AND RUSSIA

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Introduction

Notions of learner autonomy and interaction are central to virtually any theoretical framework in distance education. Early theorists in the field stressed the need for providing adult learners with more choice and responsibility in their studies and empowering them to make independent decisions on their learning. According to Farnes (2000), these theoretical frameworks, which originated mainly in the 1960s and 1970s, can be also be defined as theories of autonomy and independence. Wedemeyer's (1981) theory of independent learning is illustrative of these early conceptualisations. Wedemeyer advocated a model of independent study, where learners would be free to set their own goals, select learning activities and determine the sequence of topics for study at a time and place suitable for them. Drawing on Wedemeyer's ideas, Moore (1972) considered learner autonomy to be an integral element of any distance education programme and stressed its importance through incorporating it as a separate dimension in his transactional distance model, one of the most well-known theoretical frameworks in distance learning to date. According to Moore, learner autonomy can be defined as a possibility "for a learner to define his own goals and problems and to evaluate his progress" (p. 81).

However, wide integration of new information technologies into distance teaching and learning changed its nature. Highly flexible and interactive modern instructional media are capable of bridging the gap between learners in various locations, providing unique opportunities for interaction and collaboration. As result, the emphasis of recent contributions to distance education theory shifted towards notions of interaction and communication. For example, Garrison (1989) replaces the concept of learner independence with a concept of learner control in his model, defining the former as "the opportunity and ability to influence the education transaction" (Garrison, 2000, p. 10), which is exercised through two-way communication between teacher and learner. Anderson (2004) suggests a model of e-learning, which could serve as the basis for developing a theory of online teaching and learning. In both collaborative and independent study modes, which are viewed as the most pervasive modes in online learning, various types of interpersonal and content interaction play a crucial role in determining relations between the core concepts. Today learner autonomy is increasingly perceived as only one of the elements of a distance learning system, where tradeoffs have to be made between creating a learner-centred environment and provision of adequate support in the form counselling or tutoring (Holmberg, 2005).

However, no conclusive empirical evidence has been produced so far on how learner autonomy and different forms of interaction interrelate to one another and to what extent perceptions of these constructs are shaped by cultural characteristics of the learner. Several studies on the subject point at the challenges that some cultural groups experience in distance education (Al-Harthi, 2005; Gayol, 1995; Goodfellow *et al.*, 2001; Gunawerdena *et al.*, 2003), but empirical research on the topic is scarce. It is also not clear how these cultural differences manifest themselves in distance learning and whether they contribute to changing interrelationships between the key theoretical constructs.

Research Goals and Methods

The present study aimed to contribute to both theoretical knowledge and body of empirical work on the subject and investigate experiences of distance learning in the contexts of the UK and Russia. More specifically it was intended to 1) explore the extent to which perceptions of dialogue and learner autonomy differed between learners, who belonged to different cultural groups and 2) elucidate relationships between learner autonomy and various types of learner interaction. The inquiry was

guided by two key research questions: Are there any differences in perceptions of dialogue and learner autonomy across the two cultural groups under study? What are interrelationships between learner autonomy and dialogue across the two groups of learners?

Interaction was conceptualised in agreement with Moore's (1991) model of interaction empirically tested by Cheng (2001) and was comprised of three types: learner-learner, learner-tutor and learner-content interaction. Based on the author's previous work on the subject (Ramanau, 2004), learner independence and learner control were delineated as two key dimensions of learner autonomy.

The empirical data was collected using the Distance Learning Experience Questionnaire, developed by the author of the study. It was partly based on previously used instruments on the subject, such as surveys on transactional distance and learner control by Bischoff *et al.* (1996), Cheng (2001), Baynton (1992) and Ramanau (2004) and course experience questionnaire adapted by Richardson and Woodley (2001) to distance learning settings.

The instrument comprised of a total of 28 closed self-report items on a 7-point Likert scale. The interaction and learner autonomy sections dealt with key dimensions of the constructs under study and their aspects – learner-learner, learner-tutor and learner-content interaction, learner control and learner independence. The questionnaire was subject to expert review and pilot testing on a sample of learners with characteristics similar to that of the target group. Cronbach's alpha results for the five key scales were at the appropriate level in both samples – from 0.69 to 0.85. Factor analysis revealed 5 main factors roughly corresponding to the questionnaire scales.

Institutional and Course Contexts

The sample of the present study included students at the Open University of the United Kingdom and at LINK, International Institute of Management in Russia. Both groups of learners studied on a postgraduate management course, designed by the Open University Business School and delivered in a distance mode over the course of 12 months. Although LINK had the right to change up to 25 percent of course content, both groups of students used very similar course materials and instructional media. Most instruction was focused on students' independent work with course materials with monthly face-to-face tutorials and regular online discussions. Although the two institutions used different online conferencing systems, both made use of the course website to provide access to various electronic resources, including the course calendar and a wealth of external resources on the Internet. In the UK the course was taught in English by UK-based Open University tutors. In Russia the language of instruction was Russian and students used Russian translations of course textbooks. Both groups of learners were regularly assessed by TMAs (tutor-marked assignments), submitted electronically via electronic TMA system or by e-mail. Students received feedback on their work and progress on the course from their tutor in the written form.

Sample Description and Descriptive Statistics

The questionnaires were distributed to samples of learners in both countries in spring and autumn 2005. The UK respondents received and returned the questionnaires by post and over the Internet, while the Russian participants completed them in before or after the tutorials or at residential schools in Korolev, Moscow Region. A total of 158 UK and 125 Russian respondents returned the questionnaires. The response rates for the UK sample were 39.5 percent for both postal and electronic versions of the survey and differences between them were not statistically significant.

The participants represented all 11 Open University regional centres in England and 12 LINK regional centres in the Russian Federation. Regional distribution varied significantly in the two samples – only 27 percent of British students were based in London and the South East, while 60 percent of Russian participants were registered with regional centres in Moscow and the Moscow Region. In general, Russian students were younger than their UK counterparts with mean age for the group of 34.9 years of age as opposed to 37.6 in a sample of UK-based students. The percent of men was slightly higher in the Russian sample – 61.4 as compared to 58.2 percent in the British sample.

Frequency and Preferred Methods of Interaction

Before exploring the differences in student views on various facets of interaction and learner autonomy, data on frequency of interaction and preferred methods of interaction were analysed. The results of Mann U-Whitney test showed that Russian learners reported more frequent learner-tutor interaction ($U = 6176$, $z = -2.406$, $p = 0.016$) than their peers in the UK, while the UK respondents reported more frequent interaction with course content ($U = 44408.5$, $z = -5.632$, $p < 0.001$). There were no significant differences in reported frequency of learner-learner interaction ($U = 6622.5$, $z = -1.241$, p – n.s.).

Students from both countries preferred different methods of contact between one another ($U = 5043.5$, $z = -4.369$, $p < 0.001$). 48.5 of Russian respondents preferred face-to-face communication with other students compared to only 29.1 students in the British sample. 8.1 of Russian students as compared to 2.0 percent of British learners preferred telephone to contact other students. While around a quarter of students in each sample named e-mail as their preferred method of contact, UK students were more likely to use the Internet in communicating with their peers – 41.2 as opposed to 18.2 percent in the Russian sample. Differences in the preferred method of learner-tutor contact were not statistically significant ($U = 6539$, $z = -1.384$ p – n.s.), although slightly higher proportion of Russian students relied on more traditional methods of contact (face-to-face and telephone) and British respondents were more likely to use the Web. 8 pairs of associations in the Russian sample and 5 in the UK sample proved to be non-significant.

Perceptions of Dialogue and Learner Autonomy

Because sample sizes were unequal Mann U-Whitney test rather than one-way ANOVA was chosen for investigating differences in perceptions of learning across the two groups. The means for each scale were obtained through calculating the mean across its items. This was followed by Mann U-Whitney test of association between perceptions of the three types of dialogue, learner control and learner independence as dependent variables and membership in one of the two cultural groups as a factor. In addition to that, correlation analysis was used to explore interrelationships between mean scale scores of learner autonomy and interaction.

In line with the findings on the frequency of different types of interaction, their perceived importance also differed across the two cultural groups in question. UK students, who reported more frequent learner-content interaction, reported less reliance on interaction with content than learners in Russia ($U = 6312$, $z = -2.020$, $p = 0.043$). While there were few differences between the two groups under study in reported frequency of learner-learner interaction UK students relied on other learners in their studies to a greater extent than learners in the Russian group ($U = 5989$, $z = -2.593$, $p = 0.01$). On the other hand, while students in Russia reported more frequent interaction with their tutors, there were no significant differences in its perceived importance between them and students on the UK course (($U = 7384.5$, $z = -0.070$, p – n.s.).

Cross-cultural differences in perceptions of learner independence and learner control were even more pronounced. UK respondents perceived themselves as more autonomous in their learning than students in Russia ($U = 4067$, $z = -5.880$, $p < 0.001$), but Russia participants reported more control over their learning ($U=5556$, $z = -3.165$, $p = 0.002$).

Finally, correlation analysis between three types of interaction, learner independence and learner control were carried out across both samples. Because the obtained dataset dealt with quasi interval data, a Spearman's rho (ρ), rather than Pearson's product moment correlation coefficient was chosen as more appropriate measure of the strength of relationship between the variables under investigation. Analysis of correlations indicated that direction and strength of the correlations between learner perceptions of dialogue and autonomy were different across the two cultural groups. A significant positive correlation was discovered between learner autonomy and learner control over their learning ($\rho = 0.20$, $p = 0.043$) and learner control and learner-content interaction ($\rho = 0.26$, $p = 0.009$) in the Russian sample. Likewise, in the British sample with growth in perceived importance of interaction with content learners reported more control over their learning ($\rho = 0.30$, $p < 0.001$), although the relationship between these two variables was somewhat stronger than among learners in Russia. In addition to that, there was significant positive interrelationship between learner autonomy and learner

control ($\rho = 0.19$, $p = 0.23$), learner-tutor interaction and learner control ($\rho = 0.25$, $p = 0.002$), learner-content interaction ($\rho = 0.22$, $p < 0.001$) and learner-learner interaction ($\rho = 0.33$, $p = 0.009$) in the sample of British students.

Discussion

The present study sheds more light on both the nature of cross-cultural differences in distance course delivery and interrelationships between learner perceptions of interaction and learner autonomy. Apparently, there are serious limitations to generalisability of its findings – the instrument chosen for the study is yet to prove its validity, particularly its Russian version, which was only administered on one occasion. The participants had a limited choice of response categories and although a separate section on open-ended comments was used, very few participants (particularly among the LINK students) made any verbatim comments. Moreover, it is very difficult to establish whether it was cultural differences between the two groups of learners or differences in surveying conditions and types of instrument administration that contributed most to differences in responses. Even if culture were to make an impact on perceptions of distance learning, it was not possible under the constraints of the present study to establish which of its dimensions shaped learner experiences.

Institutional differences between the Open University and LINK contribute to the complexity of analysis. Despite the fact that both groups of learners were registered with the Open University in the United Kingdom, their recruitment, tuition and tutorial support were organised by independent education providers that are part of the LINK distance learning network. Most of these institutions are either state universities to small for-profit providers and private higher education institutions (Schennikov, 2003). The amount of student support in bigger regional centres and smaller for-profit providers, which have a vested interest in student retention on the programme, might vary enormously.

According to results of data analysis, perceived levels of learner independence were positively related to both perceptions of learner control and learner-content interaction across the two groups of learners. Findings from this research are consistent with the findings of the author's previous study, in which positive association between learner-tutor and learner-learner interaction, learner-tutor-interaction and control, control and learner-content interaction was reported in a sample of 87 Open University students (Ramanau, 2004). It should be noted, however, that students from the previous study were enrolled into Web-based courses, while the curriculum of the present programme relied on the use of online media to a far lesser extent, which places limitations on comparability of the two contexts. However, as in earlier studies (Ramanau, 2004 and 2005) tutor-learner dialogue appeared to be central to learner perceptions of distance learning among British students, although present piece of research found no significant relationships between learner-content interaction and learner independence.

From the cross-cultural perspective, the findings of the present project seem to suggest that there were more differences than similarities in perceptions of the two groups of students. Statistically significant differences were reported on four out of five dimensions of interaction and learner autonomy. It might be argued that learner perceptions of distance learning are shaped by cultural characteristics of students and the institutional context in which learning occurs. Students from the two countries seemed to organise their studies differently – while UK participants preferred to work with course materials more often, they relied on them less in their coursework than their Russian peers, placing more emphasis on interaction with other learners. Students from Russia tended to contact their tutors more frequently, but relied on interaction with content to a greater extent. British students saw themselves as autonomous in their learning, but with little control over the learning process. On the contrary, Russian students perceived themselves in control of their learning, but having less independence than UK learners.

Conclusions

To draw a conclusion, the extent of differences in learner perceptions of dialogue and learner autonomy that this study reveals questions the degree to which many theories of distance education are applicable to analysing distance learning experiences in cultural settings outside Western Europe and North America, where an overwhelming majority of them originated. Although most theorists in the area seem to acknowledge the importance of cross-cultural differences in distance learning the nature of their

impact on learning experiences is yet to be investigated, particularly through empirical studies. Arguably, as is the case with cross-cultural studies in organisational research (Schaffer and Riordan, 2003), culture could be incorporated as one of the variables in future theoretical models of distance education to take full accounts of its effects on all aspects of teaching and learning at a distance. Moreover, future cross-cultural research in the area could seek to investigate the extent to which individual dimensions of culture (e.g. based on theoretical frameworks suggested by Hofstede (2001), Trompenaars and Hampden-Turner (1997)) shape learning experiences and behaviour.

Acknowledgements

The author of the study would like to thank his academic supervisors, Professor John Richardson and Professor Barbara Hodgson of the Open University for their support during the study, Nick Haycox and Donna Brumfit of the Survey Office for help with survey administration and Tatyana Lyutova of LINK for her assistance in organising data collection in Russia.

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E-TASTERS – NEW DEVELOPMENTS ON E-LEARNING FOR LIFELONG LEARNING

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Introduction

In this paper the methodology and the development of e-Tasters is presented. A wide range of ODL (Opening and Distance Learning) actors from EU and CEE countries, partners in the EU Socrates Minerva 'e-Taster' project focus on developing an innovative approach for enhancing international e-learning course development and delivery.

In this spirit nine partners from 6 countries (North Hungarian Regional Distance Education Center, E-Collegium Foundation, Mimoza Communication Ltd., "Politehnica" University of Timisoara, European Association of Distance Teaching Universities, University of East London, University of Plovdiv "Paisii Hilendarski", Kaunas Regional Distance Education Study Centre) propose a joint development of 12 short, freely accessible, on-line courses as e-Taster in English, by applying versatile pedagogical approaches, fitting to specific training needs. A selection of 4 from 12 will be translated to 9 other languages, and then will be piloted in three phases, multilingual delivery of developed e-Taster courses to general public, citizens of several EU and PHARE countries, via one specific, advanced multilingual e-learning platform, supported by members of the two ODL networks: EADTU and e-Collegium. Three phases of piloting offers different levels of learners' support (both in language and methodological aspects) and collaborative approach and tools, to be tested as networking models (see www.e-taster.net).

The main outcomes in the e-Taster project are:

- the content development of e-Taster,
- development and testing of multilingual (EN, HU, RO, LT, BG) e-learning scenario, operable e-learning environment of the COEDU system,
- descriptions on technical specifications and manual for course developers and editors, learners' and tutors' guides,
- multi-lingual adaptation and delivery of e-Taster in EN, HU, RO, LT, BG, PL, D, F, IT, ES,
- sustainability/business plan with detailed models of contracts on reusability of results by further members and third parties,
- survey and evaluation via the on-line feedback followed by an analysis and recommendations.

What is an e-Taster?

In the recent past there were several EU programs which involved the development and the integration of European HRD, but a deep analysis of their results pointed to some of their common weaknesses concerning effectiveness and sustainability. In this case the expected benefits of developing a competitive virtual educational area of Europe remain only a hope without a real extension of international collaboration in course delivery. By joint development and delivery of non-accredited, short self-standing taster e-learning courses in multilingual format, several of the well-known barriers can be avoided or diminished – accreditation, matching with national systems and curricula, difficulties with recognitions and course build-up, financial arrangements, etc.

The taster model was first introduced in late 1990's by the previous University for Industry Pilot project and the Learning North East (LNE) project (funded by ESF, ADAPT Round 3) (Robertson and Kocsis Baan, 2005), using a portfolio of tasters that can be customised to reach different target markets and to

contribute to the culture of lifelong learning. The LNE project was a successful project at involving SMEs in learning (613 SMEs involved, 7,441 employees registered, 26,183 taster registrations, 97,222 hours of learning recorded). In its concept a taster is:

- a bite sized chunk of learning – usually taking between 5 and 20 hours;
- relevant to the needs of a large number of learners;
- tells the learner what they will gain by learning;
- delivers an outcome for the learner;
- ensures that the learner knows they have achieved the outcome;
- marketed attractively to those who will benefit most.

In the last decades there are different approaches to instructional design and learning styles (Moore and Anderson, 2003). It is clear that e-learning is becoming an integral part of organisational training and also of a tool for general public training. E-learning may be delivered via numerous electronic media, including the Internet, intranets, extranets, satellite broadcast, audio/videotape, interactive television, and CD-ROM. Learner needs are also driving forces in e-learning. In today's new economy characterised by globalisation, increased intensive competition, knowledge sharing and transfer, and information technology revolution, e-learning is a more important tool to satisfy the needs of the new world of lifelong learning (Zhang & Nunamaker, 2003). The rise of cognitivism as the dominant 'post-modern/post-behaviourist' learning theory and the recognition of the importance of the social context for learning is changing curricula and teaching practice. Significant trends emerge worldwide as learners, trainers and teachers evaluate the capacity of e-learning to improve learning for different types of skills and competencies (Reding, 2003; Straub, 2003). There are several attempts to identify the appropriate use of technology and media that can really enhance learning (Mitchell, 2002, Russell, 2004) and to broaden the e-learning (Maier, 2002: Moore and Anderson, 2003) so it includes everyone, not just a few (Rowntree, 1998).

The taster learning design model is based on the principles of autonomous learner, (Robertson and Kocsis Baan, 2005, Rowntree, 1998) 'chunks of learning' (Lockwood and Gooley, 2001). In a 'bite sized chunk of learning', as a learning concept, there should be a learning design that functions as a navigation system for the learner, the activity within the navigational system should be as wide and varied as possible, and the educational material is accessible to them. Our taster learning model comprises:

- an introduction to the principles of autonomous learning online;
- clear learning outcomes;
- an activity based structure that incorporates a range of learning elements;
- feedback to each activity;
- key learning points;
- summary;
- self Assessment Questions;
- full attention to W3C accessibility criteria.

The e-Taster concept introduces as a novelty the well-designed course development approach, a multilingual delivery via a multilingual online platform – COEDU (Coedu, 2001) and models of joint delivery – different levels of learners' support. The online delivery, the independent model of learner as well as the variety of the titles, the target audience in the general public increase the level of acceptance of this e-learning model in the educational society. In the same time, due to the e-Taster characteristics the learner' general competencies can be improved in a short time and an easy way. The multilingual system of the e-Taster ascertain the acquisition of similar levels of competencies for all the learners and allows a very wide spread over Europe.

e-Taster Course Development

During the period of the Socrates Minerva e-Taster project 12 courses in EN, HU, RO, LT, BG, PL, D, F, IT, ES will be developed: Time management, Job application, Job interview, Quo Vadis, Europe, e-Learning, Deveploment of Project Proposal, Project management, Gender Studies, Taste of EU, IT for everybody, Multimedia, Engineering. There will be two models of learners: the independent learner and the locally tutored groups (native navigation system and tutoring in HU, RO, LT, BG, EN) with a collaborative model for the international group of learners based on the complex COEDU/ECBS system (Coedu, 2005).

In particular, "Politehnica" University from Timisoara develops the e-Taster "IT for everybody" and "Multimedia" courses. The "IT for everybody" course is an ICT educational product aiming at supporting people indifferent of their knowledge about computers and learners with disabilities to develop skills necessary for entering and remaining in employment. The entire application should be accessible for everyone. Therefore, the "IT for everybody" team works with a combination of the Web Content Accessibility Guidelines (WCAG) published by the W3C (W3C, 2005), and the opinion of accessibility experts (Andone *et al.,* 2005b). The guidelines explain how to make Web content accessible to everybody, including people with disabilities. They suggest the need of text equivalents (to provide content that, when presented to the user, conveys essentially the same function or purpose as auditory or visual content); to ensure that graphics are understandable when viewed without colour; to provide clear and consistent navigation mechanisms; the text should be readable and familiar; slow animation in comparison to normal E-learning courses; highlight box around the area that needs to be clicked by the student.

The "IT for everybody" course is an ICT overview on 30 pages, 15 interactive simulations, 1 video, 10 activities and 4 activities for the wiki area. It comprises information about computers and networks, operation systems, file types and structures, Internet and new ICT tool use and connectivity.

In the spirit of the WCAG and for the increased level of the interactivity the text is combined with different multimedia features and with:

- links to an extended glossary and relevant Internet links for extra information, software access;
- wiki technology (www.wikipedia.org) on which learners become active participants in the course development *"Activity 1: If you know any other definitions about IT or have a personal opinion please enter it in the Wiki area;";*
- true simulations and demos possible by letting viewers click their mouse in our simulated application (Figure 1): click boxes are inserted in simulation and choose subsequent actions can be choosen from a drop down menu, based on user response; specify the type of response required – left mouse click, double mouse click, or keyboard interaction; text entry fields let them type text into our simulation, just like they would in the real application; text entry questions can include multiple correct answers and we enhance the learning process by including success messages.

The interactive simulation and demos have been done with the package Macromedia Robodemo, elements of Macromedia Flash, image processing in Adobe Photoshop. File import and export in .swf and .fla format, with the editing options according with WCAG guidelines will allow screen readers access to the course, and will considerably improve the accessibility features.

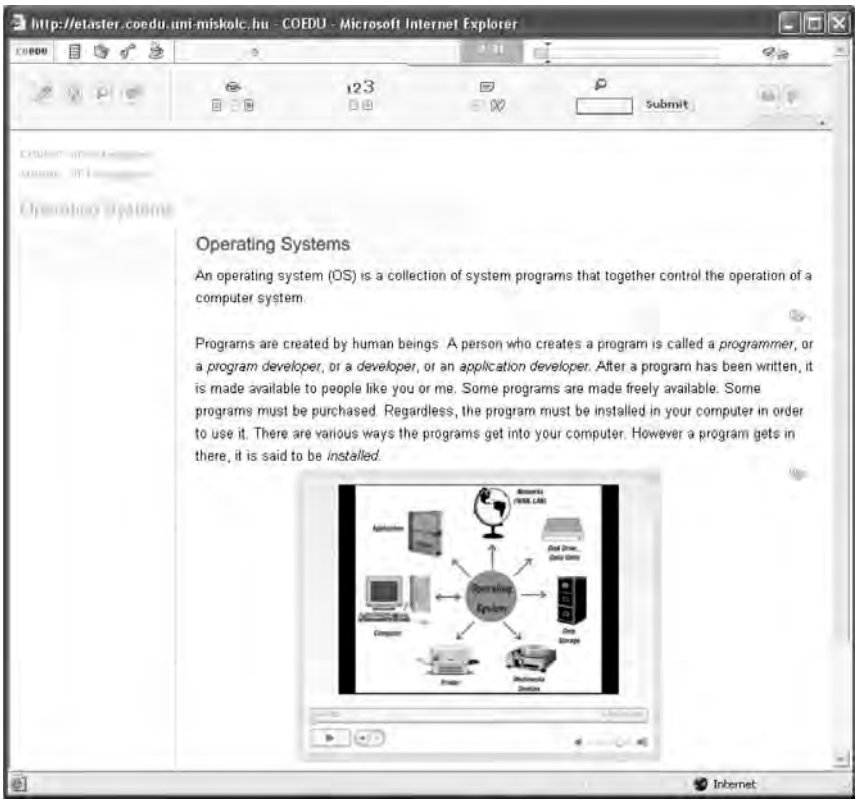


Figure 1. “IT for everybody” course

e-Taster Online Questionnaires/Evaluation Tools Design

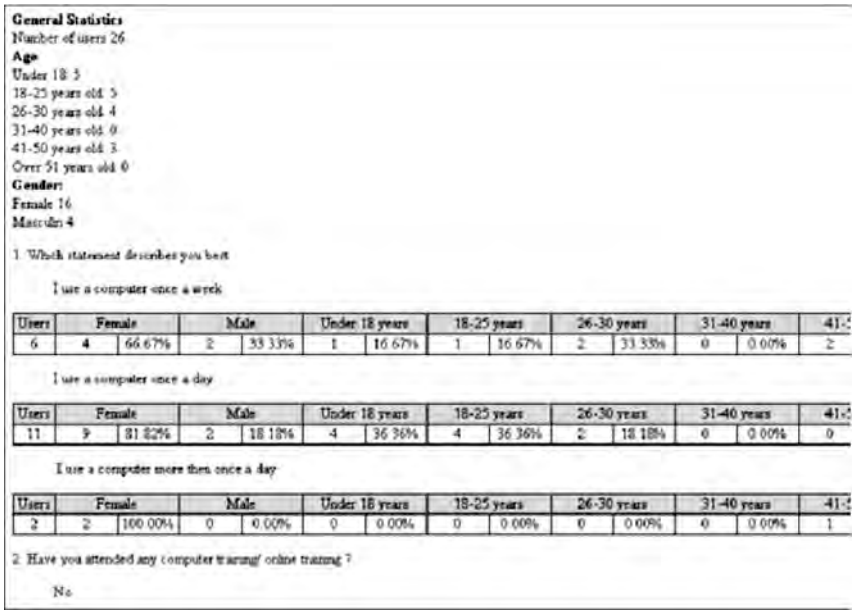
As a new medium for questionnaire delivery, the Internet has the potential to revolutionise the survey process. Online questionnaires provide several advantages over traditional survey methods in terms of cost, speed, appearance, flexibility, functionality, and usability (Dillman, 2000). For instance, delivery is faster, responses are received more quickly, and data collection can be automated or accelerated (Lumsden and Morgan, 2005). Online questionnaires can also provide many capabilities not found in traditional paper-based questionnaires: they can include pop-up instructions and error messages; they can incorporate links; and it is possible to encode difficult skip patterns making such patterns virtually invisible to respondents. Moreover, it can be written in a number of interactive ways to assist in (a) sequencing of items and navigation of the forms, (b) giving definitions and clarification of terms, (c) recording responses, and (d) helping to avoid, detect, and correct errors at the point of entry or on completion of sets of items (Lazar and Preece, 1999). Like many new technologies, however, online questionnaires face criticism despite their advantages. Typically, such criticisms focus on the vulnerability of online-questionnaires to the four standard survey error types: coverage, non-response, sampling, and measurement errors (Dillman, 2000), some currently exacerbated in online-questionnaires as a result of the digital divide. But in the same time, several developed countries have reported substantial increases in computer and internet access (Boitos, 2004).

To prevent errors of this kind, and their consequences, the “Politehnica” University of Timisoara multimedia team (UPT) (Andone *et al.*, 2005a) have developed a practical, comprehensive tool for the design of online questionnaires. The tool is part of the e-Taster project methodology and delivers surveys as final phase of the evaluation and assessment of the e-Taster course. The questionnaire can set up different types of questions: multiple choices with one choice or with several choices, selection questions, rating questions and open questions. In the e-Taster courses each student will need at the end to fulfil an overall evaluation questionnaire, which will be in 5 languages. For general evaluation of the effective and sustainability of the programme the real time statistics are done at overall level but also at country level. This questionnaire and the statistics in a graph format are done using the same online questionnaire tool developed by UPT.

The questionnaire is based on a database where the answers are stored for each question. The user data for access to the survey is directly extracted from the COEDU courses database (the learner is logged on and is using a username and password at the time of the survey, so his personal information is already in the database). As “country” is a special field in the database, the user must choose the country at the beginning of the course or at the beginning of the feedback questionnaire. The statistics generated according with these data can be seen in a general view or based on each country listed in the system. The questionnaire and course completion is a requirement for learner achievement of the Certificate of Attendance. When the learner finalizes the evaluation he can choose to see the overall results in general statistics – as a transparent method for external evaluation and for increasing the trust in the e-Taster system and methodology. The statistical results, based on a multi-variance formula, are split relatively with gender and age groups for every answer and question. For qualitative analysis of the e-Taster methodology the individual answers are considered, which can be accessed by each user by an administrator.

The e-Taster evaluation tool has an administrator part where for authorized persons, different result views are possible:

- the part where the administrator can see what each user has answered to the survey (the information is taken from the database where it has been stored at the completion of the survey);
- the statistic part, where he can see the general statistics or for each country in particular (Figure 2).



General Statistics
Number of users 26
Age
Under 18: 5
18-25 years old: 5
26-30 years old: 4
31-40 years old: 0
41-50 years old: 3
Over 51 years old: 0
Gender:
Female 16
Masculin 4

1. Which statement describes you best

I use a computer once a week

Users	Female		Male		Under 18 years		18-25 years		26-30 years		31-40 years		41-
6	4	66.67%	2	33.33%	1	16.67%	1	16.67%	2	33.33%	0	0.00%	2

I use a computer once a day

Users	Female		Male		Under 18 years		18-25 years		26-30 years		31-40 years		41-
11	9	81.82%	2	18.18%	4	36.36%	4	36.36%	2	18.18%	0	0.00%	0

I use a computer more than once a day

Users	Female		Male		Under 18 years		18-25 years		26-30 years		31-40 years		41-
2	2	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1

2. Have you attended any computer training/ online training ?

No

Figure 2. e-Taster evaluation: general statistics

Challenges and Conclusion

During development, the team needed to overcome several challenges:

- the subject novelty and new learning style and methodology;
- special approach in content development is needed – simple “demos” or “copy-paste” from any existing course are not adequate;
- using the same e-learning environment for all the courses and all the universities involved;
- the difficulties in international, networked delivery;
- the general user interface for fulfilling several usability requirements;
- different technical solutions (real-time simulation with direct user interaction).

As a result e-Taster courses and evaluation which respects the universal design rules were created. The e-Taster courses are a friendly e-learning method for people with low IT skills, general public, allowing different levels of interaction and innovating the methodology of life-long learning. The application is tested and evaluated by all the partners in 5 countries. For more and actual information please visit the project website at www.e-taster.net.

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MOBILE LEARNING: THE NEXT GENERATION OF LEARNING EXPLORING ONLINE SERVICES IN A MOBILE ENVIRONMENT

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Introduction

This paper is written as part of the European Commission's Leonardo da Vinci project "Mobile Learning: The Next Generation of Learning"[1] in collaboration between three of the project partners. The paper profiles three separate research areas undertaken by the partners addressing trends and practice of integrating new media and ICT applications in education. The future is wireless. The project proposes that the next generation is the provision of education and training on wireless devices: Personal Digital Devices (PDAs), Mobile Phones and Smart phones.

The aim of this project was to develop and adapt courses for current and future mobile handsets where mobile learning is defined as the provision of training courses via wireless devices. Courseware was developed as part of a fully functional mobile Learning Management System (mLMS). Technologies available to mobile device platforms were evaluated to develop the courseware as well as the mobile devices themselves. The courses were tested and evaluated, and the results widely disseminated.

The three undertakings examined a variety of mobile device options and subjects and included

- Exploring online services in a mobile environment using PDAs. [1]
- Developing learning materials for smart phones using Macromedia Flashlite. [2]
- Mobilizing a contemporary art course for a smart phone using ATutor. [3]

1. Exploring Online Services in a Mobile Environment

Development undertaken by NKI during the EU Leonardo project "Mobile Learning: The Next Generation of Learning", investigated online services in a mobile environment. Enhancements were made to their LMS – SESAM, to provide services and web pages for any mobile device with a Hyper Text Markup Language (HTML) compatible browser. The course was tested in a controlled environment with 18 people.

The services found interesting and useful were IP Telephony by the use of Skype and messaging services such as MSN Messenger (Skype also has this feature). The development of Opera's Small-Screen Rendering™ browser for the PDA is highly anticipated and is expected to enhance the readability and screen rendering on small screens. In its absence Cascading Style Sheet (CSS) were chosen to make changes in the layout and providing the appropriate style sheets based on the clients accessing the page.

Among the most important findings was that if the structure of the document is good, the challenge of transforming content to the small screens or different layouts actually required less effort than expected. Difficulties were experienced with large illustrations that contained too much information for the small screens as well as large Flash animations with fixed width. The work-around is to zoom in and scroll on the illustration that needs a certain size to be understood.

[1] The Leonardo da Vinci Project – Mobile Learning: The Next Generation of Learning http://learning.ericsson.net/mlearning2/index.shtml

1.1 The Need for Adapting to Mobile Devices

To better serve the increasing demand for different formats as well as mobility it is necessary to give the mobile user a better experience with existing web pages. The reason for targeting mobile devices at this point is because there are more and more users who acquire mobile devices and want to use them with our services enhancing the need to adapt the existing web pages and services to the mobile devices.

One of the biggest challenges concerning the mobile devices was to find acceptable solutions adapted to the small screen. There is simply not enough space for all the information found on a traditional web page on a small screen. Another problem was the limited data transfer rate and processing power found in mobile devices. When people use a mobile device with Internet connectivity, the connection speed is traditionally lower, for instance, via a mobile phone. The courseware design incorporates online high-speed access wherever you are.

1.2 Always-online Test Environment

A wireless, broadband community counting 5 users of mobile learning at home and at work was established using a wireless 802.11b base station connected to a broadband Internet connection that provides the basic "always online" infrastructure. The users are equipped with PDAs that have wireless access to an Asymmetric Digital Subscriber Line (ADSL). A test with 18 people to see how they experienced the mobile environment was also undertaken.

This environment allows the users to explore wireless applications considered to be widely available in the future. Several applications were developed for the PDA using Macromedia Flash, streamed video, synthetic speech and synchronous communication such as Skype and MSN Messenger. The applications were tested through the "always online" environment utilising:

- Synchronous communications, chat
- Mobile access to e-mail which might generate a quicker response
- High bandwidth gives fast downloading of course content and use of audio, video and advanced graphics
- Use of Flash, Java, etc. due to high storage capacity in future PocketPC
- Access to the resources at the Internet at all times
- ADSL gives you control over cost
- Not dependent on synchronization with desktop PC
- Online assessments and assignments
- Opens for collaboration between mobile learners

The wireless technology was tested at home and at work to see how it influenced the users and how they utilized the Internet as a source for information as well as the benefits of studying wirelessly. The LMS server was modified so that web pages and content could fit the small screen of the PDA (240x320). This was done mostly by CSS but some structural changes have also been made to make it easier to adapt the pages to the small screen. The goal was to provide the mobile users with the same information already provided to traditional clients by the LMS, but with a different layout better suited to the small screen.

Figure 1.1: Video Clip Screen Shot

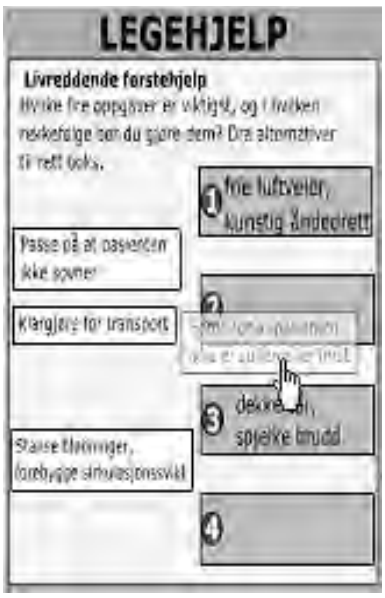

Figure 1.2: Drag and Drop assignment

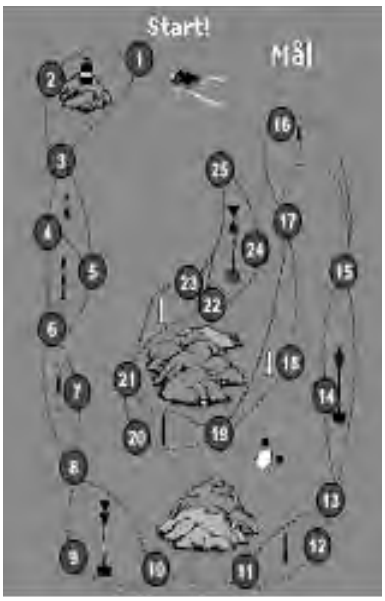

Figure 1.3: Boat Operators Certificate Game

Figure 1. Screen layouts for the applications created

2. Developing Learning Materials for Smart Phones Using Macromedia Flashlite

The modern day mobile phone user is experiencing dramatic change in what services are possible for use via the mobile phone. The mobile telecommunications industry is undergoing a transition as mobile phone usage moves towards data services operating on mobile handsets and networks. Device capability and sophistication has greatly increased allowing subscribers to enjoy premium content and data services on their mobile devices. The technical aspects experienced in developing a learning application specifically designed for smart phone users Macromedia Flashlite.

2.1 Developing the Application

The application was based on an instructor led technical snapshot series and re-designed for the mobile environment and implemented using Macromedia Flashlite. The aim of the snapshot series is to provide an insight to new business areas, concepts, technologies or hot topics and it is believed this effort to disseminate this information, create awareness and encourage further study would be greatly assisted by mobile learning.

The course content was designed with less formal education requirements and learning objectives for example, than the web based WCDMA overview course[2]. The aim was to provide useful, fun and appealing learning options to cater for all users on “nice to know” information. By creating material based on the snapshot series of presentations and making it available in a blended environment, it was anticipated the material would be used by students at times that were convenient for them, such as work commutes, airports, etc. and when in transit.

Awareness of the learning materials available is promoted through a content portal, through e-mail, communication with colleagues and device interaction, for example messaging, USB memory sticks and using the mobile device in conjunction with the PC and other devices.

[2] Courseware produced by Ericsson as part of the Leonardo Project – http://learning.ericsson.net/mlearning2/files/workpackage3/ericsson_technical_workingpaper_2004_pa2.pdf

The course material is part of self-paced learning, which runs continuously as part of career and professional development. Some assumptions are made surrounding the usage of such learning materials and the devices used for testing.

- The material, mobile device and m-learning environment is generally geared towards short and spontaneous study periods.
- A basic understanding of subject matter is already established before accessing the mobile courseware and the context of the courseware or learning material is understood.
- Users have an understanding of how a smart phone operates.
- The courseware is designed as an introduction, to prompt investigation and further blended learning by the user and is viewed as a catalyst in the learning process.

The course material consists of screens displaying text, audio and graphical content implemented in Macromedia Flashlite for mobile devices. Macromedia Flashlite facilitates content rich animation and multimedia on a mobile operating system. It has a compression algorithm which greatly reduces the file size and overcomes the memory and hardware limitations currently presented by mobile phones. An interactive help feature is available by allowing the user to click on a diagram or graphic for further explanation. A self-paced interactive quiz accompanies the material as a separate module.

Information and knowledge sharing would be a result of the material being developed and made available and then being shared with friends and colleagues. The user would build up a knowledge network consisting of available courseware and a group of peers or colleagues with similar interest areas. Information could be exchanged through MMS, e-mail and PC distribution. The user simply "loads up" their device with courseware which is available for instant use with mobility.

Figure 2.1 Navigation Figure 2.2 The Help Menu Figure 2.3 Interactive Exercise

Figure 2. Screen layouts for the Flashlite application

3. Mobilizing a Contemporary Art Course Using ATutor

Courseware featuring contemporary art for the smart phone has been developed. The course was retro fitted to suit the needs of a mobile application. One of the goals was to ensure the compatibility of the course to the SCORM standard. The structured and converted courseware was published on the web using an open source learning management system called ATutor. This software was also modified to be able to use it on the screen of a smart phone.

3.1 The Courseware

The original courseware itself was developed by an art student at an art college in Budapest. It contains an overview of the modern art branches; moreover it goes deeper with the review of three larger art directions and with the review of specific styles and artists in these areas. The courseware transcript is written in Hungarian as Hungarian art students are the target group for this material. It contains approximately 50 pictures as examples for various art directions. These pictures are sourced from a partner, the VirtuartNet Gallery, which is well known among galleries dealing with contemporary art and has a web page with appropriate digitized pictures and materials about painters. These pictures and data were used with the expressed permission of the Gallery.

After the realization of this course on a paper-based form it was analyzed and restructured during a consultation process between the author and an e-learning expert, who is familiar with the SCORM standard. The result of this consultation was the course material being divided into three packages depicting the three main part of the course. The metadata required by the SCORM standard was then created, which described the internal structure of the material – so describing sections and subsections contained by various files.

3.2 Packaging

The SCORM standard suggests a content packaging methodology about the creation of content entities in the course. This simply means that only a relatively small part of information can be shown on one page, or in one file in our case. As a result of this, the content was separated into plain HTML files containing a small amount of information. Using this technique maintaining the appropriate structure of the course was possible, allowing easy navigation. It is also better for the content management system to manage user progress by bookmarks – which simply means the storage of current part (file) of the material, but not the current page when the text is long and it has to be scrolled. As a result, three content packages have been made with their appropriate metafiles describing the structure in a specified XML format[3]. The final packages were created simply by zipping the packages into standard ZIP files.

3.3 Publishing on the Web

After creating the content package a web service provider was chosen to host the material in ATutor. Atutor was chosen because of its SCORM conformance, which was considered important, and the relative easy usability. A localization of the ATutor learning management system was created, so it can communicate with users in Hungarian. However the findings are that ATutor does not fully comply with the SCORM standard. It does not implement the Run Time Environment, which does not pose any problem to the courseware as we do not use this feature of SCORM (it is only necessary for interactions between the material and the learning management system, as by tests for example). Moreover there are other minor differences in the metadata interpretation of ATutor and the standard. So two kinds of packages were designed: the first package suitable for using in ATutor, the second package conforming to the SCORM standard. The SCORM conformance was tested with the open source testing suite available from Advanced Distributed Learning[4] and it results that our packages are well-formed, valid and complies with the standard.

Since the packages contain plain HTML pages with pictures they are published as normal web pages and a Table of Contents created for them, which follows the structure of the course described in the SCORM metadata files. This way the two representations of the course are identical. This webpage is also hosted by our partner, but it is separated from Atutor.

3.4 Mobilization

Since the original material was divided into small textual parts according to the SCORM standard, the original larger body of material is now represented by three smaller packages, with smaller file sizes and as a result each package can better fit the smaller screen and memory of a smart phone and mobility

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[3] The appropriate XML schemas can be downloaded from ADL (http://www.adlnet.org/xsd/adlcp_v1p3) or IMS (http://www.imsglobal.org/xsd/imscp_v1p1)

[4] http://www.adlnet.org/index.cfm?fuseaction=license&fileid=1110&libid=735

is better achieved. However we have had troubles with the pictures. The original pictures of the VirtuartNet gallery were large in the sense of pixels and bytes as well. So they were converted to a smaller form, but the problem of relative sizing remains unsolved.

This leads to the troubles with smart phone browsers. There are two browsers available for our testing smart phone: Opera and the integrated browser from Symbian[5]. Each browser interprets and displays differently the relative size of the given picture. The picture width sized 60% is interpreted by Opera as 60% of the visible page width, by the internal browser as the percentage of the picture width (in pixels). So it was decided to directly convert pictures to a small form in order to reach optimal visibility on small screens. There was another issue with browsers: the internal browser supports special Hungarian characters[6] while Opera does not. As a future experiment we have to try some other type of encoding like Unicode and the almost outdated HTML encoding.

Next issue with mobilization was to change the appearance of Atutor, since it uses a horizontal arrangement, which is quite optimal for large PC screens but does not fit on small screens. Since Atutor can have so called Themes, layout was arranged to a vertical form. The course could not be tested in on-line forms due to connection issues, but it was tested it with PDAs and it is quite usable.

3.5 Being On-line

Since the test device was a smart phone, namely SonyEricsson P900, on-line usage was stated as a requirement. Due to connection and browser issues on-line testing was not tested. Of the two browsers available for our smart phone, the internal browser is WML browser capable of interpreting HTML pages as well. This browser can connect to the internet by using the GPRS features of the smart phone. The features of this browser are much more moderate than Opera, which is maybe going to be a de-facto standard in the market of pocket browsers. But Opera cannot connect through the test device, it cannot use the GPRS features, therefore it cannot reach the internet. The reason for this is maybe the lack of TCP/IP stack in these kinds of phones (other smart phones are affected as well). The phone connects to the internet through a WAP gateway, which requires another protocol than plain TCP/IP, however it is based on it. The on-line version of the courseware is not accessible through a mobile internet connection but the HTML package files can be stored on the memory card of the smart phone and can be viewed with every browser on the phone. It can be studied in spare times or in front of pictures in a gallery or museum. This situation will be the basis of future tests.

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[5] SonyEricsson P900 works with Symbian 7.0 operation system

[6] These characters are ü, ű, ö and ő

AMPLIFICATION OF KNOWLEDGE BY CREATING AN INFINITE ADAPTABLE FEEDBACK LOOP

Sybille Paar, Johannes Feiner, Takashi Linzbichler, Franz Niederl, FH Joanneum, Austria

Introduction

Virtually everybody knows about the rock guitarist Jimi Hendrix. One of his world-famous tricks playing the electric guitar was to use the feedback noise created by the electro-mechanical system of strings, pickup, amplifier and speaker as a stylistic element in his playing.

What is happening there is, in short: the movement of the guitar strings creates an electric signal within the pickup, which is being intensified by the amplifier. The last-mentioned drives the speaker, the speaker creates sonic and magnetic waves and these waves move the strings that again create an electric signal... And, yes, the sound is getting louder and louder until it almost explodes into a crescendo of tones and overtones.

But what has this all to do with (e)Learning and teaching? Is there anything we can deduce from Hendrix' guitar playing for our daily work in teaching? One might probably and (too) quickly state: no. In our experience, however, similar effects can be used maybe not to create but definitely to increase knowledge. Learning (and teaching) always implicitly or explicitly makes use of what would technically spoken be servo loops. Consider the following scenario (Figure 1).

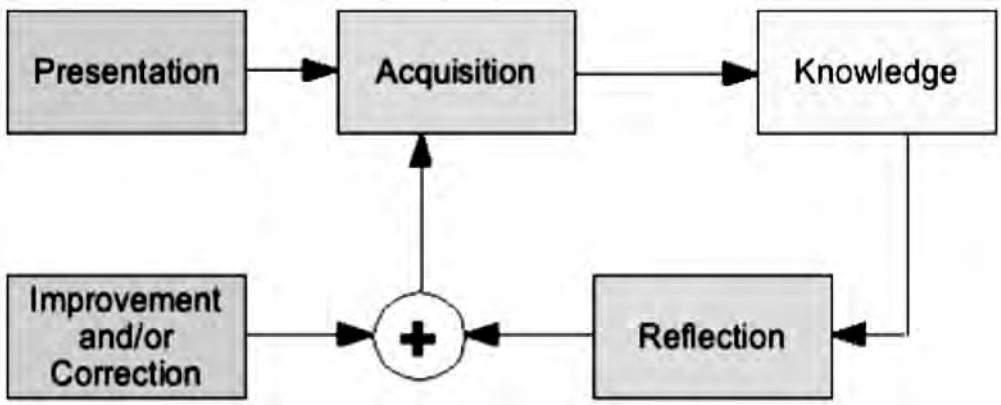

Figure 1. Circle of knowledge-acquisition

Building up knowledge is presented here as an ongoing circle of refinement and reflection, steered by the teacher in that he/she

- presents his/her contents of teaching,
- and helps to build knowledge based on this content by adapting the acquisition circle.

The first of the two steps is of course self-explanatory, the second might be worth some additional notes. Every action taken by the teacher during or after the students' acquisition of the presented contents will influence this acquisition process. The most important process in this context is of course the review of the students' knowledge by means of e.g. an exam.

So the main influence on the process of knowledge building is, besides the presentation of topics, determined by the teachers' (or probably other people's or entities') influence on refining and improving the already gathered knowledge. The interesting fact about this model is that once started, the whole process keeps running, while automatically increasing, strengthening and fastening the students' knowledge. Speaking with the Hendrix-example from above this would mean that the only way to stop the noisy feedback-loop is to turn the amplifiers' gain down (i.e. to no longer provide any teacher's feedback to the students).

This model has already been successfully implemented into the eLearning software, most notably FLE3 from UIAH's Media Labs in Helsinki[1]. So, there is nothing new until here.

But based on the model above the department ITM (Internet Technology and Management) of Styria's University of Applied Sciences FH Joanneum started to consider integrating elements of problem based learning into this model. The main reason to do so was the unsuccessful search for an adequate software solution when introducing a new part-time degree program with as much as up to 70% of the teaching done by means of eLearning.

Being an IT study program, the question was how to adapt the above mentioned (servo) loop to our own special needs, which include the following:

- the development of an appropriate eLearning platform to be used within our courses
- to provide real-world problems for our students' project works
- to cultivate the students' creativity and their technical as well as social skills

To cover these tasks, we started the eNcephalon project in spring 2004. The project is centered on an OpenSource content management system (CMS) and several tools for carrying out synchronous lessons, like, among others, audio-conferencing and desktop-sharing. While using this system for our everyday work, we are now developing a sophisticated integrated, yet modular eLearning system around these focal points together with our students.

Didactical Approach

To understand the didactical approach used for eNcephalon, one must imagine that the internet has revolutionised various parts of our lives, has led to new possibilities in teaching and also has called into question the traditional way of acquiring and passing on knowledge. eLearning is no longer just a term that describes a futuristic vision but has become part of almost every student's learning environment. The first generation of eLearning platforms has already been evaluated and improved and they are nowadays widely used in schools and universities. Therefore it is crucial that teachers and lecturers keep up to date and adapt their teaching methods to this eLearning environment.

These didactical challenges are met by employing a very innovative approach called *sustainable project-based eLearning* (SPBEL), which carries the already well-known method of project-based learning (PBL) a little bit further. In other words, this new teaching and learning model incorporates the advantages of project-based learning and combines it with an approach that ensures the sustainability of the outcome of the projects. Thus, SPBEL like PBL "[…] engages students in complex activities based on challenging questions, includes a community of inquiry, shifts away from traditional teacher-centred teaching and emphasizes student-centred instruction. It allows students to work autonomously to construct their own learning and culminates in realistic, student-generated products." [1]

The most important step, however, when it comes to applying SPBEL is that the output of those projects is not considered to be an end product. As the projects' tasks are focused on how to improve the already existing eLearning platform eNcephalon[2], the student-generated products are subsequently integrated into the eLearning environment and are being continuously evaluated and tested by lecturers and students who take part in online-sessions. The suggestions for improvement resulting from these usability tests form the basis for new project tasks, which are finally carried out by the next generation of students. Hence, the sustainability of the students' work is guaranteed.

Worth mentioning as well is that certain eLearning objects of the platform are already used by the students while carrying out their projects. The running documentation of the projects' progress is for instance written down on a Wiki-Page and the projects' outcome is finally uploaded into a folder provided on the platform.

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[1] http://fle3.uiah.fi

[2] https://elearning.fh-joanneum.at/elearning

While the students are working on their projects, the teacher takes on the role of the so-called pedagogical agent, which means that he/she accompanies and supports the project-based learning process [2, 201sqq.]. In other words, they become coaches and are no longer just presenters of content. Students become 'constructors' of their own learning platform and therefore they are no longer reduced to the role of a passive consumer.

Whenever questions or problems arise, students have the opportunity to use synchronous as well as asynchronous means of communication, which are provided on the platform. The lack of social interaction, which is often criticised as one of the disadvantages of eLearning, is compensated by the use of synchronous eLearning tools like audio conferences or, in future, also video conferences. As the synchronous tools constitute such an important social factor in the eLearning environment they are paid special attention to. That's why presentations are either given at the university or carried out online with the help of synchronous communication tools such as audio conferencing and desktop sharing. The advantage of asynchronous media, however, is that communication can happen regardless of time and location. Students have the opportunity to post their questions in a forum and colleagues as well as lecturers can comment on these questions and give relevant feedback whenever and wherever they have time to. Yet, years of experience with the forum have shown that even this medium has its shortcomings. It is, for instance, often difficult for students to put down in writing the problems and questions they have. Furthermore, the social and emotional aspect of communication can only be inadequately expressed by the use of emoticons.

A possible way to overcome or reduce these drawbacks is to introduce podcasts (= digital audio messages). Via spoken language emotions can more easily be conveyed and transmitted and the suprasegmental elements of language such as pitch, stress and modulation can direct the students' attention to particular pieces of information, helping them to distinguish between more and less informative parts of the talk. Thus, spoken language can on the one hand be used to convey concrete information and, on the other hand, to replace ample texts.

In order to offer a higher degree of authenticity by means of visualisation so-called vodcasts (= digital video messages) are supposed to be put into practice in the near future. The visual component in addition to the audio and text-based material leads to a more effective way of acquiring and transferring knowledge [2, 148sqq.].

One of the advantages of SPBEL is the unique way in which it can motivate students by engaging them in activities that lead to a direct improvement of their own learning environment. The students have the possibility to use technologies and tools that have already been developed further by their colleagues in their own planning, development and final presentation of their projects. By designing and implementing their own learning environment students can live their creativity while learning. They (re)invent things and no longer just use a 'finished' product which cannot be altered or customized according to their needs.

So, the outcome of the (admittedly quite unique) combination of SPBEL, mostly internet-related course contents (networking, programming, operating systems, server technologies, etc.), the constraint to use eLearning tools and a certain, perhaps quite high, affinity of our department towards OpenSource software (see below) led to a didactic system that again can be modelled and depicted as a self-contained servo (or feedback) loop (Figure 2).

Technical Framework

An absolutely necessary requirement for SPBEL is an adaptable technical platform. We use an open source framework which allows everyone to modify and adjust the software according to one's needs which involves adding functionality, changing behaviour or removing bugs. The modular architecture ensures extensibility and configurability. Besides, the implementation relies on solid software packages like the object oriented python programming language, the object oriented multimedia database and the application server Zope [3]. All this is topped by Plone [4], a highly customizable content management and portal system.

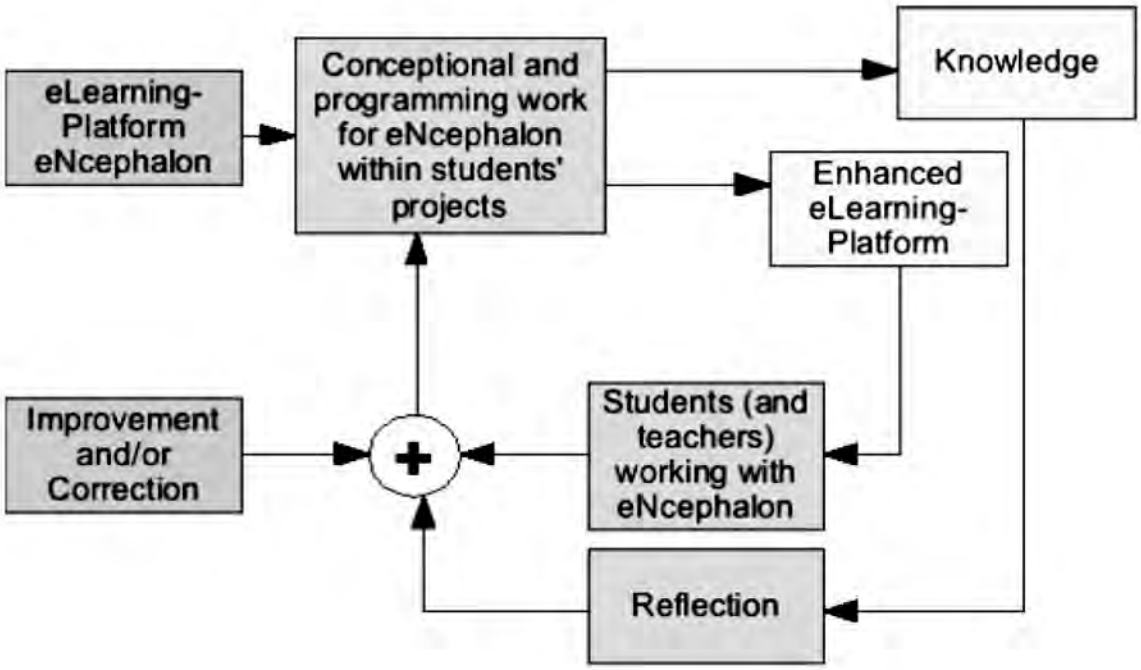

Figure 2. Acquisition of knowledge within eNcephalon

Results of Our Projects

Figure 3. eNcian, eNcephalon's rich client under development

One of the software projects initiated in a course located within the 6th semester of the curriculum of ITM was surprisingly successful: eNcian[3]. Due to the lack of comfort at students' desktop when using eLearning tools the idea of a smart standalone client was born. The resulting client software is called eNcian (the smart, little friend of eNcephalon – the great eLearning system, Figure 3). It allows users (foremost students, but also teachers) to start several synchronous eLearning tools with a single mouse-click. All user settings are pre-configured to one's needs, which means that after having logged into the eLearning system the student is automatically connected to the chat-room, can see the teacher's desktop and our tailor-made feedback tool is activated, asking "Too Fast? Too Slow?".

Another case in which the 'return of investment' (be the investor the student or the department) becomes visible is the diploma thesis of one of ITM's students, who designed and planned a high availability system (a cluster of database and application server nodes). Load balancing, redundancy and even an adequate backup strategy were laid out. Since it's implementation, it has formed the server backbone of the ITM eNcephalon eLearning framework (Figure 4).

Concluding, some more words concerning the projects' quality have to be added: sudents as well as teachers are aware of the fact that their achievements cannot be compared to the quality of commercial

[3] http://dev-itm.fh-joanneum.at/plone/encian/

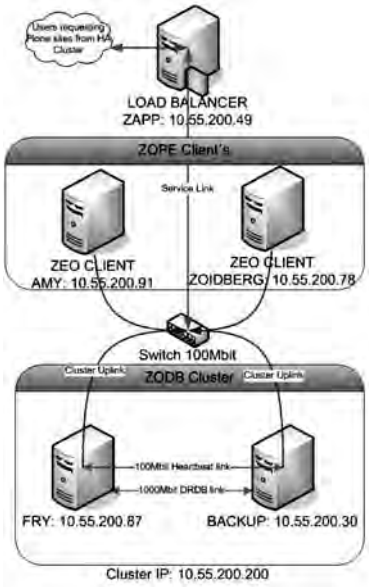

Figure 4. The ZODB HA cluster developed for eNcephalon

products for several resaons. There is neither a hotline they can rely on, nor a company that produces new versions or fixes bugs every few months. But there is still another and probably more efficient way of ensuring the products' quality in terms of usability which again involves the students themselves. As they are all constantly using the eLearning platform, they are also able to give constructive and relevant feedback which, e.g. leads almost immediately to the fixing of possible bugs.

Finally the eLearning environment eNcephalon supports the students in gathering social competence besides acquiring technical knowledge. The range of skills developed during the projects is very broad. To name just a few, one might think of social skills like teamwork, or technical expertise in software-engineering. This also involves giving and receiving critical feedback, practising joint project work, studying marketing skills for advertising one's own work and last but not least cooperating internationally. As an example, a multiple choice quiz is now being developed together with the University of Magdeburg in Germany.

Conclusion

When we started the eNcephalon project we subtitled it 'eLearning by doing', to paraphrase the hands-on approach we preferably use for our teachings. It soon turned out that the potential of combining the OpenSource software approach with the didactic concept of SPBEL is much higher than we originally thought. The idea of students creating and adapting their own learning environment during their regular studies was more effective than anyone of us had expected. The benefits of this approach are at hand: Students are getting used to working in interdisciplinary groups while doing real-world projects and in addition to that they are highly motivated to 'do things right', as they themselves have to use the results of their efforts in their everyday work.

Of course, as it is the case with many regenerative systems, eNcephalon is getting bigger (and hopefully better) all the time, so where is the limit for this growth? Take another look at Jimi Hendrix: when the feedback got too loud, he burned his guitar. And we might just abandon eNcephalon, maybe to create eNcephalon2, trying to make it even better. And the circle continues...

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INTELLIGENT LIFE LONG LEARNING TUTORING SYSTEM FOR REAL ESTATE MANAGEMENT

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1. Introduction

The notion of intelligent machines for teaching purposes can be traced back to 1926 when Sidney L. Pressey built a machine with multiple choice questions and answers [10]. Intelligent Tutoring Systems (ITS) are an outgrowth of the earlier computer-aided instruction, which usually refers to a frame-based system with hard-coded links, i.e. hypertext with an instructional purpose [6]. In the 1960's, researchers created a number of Computer Assisted Instructional systems that were generative [16]. By the late 1960's and early 1970's, many researchers had moved beyond merely presenting problems to learners while collecting and tabulating their responses, to considering the student a factor in the overall instructional system [17]. At the beginning of the 1990's, early ITSs focused their efforts on lesson navigation, or a kind of electronic page-turner presenting frames of text or graphics. This type of ITS is often referred to as a first generation ITS. Second generation ITSs use the model-tracing algorithm [1] to create a model of the student and trace student thinking [13]. ITSs where a model of both the student and the tutor are created in an effort to improve performance were the natural extension to second generation systems. Different researchers [7, 8] have developed third generation ITSs that model the tutor as well as the student.

Intelligent Tutoring Systems emerged from Artificial Intelligence. When analysing the essence of ITS, it is worth-while to take into account the research of other authors and institutions [3, 4, 5, 6, 14, 15, 18, 19]. One reason that ITS is such a large and varied field is that "intelligent tutoring systems" is a broad term, encompassing any computer program that contains some intelligence and can be used in learning [6]. Therefore, in order to increase the degree of objectivity, we shall rely on the research of specialists and institutions working in this field. There are various intelligent tutoring system definitions such as: a learning technology that dynamically adapts learning content to objectives, needs, and preferences of a learner by making use of his expertise in instructional methods and the subject to be taught [19]. A tutoring system is a software whose aim is to communicate the knowledge of a domain (mathematics, language, etc.) to its user. Such a system is named "intelligent" mainly if it can adapt the interactions to the learner. Therefore, a tutoring system must have, among other things, some information about the user [5]. Intelligent Tutoring Systems (ITS) are software programs which provide instruction for a learner with guidance and insight in the way a teacher would guide a student. In an ITS program the knowledge of "how to teach" is distinct from that which is to be taught and from that which the student knows. Each of these areas of knowledge may be captured in a knowledge base or at least some form of an abstraction which the program operates upon to control its execution [9]. Broadly defined, an intelligent tutoring system is educational software containing an artificial intelligence component. The software tracks students' work, tailoring feedback and hints along the way. By collecting information on a particular student's performance, the software can make inferences about strengths and weaknesses, and can suggest additional work [48].

According to Freedman [6], the traditional ITS model contains four components: the domain model, the student model, the teaching model, and a learning environment or user interface. Wenger [18] presents the following model of ITS: Domain Expertise, Student Models, Pedagogical Expertise and Interface. Beck *et al.* [5] have identified five major components of ITS: Student Model, Pedagogical Module, Domain Knowledge, Communications Module and Expert Model. Each ITS must have these three components: knowledge of the domain, knowledge of the learner, knowledge of teacher strategies [10].

This paper is structured as follows. Following this introduction, Sections 2-9 describe the Intelligent Life Long Learning Tutoring System for Real Estate Management: Structure (Section 2), Domain Model (Section 3), Student Model (Section 4), Decision Support Sub-system (Section 5), Database of Computer Learning Systems (Section 6), Tutor and Testing Model (Section 7) and Graphic interface (Section 8). Finally, some concluding remarks are provided in Section 9.

2. Structure of the Intelligent Life Long Learning Tutoring System for Real Estate Management

The Intelligent Life Long Learning Tutoring System for Real Estate Management (ILLLTS-REM) has been created by authors in order to help employees to improve their qualifications in the field of real estate throughout their active professional life. This system enables learners to navigate in the information and knowledge variety and dynamically adapts learning content to objectives, needs, and preferences of a student by making use of his/her available expertise.

The Intelligent Life Long Learning Tutoring System for Real Estate Management consists of six subsystems:

- Domain Model,
- Student Model,
- Tutor and Testing Model,
- Database of Computer Learning Systems,
- Decision Support Subsystem,
- Graphic Interface.

The subsystems are briefly analysed below.

3. Domain Model

Domain Model (Domain Knowledge) component contains information the tutor is teaching, and is the most important since without it there would be nothing to teach the to student [5].

Since 1999 the e-learning Master degree studies "Real Estate Management" have been introduced in Vilnius Gediminas Technical University (VGTU), Master degree studies "Construction Economics" from 2000, and Master degree studies "Internet Technologies and Real Estate Business" from 2003 as well (see http://odl.vtu.lt/). There are currently 220 master students from all over Lithuania studying in these three e-learning master programs.

63 modules are studied within the above programmes. All 63 modules with their supplement audio and video material are available at the ILLLTS-REM Domain Model. Usually, the amount of the material for one subject in text form varies from 100 to 500 pages.

Different Web-based links are in the presented teaching material. These links provide better conditions for lesson navigation and acquiring more related information and knowledge.

After registration, students mark the sections of 63 modules they want to study in the electronic questionnaires. If a student has already participated in these e-learning studies, then the modules he/she has studied before are considered. The system can also offer study materials to students according to the repetitive key words in different modules. Mixed approach is also possible. The received information is used for the action plans: "mini curricula" that are used to lead the learner. Naturally, different students receive different study materials. For instance, if a student is working as a real estate broker, he/she receives study materials related to real estate buying, selling, broker activities, real estate contracts, etc.

4. Student Model

ITS is named "intelligent" mainly if it can adapt the interactions to the learner. Therefore, a tutoring system must have, among other things, some information about the user [5].

The intelligent tutoring system starts by assessing the student knowledge of the subject or what the student already knows. Student Model uses that data to create a representation of the student's knowledge and learning process and represents the student's knowledge in terms of deviations from an

expert's knowledge. On the basis of these deviations the system can decide what curriculum module, or chapter (subchapter) of module should be incorporated next, and how it should be presented (text, multimedia, computer learning system, etc.).

The Student Model stores data that is specific to each individual student. This information can be explicit (year of birth or university completion) or tacit. Explicit knowledge, i.e. information is widely used in information technologies. The main student knowledge is tacit. Tacit knowledge is comprised of informal and non-registered practice and skills. This knowledge is vitally important because it defines the abilities and experience of learners.

The Student Model is used to accumulate information about education of a student, his/her study needs, training schedule, results of previous tests (if he/she has studied in the above-listed e-learning MSc programmes or qualification improvement courses before) and study results. Thus the Student Model accumulates information about the whole learning history of a student.

Since the purpose of the Student Model is to provide data for the Tutor Module, all of the data gathered should be able to be used by the Tutor module.

5. Decision Support Sub-system

Decision Support Sub-system is used in mostly of all components of ILLLTS-REM (Domain Model, Student Model, Tutor and Testing Model, and Database of Computer Learning Systems) by giving different level of intelligence for these components.

Decision Support Sub-system aid in and strengthen some kind of decision process. Decision Support Sub-system, that is a computer-based system that brings together information from a variety of sources, assists in the organization and analysis of information, and facilitates the evaluation of assumptions underlying the use of specific models. Decision Support Sub-system comprise of the following four constituent parts. These parts are: data (database and its management system), models (model base and its management system), user interface and message management system.

For example, ILLLTS-REM focusing on intelligence in the Integrated Web-based Negotiation Decision Support System for Real Estate (Database of Computer Learning Systems, see http://dss.vtu.lt/realestate/) can create value in the following important ways: search for real estate alternatives, find out alternatives and make an initial negotiation table, complete a multiple criteria analysis of alternatives, make negotiations based on real calculations, determine the most rational real estate purchase variant, and complete an analysis of the loan alternatives offered by certain banks. Also by using a Decision Support Sub-system, the tutor can compare the learner's solution to the expert's solution, pinpointing the places where the learner had difficulties. Decision Support Sub-system have been developed by using multiple criteria methods [12, 20] as was developed by the authors.

6. Database of Computer Learning Systems

The database of computer learning systems enables using the following Web-based computer learning systems: construction, real estate, facilities management, international trade, ethics, innovation, sustainable development, building refurbishment, etc. Above systems have been developed by using multiple criteria methods [12, 20] as was developed by the authors. Each computer learning system consists of a database, a database management system, model-base, a model-base management system and a user interface. Application of multiple criteria computer learning systems developed by authors allows one to determine the strengths and weaknesses of analysed alternatives and its constituent parts. Calculations were made to find out by what degree one version is better than the other and the reasons disclosed why it is namely so. Landmarks are set for an increase in the efficiency of versions. All this was done argumentatively, based on indexes under investigation, on their values and weights. This saved students' time considerably by allowing them to increase both the efficiency and quality of e-learning. Below is a list of typical problems solved by graduates in their course and diploma projects:

- Multiple criteria analysis and determination of market value of a real estate (e.g. residential houses, commercial, office, warehousing, manufacturing and agricultural buildings, etc.).

- Analysis and selection of a rational real estate version.
- Multiple criteria analysis and determination of the highest and best use of a real estate.
- Determination of efficient investment instruments.
- Determination of efficient investment projects.
- Determination of efficient financing instruments.
- Multiple criteria analysis of a property's obsolescence.
- Alternative design of a project's life-time process (i.e. one-family dwelling houses, agricultural buildings, cast-in-place buildings, prefabricated panel buildings, refurbishment of buildings, etc.), its multiple criteria evaluation, determination of utility degree and the selection of the most efficient version.

The use of multiple criteria computer learning systems in solving various problems encountered in the course and diploma projects was also aimed at determining: student's knowledge acquired at the university, student's general level of education, student's keenness of mind, student's ability of fast and adequate response to changing situation.

7. Tutor and Testing Model

The Domain Model presents frames to the learner. Tutor and Testing Model provide a model of the teaching process and support the transition to a new knowledge state. For example, information about when to test, when to present a new topic, and which topic to present is controlled by this module. The Tutor and Testing Model reflect teaching experience of associate professors or professors. The Student Model is used as input to this component, so the Tutor and Testing Model decisions reflect the differing needs of each student.

The Tutor and Testing Model formulates questions of various difficulties, specifies sources for additional studies and helps to select literature and multimedia for further studies and a computer learning system to be used during studies.

Student can select the level of difficulty at which the teaching takes place. For example, the chapters of modules with mathematical orientation (i.e. mathematical methods used for estimation for market or investment value) are quite difficult for some students.

Traditional testing systems evaluate learner's state by giving them a mark and do not provide a possibility to learn about own knowledge gaps or to improve knowledge in any other way. The Tutor and Testing Model compare the knowledge possessed by a student (test before studies) and obtained by a student during studies (test after studies) and then it performs a diagnosis based on the differences. By collecting information on a history of a student's responses, the Tutor and Testing Model provide feedback and help to determine strengths and weaknesses of student's knowledge, new knowledge obtained during studies is summarized and various recommendations and offers are provided. After giving feedback, the system reassesses and updates the student skills model and the entire cycle is repeated. As the system is assessing what the student knows, it is also considering what the student needs to know, which part of the curriculum is to be taught next.

Also there are option of selection of the following question in a test depends on the correctness of answers to the previous questions. Correct answers lead to the more difficult, incorrect – to the easier ones.

The obtained knowledge is the difference between the possessed knowledge (test before studies) and the final knowledge (test after studies). The Tutor and Testing Model also explain why one or another answer is correct/incorrect and offers certain additional literature and multimedia related to the incorrectly answered question.

Applying ILLLTS-REM, a tutor does not renew tests for every learner. Questions are saved in a question database and hundreds of test alternatives are developed casually.

The questions base of the Tutor and Testing Model accumulates the following information:

- Questions according to modules,
- Possible answers to the question,
- Evaluation of correctness of possible answer versions (an incorrect answer is evaluated by zero and a correct is evaluated by one; intermediate answers get from 0 to 1),
- Difficulty of a question determined on the basis of the results of previous tests taken by other students,
- Link to the study material related to the question,
- Time allocated for testing.

Having such a question data base, it is possible to create tests also in a non-random way, but to individualize it for each student according to the number of questions, their difficulty and proportion of questions of different topics. Received test results are saved in the results data base.

8. Graphic Interface

A modern intelligent tutoring system can implement its functions effectively only when users can have active dialogue with a computer by using means for dialogue organisation determining how the information is provided and how the information and commands are interchanged. Therefore, the system-user dialogue is important, as well as the interface (dialogue system) helping to have comfortable and effective dialogue. Without a suitable interface, a user cannot have full advantage of the system features. The user interface includes all mechanisms for data input and for output of results from the system. Various user interface types are used (commands, menu, graphic, etc.). This system has graphic interface: icons in windows opened in the computer screen show data, models and other objects available in the system. By graphic interface a user can control data, knowledge and subsystems and can review the results in the computer screen or have them printed.

9. Conclusions

Analysis of intelligent tutoring systems has been performed in the paper and new system has been offered. The Intelligent Life Long Learning Tutoring System for Real Estate Management developed by authors consists of six subsystems: Domain Model, Student Model, Tutor and Testing Model, Database of Computer Learning Systems, Decision Support Subsystem, Graphic Interface.

Domain model includes knowledge with the supplemental audio and video material for 63 modules being taught in Vilnius Gediminas Technical University. Student model enables to adapt to a learner needs and knowledge level. Decision support subsystem is used for all components of intelligent tutoring system giving them different level of intelligence. Database of computer learning systems enables using the following web-based learning systems: construction, real estate, facilities management, international trade, ethics, innovation, sustainable development, building refurbishment, etc. Tutor and testing model provide a model of the teaching process and support transition to a new knowledge state. Graphic interface is used to create an effective system-user dialogue.

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AN INDUCTIVE AND OPPORTUNISTIC DETECTION OF A PEDAGOGICAL PATTERN IN A 17 ONLINE COURSES SAMPLE

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Abstract

LabSET (Support Lab for Telematic Learning – University of Ličge, Belgium) applied a pedagogical pattern detection process on 17 online courses designed by faculty. The analysis unearths 11 instances of an activity structure named here RQAT (Reading-Questions/Answers-Test) which offers an alternative (among others) to the conventional lecturing, still extensively practiced in higher education. The recurrence and the relative invariance of the RQAT learning design legitimated an attempt to format it as a pedagogical pattern, used within LabSET's missions of teacher professional development. The conceptual documentation of RQAT suggests also an "illustration" of the pattern and its linkage to a taxonomy of skills.

Introduction

"Patterns are not created or invented; they are identified via an invariant principle (of good design) as manifest across different places and cultures" (Fincher, 2002a). The detection process of the pattern documented in this article was conducted according to an inductive method, (Brouns, 2005), an approach "which allows patterns to be induced from existing courses". Although Brouns advocates for an automation of such a process, the RQAT pattern was here identified via a "human-made" inspection. The process can also be described as "opportunistic": "It takes as its starting point an observation about the quality of an actual situation and then tries to pin down exactly what it is about that situation (and others like it) that is good" (E-LEN, 2004). Authors oppose the adjectives "inductive" and "opportunistic" to approaches labelled as:

- "based on instructional theory": "pedagogical patterns are commonly created by human cognitive processing in writer's workshops" (Brouns, 2005);
- "top-down": "you can start by trying to identify those things for which you know that you need a good pattern. This could be by brainstorming within a group of experienced practitioners, or working from an existing text on elements within the design of learning. The top-down approach provides a faster way to generate a large number of potential patterns." (E-LEN, 2004) Such presentation of patterns' creation process tend to convey the idea that they could be produced "on demand". We submit that a hurried assimilation of patterns to "best practice" (see section 4) reinforces this view which leads to a play down of one important aspect of patterns' initial requirement: observed recurrence.

RQAT emerges as a pattern from the observation of existing courses (four courses are related to educational technology. Other courses come from a broad range of concept domains). Nevertheless, the couple "problem-solution" it instantiates received a first theorization by Gibbs & Jenkins (1992) and Leclercq (1998). RQAT is composed of three learning events. In the first one, the student receives material to read (R). In the second, he asks questions to the teacher (Q&A). In the third one, he performs a test (T) on the content read and clarified. For some professional educators, this pattern may at first sight seem obvious. However, for many teachers who authored an online course according to RQAT, the pattern represents a sweeping change, leading them (and their students) from a "chalk and talk" course to blended or fully e-learning, from pure "transmission/reception" to a more task-based and student-centred method. Therefore, it might be not so trivial to document a pattern which enabled so many trainers to cross those lines.

In the first section, we develop the reasons we have for assimilating the RQAT activity structure to a pattern. In the second section, we express this recurring learning design in an Alexandrian pattern format (with two additions: a "pedagogical photograph" of the pattern and a link to a taxonomy of skills). In the final section, we elaborate on the benefits we expect from the use of pedagogical patterns in our everyday work with academy.

"Patternity test" for RQAT

"A pattern is a named nugget of insight that conveys the essence of a proven solution to a recurring problem within a certain context amidst competing concerns." Among possible definitions, we chose that of Appleton (2000). Appleton comes from the software domain. So far, articles focused on pedagogical patterns either pick up Alexander's definition (Goodyear, E-LEN) or produce a "scattered definition" putting diverse emphasis on problem-solution couple, invariance, abstraction, recurrence, best practice, design rules (The Pedagogical Patterns project, Brouns)… Fincher (2002) opts for the definition of Rielhe & Zullighoven (1996), having also computer sciences as a background. Despite the quality of this abstract definition, we stick to one mentioning explicitely the "couple problem-solution", because this expression makes patterns more understandable and familiar to teachers. Does RQAT match this definition?

Recurring problems

From the interviews of the teachers having authored the online courses composing the sample, it appears that those who implemented an RQAT learning design structure were concerned by the following problems:

- high quantity of expository teaching (lecturing);
- low level of individual participation in large groups settings;
- lack of preparation by students for class time;
- lack of time for discussion in class.

The pattern RQAT is considered by practitioners as a possible reaction to the aforementioned general problems in pedagogy. The last two items are also documented as common instructional challenges for teachers from University of Waterloo (Buzza et al., 2005).

Proven solution

Patterns can be seen as solutions bridging between empirical evidence, experience, theory and the practical problems of design. This convergence is observed with RQAT.

Empirical evidence and experience

After Alexander (1977, 1979), several authors underline that even if something appears to have all the requisite pattern elements, it should not be considered as a pattern until it has been verified to be a recurring and non-arbitrary phenomenon (Appleton, 2000, Fincher, 2002b). For RQAT, this empirical quantitative condition is met since 11 teachers fostered the RQAT structure as an effective design solution for the problems listed in section 2.1.

Educational theory

This empirical evidence is backed up by theory. Observed from a psycho-pedagogical viewpoint, the pattern RQAT implemented by the teachers in replacement of the conventional "learning-by-being-taught" makes sense. Constructivist pedagogy invites teachers to promote learner activity, what is being done by getting students read and ask questions instead of being maintained as pure listeners (see the section "Body" of the pattern).

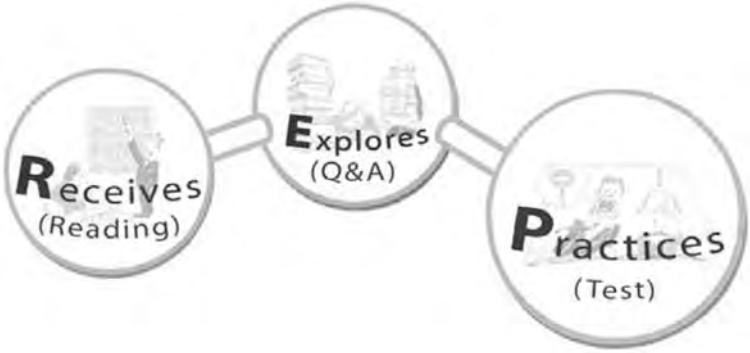
RQAT expressed in a pattern format

Found in 11 online courses, the RQAT structure prompted its capture as a pattern. The format selected sticks to the fundamental principles and structure of Alexandrian patterns. The sections' titles as well as their short elaboration in brackets come from Goodyear (2004). We decided not to use the formats coined by Bergin and E-LEN. Whilst they share clear pedagogic concerns, they are made up of 11 (Bergin, 2002) or 12 (E-LEN, 2004) sections, which appears rather complex for a use of patterns as tools for teacher professional development (see section 4). E-LEN itself considers that pattern format could be accommodated to different uses or target audiences: "We chose to use a very comprehensive structure to enable us to capture all relevant aspects of a design pattern. A detailed structure such as this can be helpful when writing patterns; however, fully mature patterns might best be communicated to others by adopting a simpler structure closer to Alexander's original." (E-LEN, 2004) Broadly, our day-to-day work with teachers convinced us that limiting the components of any model or tool acts as a cognitive facilitator (Miller, 1956) and an incentive for adoption.

Name

Personal and active appropriation of content.

A picture (showing an archetypal example of the pattern)



For architecture, it seems obvious to provide the illustration of a pattern. When it comes to pedagogy, it becomes a challenge. More generally, "user-friendly" visualisation of pedagogical scenarios or patterns is an issue discussed today (Griffiths, 2005, Richards, 2005, Fincher, 2002a). The "picture" proposed here is inspired from the "8 Learning events model" (Leclercq & Poumay, 2005) which introduces standardization of basic teaching and learning activities. It is composed of 8 documented teaching/learning events, i.e. ways of learning. This high level tool-kit provides guiding principle for taking decisions about how to divide the continuum of pedagogic practice into pedagogically meaningful parts. The 8 events are basic elements, "primitives" (Casey, 2005), which can be applied in any context wherein activity structures' analysis and building are at stake. In order to obtain this "atomistic" representation, highlighting the succession of intended mental process in the learner's mind, we interpreted the student's activities composing the RQAT pattern into the "8 Learning events" vocabulary, hoping that it will help teachers to get a quick understanding of the pattern. The upcoming efforts, especially in the European project iClass whose LabSET is a partner, will try to produce other pedagogical patterns from existing online courses and will build on this model (see the experimental research website http://www.labset.net/projets/iclass).

Context (how the pattern helps to complete some larger patterns)

The RQAT pattern is mainly concerned with the establishment of appropriate organisational forms for promoting personal and active appropriation of content. It presents as an alternative to traditional lectures delivered to large groups of students. The pattern has very wide applicability to almost every domain, for literary topics or for mathematics and sciences. The pattern can be used in face-to-face settings but can be implemented in an e-learning mode, the content being made available online and the Q&A session taking place in a forum. As possible competing concern, it can be mentioned that RQAT remains content-oriented. Yet, for teachers naturally committed to this orientation, the pattern represents

both a reassuring ground and an exploratory territory. This intermediate position might explain partly why teachers are willing to make a first move (just one!) towards e-learning, embrace this pattern quite naturally. Aside from the specific skills (tied to the content of the course), RQAT, due to its own internal features, trains the following transversal skills (coming from the taxonomy of Knight, 2004):

- Personal qualities
  - Independence (ability to work without supervisor)
- Personal qualities
  - Core skills
  - Reading effectiveness (the recognition and retention of key points)
  - Listening (focused attention in which key points are recognised)

(Characterized by an abstraction effort and a concern for reuse, we wonder whether pedagogical patterns can mention very specific skills or learning objectives, i.e. skills and objectives tightly rooted in the concept-domain of the course from which they are extracted. These seem to be more fitted to dedicated scenarios. On the contrary, transversal (reusable) skills, located at a level of abstraction similar to patterns can find place in a pedagogical pattern conceptual documentation).

Problem headline (to give the essence of the problem in one or two sentences)

Traditional lecture delivery of course content in large groups quite often ends up in a good deal of students "switching off". How can instructors facilitate the rise of all learners' level of mental activity in the content appropriation process?

Body of the problem (its empirical background, evidence for its validity, its analysis, its rationale, examples of different ways by which the pattern can be manifested)

Teachers who give lectures to large audiences experiment frequently students' passivity during the course. According to Leclercq (1998) an active participation implies that the learner has mastered the prerequisites. Attending a course without being "impregnated" to some degree with the content delivered reduces the expected benefit of this attendance. Conversely, individual preparation provides the student with a first representation of the topic, allows the subsumption process (Ausubel, 1978) to occur, and supports more commitment and (mental or observable) participation. The removal of the conventional lecture and its substitution with a Q&A session is an additional step toward passivity reduction. The course period is used for answering learners' questions on the content read, discussing and criticizing it. Such approaches of the content, left at the students' initiative, are still kept very limited in the traditional "learning-by-being-taught" though they produce a more in-depth learning (Leclercq, 1998). Additionally, reading material before the lesson and prepare oneself to ask questions about it during the course benefits to the student as it trains him/her to being more autonomous and responsible, especially when a formative test closes the sequence and gives him/her an indication about the knowledge level he/she achieved.

Solution (stated as an instruction, so that you know what to do to build the pattern)

Use the RQAT structure, or one of its variant, as a substitute for traditional lecture delivery of course content. For that, make sure:

- to get students engaged with material before the course time;
- to consider the course more as series of workshops than of lectures;
- to warn students that a test will be the closing activity of the sequence and have this test ready.

A diagrammatic representation of the solution

As educationalists and teachers, we do not see, at this stage, what could be the content of this section in the case of pedagogical patterns.

Embellishment (to link the pattern to the smaller patterns which are needed to complete it)

An assignment to read the material before the course does not mean that the material will actually be read by all students. It would be logical to link RQAT to existing or forthcoming patterns addressing this issue and outlining solutions. It should be possible and useful also to link the Q&A activity to smaller patterns related to knowledge-sharing, questioning and critique through discussion, for example, the pattern "Learning through discussion" (McAndrew, 2004) or the pattern "Honor questions" (Fricke, 2003). (In this section, we hesitated to mention observed variations of the pattern. The courses' sample shows nuances in the execution of RQAT that reflect its different interpretation by instructors. For instance, the "R" (reading) part is sometimes reduced, to the benefit of the Q&A. The opposite situation is noted as well. Both are variations in intensity regarding the student' activities composing the pattern. In two courses, the basic structure is present but "enriched": a debate in groups is added preceeding or following the Q&A session. In other courses, there is an inversion of the Q&A session and the test. When we refer here to 11 courses built on RQAT pattern, we mean a "strict RQAT". Only variations in intensity have been tolerated. Extra learning events or differences in the activities' order are not comprised in the figure. But the question remains open: to what extent can an "invariant" be accommodated before loosing what makes it specific? What is the tolerance of a pattern to interpretation?)

Patterns as staff development tool

Designing for networked learning is a complex task which deserves better tools and methods. In this respect, LabSET, as a support centre for helping faculty to design online courses, has been developing pedagogic conceptual tools. All of them try "to strike an appropriate balance between rigour and prescriptiveness and to find appropriate levels of generality. Practitioners, quite reasonably, complain if the "guidance" they are given appears to be too vague or is unsupported by research. Equally, they resist tight prescription – whether it be prescription of the technology to be used, or the pedagogical strategies to be employed" (Goodyear, 2004). We believe that patterns locate at this right level between rigour and prescriptiveness and can therefore be worth incorporating in our conceptual tool-kit as powerful staff development vehicles when used as the basis for discussion and collaborative work with teachers, allowing them to identify, clarify the components of their own practice and trigger their pedagogic creativity. This use of patterns should be distinguished from two other views. The first one is tempted to equate patterns and best practices: "Patterns are designed to capture best practice in a specific domain" (The Pedagogical Patterns project. See also recent discussion lead by the UNFOLD project (UNFOLD, 2005) on this topic). We do not support this conception. In our opinion, patterns abstract practice which is to be evaluated by the teachers. They are not good or bad independently of this situated judgment (Lave, 1990) by practitioners. The second view is tempted to see patterns as "recipes" likely to contribute to the "industrialization", "streamlining" of e-learning courses production by boosting immediate reuse opportunities and the associated resources and time savings. By linking patterns to some kind of template or semi-completed worksheet, time savings in the preparation of lesson might be envisaged for users. Nevertheless, the main benefit we expect from the use of patterns must be found firstly in teachers' meta-cognitive professional development. As organizational and communicative frameworks, patterns embed promise of reuse in that they provide users with the freedom to contextualize them. Patterns offer principled, structured but flexible resource promoting the sharing and re-appropriation of ideas. They suggest rather than prescribe a solution. Solutions are intentionally incomplete: they offer guidance but require embellishment. As facilities in the hands of teachers, patterns demand effort and responsibility from their users. As McAndrew notes: "The point of patterns is not to support immediate reuse, but rather to support creativity […] the descriptions used in patterns should not relieve teachers of pedagogic responsibility, but rather support their engagement […] patterns should not resolve all of teachers problems, they should leave them with things to think about and decide" (UNFOLD, 2004).

Conclusion

LabSET scrutinized 17 online courses used at the University of Ličge wherein it identified a recurring activity structure, documented as a pattern. None of the 11 occurrences of this structure constitutes the pattern itself but each exemplar illustrates an application of the solution the pattern documents. This

pattern looks valuable from the learner's viewpoint, as it promotes a more active engagement with the content, and from a faculty development viewpoint as it is easily adopted, adapted and implemented by teachers. Not revolutionary, but realistic and flexible, RQAT (Reading,Q/A,Test) stands as a good guidance for going from a conventional expository teaching method to more constructivist approaches. LabSET contemplates going further in the identification of reusable parts of existing courses and, possibly, the recording of these recurring design experience in the form of design patterns. Those patterns will be looked for at the level of granularity where RQAT locates: pedagogical meaningful combination of learner's activities within a task-based instructional approach.

Acknowledgement

This research work would not have been possible without the funding provided by the European project iClass.

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WEBLOG AND WIKI, SCENARIOS FOR COMPUTER SUPPORTED COOPERATIVE LEARNING

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Computer supported cooperative learning

Beside Discussionboards, new social software such as Wiki and Weblogs get more and more popular. They are used for different purposes and agendas, for politics, economy, journalism, and e-learning settings. New opportunities and questions emerge especially for individual learning, cooperative learning, and building (learning) communities. How can we use these new tools for adequate learning, especially for collaborative learning?

Dillenbourg (1999) refers to the very broad definition of *collaborative* learning as "a situation in which two or more people learn or attempt to learn something together" (p. 2). The discrimination criterion between *collaborative* and *cooperative* is the division of labour. The term *cooperative* is used when learning partners divide work and bring together single results to obtain a final result. In *collaborative* learning settings group members solve the problem together without any sub-tasks.

Different advantages are seen for cooperative learning, e.g. better student achievement, improved intergroup relations, increased self-esteem, critical thinking and problem solving (Slavin, 1995). Fischer and Waibel (2002) refer to increased motivation. Students can adapt varying perspectives and profit from different resources. In particular for computer supported cooperative learning further advantages can be identified. It offers learning independent of time and place and promises higher participation. With the possibility of multimedia integration new learning settings emerge (Fischer & Waibel, 2002).

In literature some factors to facilitate cooperative learning are mentioned. Effective learning outcomes from cooperative learning depend on individual characteristics, learning methods, visualisations tools, moderation and learning task. In context of learning methods, structuring of communication and interaction plays an important role for effective cooperative learning (Hesse, Garsoffky & Hron, 2001; Reinmann-Rothmeier & Mandl, 2002). Hesse *et al.* (2001) classify the methods in highly structured, semi-structured and structured offers. Cooperation scripts and reciprocal teaching are methods to help learners structuring the learning process and therefore facilitate knowledge processes and learning outcomes.

Weblog and Wiki

Weblogs are based on a Content Management System and are characterised by frequently updated, reverse-chronological entries containing links to other Web pages (Blood, 2004). Weblog Users refer to other Weblog postings via links. Tools like Trackback, RSS foster referencing and therefore community building. Because of the possibilities and potential for different use, Weblogs are discussed for teaching and learning assignment (Ashley, 2002; Wrede, 2003; Baumgartner, Bergner & Pullich, 2004; Wijnia, 2005). Baumgartner, Bergner and Pullich (2004) stated Weblogs "have the potential to revolutionise the organisational structure of traditional teaching environments" (p. 164). As mentioned above, Weblogs are characterised by referencing and linking. In comparision to other tools Weblogs "organise the discussion around a network of linked websites" (Baumgartner *et al.*, 2004, p. 165).

Weblog as a tool for collaborative learning means that it can be used for groups to exchange information and to construct new knowledge. Weblog in its original way will be used by one author who produces the content and offers his or her opinion and knowledge to all readers. However, authoring rights can be changed and therefore used for equally based content production.

Previous findings indicate that structuring communication can enhance cooperative learning (Hron, Hesse, Cress & Giovis, 2000; Weinberger, Reiserer, Ertl, Fischer & Mandl, 2005). Based on the

assumption that the communication tools have sharing and differing aspects, Jadin and Batinic (2006) divide the tools in regard to their degree of structure. To identify the degree of structure three factors were used: communication, presentation and flexibility. Therefore Discussionboard and Weblog are communication tools with high structure degree and Wiki can be seen as a tool with low structure degree. The authors assumed that tools with high structure degree (Weblog and Discussionsboard) facilitate communication and coordination and provide a better overview of the communication process than tools with low structure degree (Wiki). Therefore better group results are expected. The study examined computer supported cooperative learning. The focus was on learning with Wiki, Weblog or Discussionboard and effective group results.

Jadin and Batinic (2006) have used Weblogs, Wiki and Discussionboards for collaborative learning in a course of the University of Linz. Seventy-five students took part on this study. The students were randomly assigned to the three experimental groups, namely "Wiki", "Weblog" or "Discussionboard". In small groups (4 or 5 persons) students had to work with a Wiki, Weblog or Discussionboard. All group members had equal authoring rights. That means that each group worked with one Wiki, Weblog or Discussionsboard. They had the possibility to generate new postings and to comment the entries. The task was based on the Jigsaw II method (Slavin, 1995). Each group member got a different chapter of a text. Groups had to generate a conclusion of the text. These results were analysed on the basis of defined criteria. The group results (conclusion of the text) were evaluated by two independent raters. The conclusion served as the dependent variable. Also, the coordination and communication frequency and the usage of other communication tools were assessed. Jadin and Batinic (2006) assumed that tools with high degree of structure (Weblog and Discussionboard) produce more effective group results than tools with low degree of structure (Wiki), which was tested with a One-Way-ANOVA. The results are significant ($F(2, 72) = 0.13, 09; p < 0.01$). For further analyses planned contrasts were calculated. The assumption can be confirmed. Communication tools with high degree of structure (Weblog and Discussionsboard) produce more effective group results than tools with low structure degree (Wiki). Analyses of the coordination and communication frequency and the usage of other communication tools show no significant differences between the three communication tools. (Jadin & Batinic, 2006)

But there are also other possible scenarios for cooperative/collaborative learning. Weblogs can be used for information inquiry. Learners collect and comment links to a defined topic. Weblogs can be used as one "Team-Blog" or individual Blogs who refers to the "Partner-Blogs" of the learning community or group. Students can adopt Weblogs as an e-portfolio tool to document learning process, topics of learning, to present his person and references, etc. Further Weblogs provide the possibility for reflections and discussion.

Wiki are also based on a Content Management System and suited for content creation. Users have equal authoring rights and can change the Wiki based documents. In a course of the University of Linz, students were instructed to write a book about "Design and Evaluation of E-learning Scenarios". For this purpose they had to use a Wiki. Each student was responsible for one chapter. In comparison to classical seminar thesis Wiki make the results of the student`s work for all learners accessible. The students read other chapters and used the possibility to comment critically on the chapters. Wiki can be used for writing a chapter, statement on a specific topic etc. The Teacher can give his or her feedback in the Wiki and the learner can adopt his version. Students from the course can read and criticize their papers. Therefore Wiki offers several possibilities of cooperative/collaborative learning.

Conclusion

It depends on learning goals, didactical possibilities which tool teachers can use for collaborative learning settings. A few different scenarios were presented. One scenario was empirically tested by Jadin and Batinic (2006).

The results show that groups who worked with high structured tools like Weblog and Discussionboard were more successful than groups with low structured tools (Wiki). Tools with the possibility of structuring communication provide a good overview for learners. This may be necessary for integrating different aspects, views and contributions of the learning partners and help learners to produce effective group results.

Future research is necessary to test different learning settings and potentials especially for the new tools Wiki and Weblog.

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COMPETENCE DEVELOPMENT ACROSS DIFFERENT MODES: A COMPARATIVE STUDY OF DISTANCE AND FACE-TO-FACE INITIAL TEACHER TRAINING IN RELATION TO BILINGUAL PUPILS

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Introduction

This paper examines the particular competence of learning to teach bilingual pupils during initial teacher training in England. It draws on two research projects funded by the Teacher Development Agency and also on research forming part of a doctoral thesis undertaken at The Open University in the UK. In each case the research involved teacher trainees in a variety of Higher Education Institutions. One of these institutions, The Open University, operates a distance-learning programme based on e-learning.

The paper explores the advantages and disadvantages of the e-learning model and compares the issues arising with more traditional face-to-face delivery. This research provides a comparative study that contrasts two very different modes of delivery and focuses on the competence development of the trainees involved. The two key research questions are:

- How does the mode of initial teacher training impact on trainees' learning to teach bilingual pupils in secondary schools in England?
- What policies, beliefs and strategies underpin the different modes of delivery involved in initial teacher training in the UK in relation to teaching bilingual pupils?

Delivery modes

Initial Teacher Training poses particular challenges to e-learning with requirement for all trainees to spend time practising skills in schools, as well as learning the theory behind teaching and learning. Hoyle and John (1995) trace the changes in discourse and delivery of initial teacher training over the previous forty years in the UK. Within the field of initial teacher training in England, these studies analyse the impact of national policies that led to a competence-based model of initial teacher training (Bottery and Wright, 2000; Furlong *et al.,* 2000; Hoyle and John, 1995; Sachs, 2003; Tickle, 2000).

The Open University (UK) Flexible PGCE is aimed at those UK graduates training to teach through distance learning, who require an individualised programme taking account of their existing skills, knowledge and personal circumstances. These are the new constituencies of potential teachers referred to by Moon and Robinson (2003). Students undertake a Needs Analysis before a customised route, in consultation with their tutors through the training programme, is agreed in order to meet the Standards for Qualified Teacher Status (QTS). If experienced, they can take an assessment-only fast track route, but most opt for somewhere between full-time study of the whole course (one year) up to part-time study of the course over a maximum of three years.

The students are trained and supported in three ways: a) through distance learning materials (including web materials, CD-Roms, printed books and online discussion via electronic conferencing); b) by subject mentors and generic coordinators in partner schools during teaching experience; and c) by subject tutors who visit school placements, assess the written portfolio and teach at day schools. The first flexible PGCE students registered on the course in 2001. Currently, there are 500 students training across England, Wales and Northern Ireland in six secondary subjects classified as "shortage" by the government. In the United Kingdom, particularly in England, the government has recognised a serious and growing shortage of recruits to teach in secondary schools. Subjects difficult to fill include: Maths; Science; Design Technology; Modern Foreign Languages; Music and Geography. The government has

tried a number of policy initiatives to address this shortfall. One of these is to fund (through the Teacher Training Agency) the development of a flexible route into teaching. The Open University have designed a new programme from scratch to meet the flexible criteria (Needs Analysis, flexible start and finish dates, individualised training). Like all other courses of ITT in England, students on the OU Flexible PGCE have to demonstrate evidence of meeting the Standards for the award of Qualified Teacher Status (QTS), essentially a common set of competency outcomes. Monitoring the quality of flexible teacher training using ODL methods is thus contextualised against highly specified national standards (Robinson, 2003) as well as costly internal standards (Moon & Robinson, 2003).

The distance-learning dimension on a flexible PGCE impacts on the type of training/briefing offered. First, the OU regionally-based academic ("Staff Tutor") has a face-to-face or telephone dialogue with the school co-ordinator to clarify partnership arrangements and confirm a contracted partnership with the school. Second, once a student has been allocated for placement, a subject specialist "briefing tutor" visits the newly signed-up school, primarily to get the new mentor up-to speed on OU systems.

The OU provide a folder insert Supporting Professional Development in ITT, which contains a number of interactive training activities linked to audio and video exemplars on a CD-Rom (although these are only relevant to mentor training). Partnership schools also receive a Partnership Handbook detailing the roles and responsibilities of mentors and school co-ordinators.

In the present, climate of efficiency, competence, and raising standards, the challenge for e-learning-based courses is to constantly up-date materials and activities without overloading trainees and trainers with still more information. Furlong *et al.,* 2000, examine the balance between theory and practice in the teacher training process.

Findings

Flexibility in terms of time, place and pace of learning

E-learning can achieve a balance in terms of workload, as it allows flexibility in terms of time, place and pace of learning. Trainees can revisit materials as often as they wish, at a time that is convenient in terms of other responsibilities. They are not dependent on attending particular lectures or tutorials.

Isolation versus opportunities to learn from peers

A potential disadvantage of e-learning is a feeling of isolation. Face-to-face training offers opportunities to learn from peers through informal discussion and structured input. There are opportunities to take part in e-conferencing and chatrooms. Indeed, trainees involved in e-learning appreciate the wide network of experience they can draw on through e-mail and e-conferencing.

Meeting individual trainees' needs

However, a strength of distance learning course is the personal, flexible, tailoring of provision to meet individual needs. In the Higher Education Institution involved in the research projects, this flexibility attracted a high number of mature trainees and a higher proportion than the national average of minority ethnic and bilingual trainees.

Reliance on schools

All training providers regardless of their mode of delivery have to comply with the National Standards required for all trainees in order to achieve qualified teacher status (TTA, 2002). All providers, therefore, rely heavily on working with local schools in order to complete the practical side of initial teacher training. The trainers in the Higher Education Institutions and trainees mentioned the heavy reliance on the nature and intake of the school when it comes to fulfilling the requirements related to bilingual pupils. The first research project highlighted the distinctions between schools with very few bilingual pupils and those with more significant proportions.

Need to monitor workload for trainers and trainees

As Edwards *et al.,* 2002, highlight, it is crucial to consider the impact of uncertainty in times of regular change. Distant learning modes of training are ideally suited to quickly responding to change in terms of modifying and augmenting materials. The challenge is to maintain an equilibrium between reflecting new requirements and workload. Many trainers in schools commented on the amount of reading involved in the e-learning training in comparison to the more traditional providers. As the prime face-to-face contact, trainers in schools and the subject specific tutors, sent to monitor school provision from the Higher Education Institutions, need to be fully acquainted with the materials and activities. They are key players in the quality assurance procedures. This becomes a particular concern in relation to standards, such as those relating to bilingual pupils. Many trainers and trainees perceive these as falling outside the traditional subject and classroom management competences prioritised within teacher training.

Training the trainers

With competences, such as teaching bilingual pupils, meeting the required standard is often highly reliant on personal histories, perceptions and commitments. E-learning materials can provide stimulating case-studies and try to instigate e-debates. However, all trainees commented on the need for actual experience when it comes to teaching and learning processes associated with bilingual learners.

Combating negative connotations and deficit models

This is a challenge for any mode of training given the large number of standards and the limited amount of time. E-learning presents potential opportunities to exchange a wide range of experiences and ideas linking trainees on a national network rather than into a locally based network of schools within reasonable reach of more traditional providers. In reality, the e-conferences and chat rooms exchanges, analysed in this research, reflect the priorities clearly stated in the national standards, relating to subject knowledge and classroom management.

Conclusion

E-learning in relation to initial teacher training offers advantages of flexibility in terms of adapting materials to meet the latest requirements; the potential to tailor provision to individual needs in terms of time and geographical position; and creating a large network for the exchange of ideas and experiences. Issues of workload; quality assurance; and how to combat feelings of isolation may be viewed as deficits within this model. In relation to the particular focus of these studies where underpinning attitudes and prevailing deficit models need to be consistently challenged, the re-shaping of knowledge and perceptions remains a challenge for all initial teacher training in England, regardless of the mode of delivery. The presentation of the paper at the conference will include:

- Findings from each of the sites visited
- Examples of best practice
- Reflection on the trainees' competence development
- Discussion of the advantages and disadvantages of different delivery modes

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BLENDED LEARNING AND IN-SERVICE FOREIGN LANGUAGE TRAINING

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1. Distance learning and foreign languages

Distance learning has developed considerably during the last decade. More and more courses are being delivered through the World Wide Web. Therefore, learners can access a wide variety of content subjects online, including foreign language (FL) courses. However, one has to bear in mind that designing successful FL online courses implies adopting a state-of-the-art Second Language Acquisition (SLA) methodology. Research in SLA indicates the 'weak' version of the communicative language teaching (CLT) approach, which "stresses the importance of providing learners with opportunities to use their English for communicative purposes and […] attempts to integrate such activities into a wider program of language teaching" (Richards and Rodgers 2001: 155), effective to promote what Hymes defines as "communicative competence"[1]. In addition, multilingualism is progressively becoming a key asset in a wide variety of professional settings. Consequently, in order to further their careers or improve their employment prospects, learners need to become proficient FL speakers able to interact and communicate effectively and appropriately in a FL in different contexts. It follows that designing online FL courses promoting the acquisition of communicative skills is of paramount importance.

Online FL courses appear to meet learners' needs for individualized learning. However, within a CLT framework the lack of face-to-face interaction, which plays a key role in promoting the acquisition of socio-pragmatic conversational skills, seems to be a serious drawback in computer-mediated FL courses. It follows that computer-mediated individualized learning features not only positive characteristics, such as flexibility of time and place, but also negative ones, such as lack of face-to-face interaction.

This paper will first analyse both the assets and the drawbacks of FL distance education. It will then present a possible solution, combining the advantages of online and face-to-face FL courses through the analysis of a blended learning model implemented by the LiReMar network in Italy.

1.1 Self-directed in-service FL learning and individualized learning

Due to its flexibility with regard to place and time, e-learning is likely to meet the need of FL learners for individualized learning. Learners can work on their tasks and post them at any location, participate in synchronous and asynchronous interactions, become part of a learning community, and become acquainted with a new kind of discourse by participating in a computer-mediated learning environment.

Distance education also appears to accommodate individual differences, such as different rates of learning and attention span, which can be affected by moods and contexts of learning. Within this conceptual framework, learners' preferred learning styles, that is the visual, auditory and kinaesthetic channels through which learners perceive and process information (Leaver, Ehrman, Shekhtman 2005: 67-69), may also be catered for in computer-mediated learning to promote intake. Furthermore, learners have different formal and content schemata, that is world knowledge, which seem to affect deeply any teaching/learning process; it follows that distance learning needs to account also for learners' prior knowledge.

Thus, to deliver effective FL online courses, distance education needs to cater for learners' individual differences. This paper will analyse later how 'L'inglese di base con Puck' online course has tried to cater for learners' individual differences.

[1] "Hymes's theory of communicative competence was a definition of what a speaker needs to know in order to be communicatively competent in a speech community", JACK C. RICHARDS & THEODORE S. RODGERS (2001) *Approaches and Methods in Language Teaching,* Cambridge: CUP, p. 159

1.2 Self-directed in-service FL learning and pragmatics

Learners taking online courses usually access the course, study and carry out activities on their own, that is in isolation, except when they are engaged in social interaction through chats and forums. Therefore, distance learning's main asset, that is flexibility of time and place, may actually have a backlash, namely learners are not provided with tasks and opportunities to develop interactional, transactional, socio-pragmatic FL skills.

This is probably the reason why few successful FL computer-mediated courses appear to have been designed and implemented so far. Most FL computer-mediated courses seem to adopt formalist, structural approaches[2] and mainly provide learners with structural activities, such as pattern drills based on behaviourist stimulus-response-reinforcement. As a result, computer-mediated FL teaching/learning seems to focus on habit formation, and explicit grammar instruction. Within this pedagogical framework, learners are unlikely to be provided with cultural and pragmatic input. Moreover, computer-mediated activities seem to focus mainly on learners' reading and listening skills rather than speaking and writing since the former appear to be more easily implemented in online learning environments. It follows that taking FL online courses learners usually develop a high linguistic competence. However, they cannot interact effectively in real-life communicative situations because communicative skills appear to be neglected by most computer-mediated learning environments. FL online learners seem to find it difficult to interact and communicate effectively in real-life situations with other FL speakers, not only because they are not usually given the opportunity to practise and thus master face-to-face communicative interaction skills but also because they have not been trained to take risks while speaking a FL. Therefore, online FL learners' affective filter[3], which is likely to be high in adult learners, may hinder them from interacting effectively in a FL in real-life communicative situations. On the one hand, computer-mediated learning seems to provide learners with a non-threatening learning environment where less self-confident students can also feel comfortable studying a FL.

In order to combine the positive characteristics of both online and face-to-face FL courses, 'L'inglese di base con Puck' course has been implemented within a blended learning framework.

2. 'L'inglese di base con Puck' course: The LiReMar Network

'L'inglese di base con Puck' is an online course targeting kindergarten and primary-school teachers planning either to start studying English as a FL or to improve their proficiency in English. The course was designed specifically for teachers belonging to the LiReMar (*L*ingua *I*nglese in *R*ete nella regione *M*arche) network. LiReMar is an online network of about 60 kindergartens and primary schools, located in the Marche region in Italy, aiming to promote the teaching/learning of English as a FL among young learners aged 3-6.

The course can be accessed at the following URL: http://teamfad.homelinux.net/teamfad/index/php

2.1 Entry requirements and course objectives

The online course features six units focusing on the adventures of Puck, a child, and his family. The course aims to provide kindergarten and primary-school teachers with basic grammar rules, lexical sets

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[2] "Language mastery is represented as acquiring a set of appropriate language stimulus-response chains", JACK C. RICHARDS & THEODORE S. RODGERS (2001) *Approaches and Methods in Language Teaching*, Cambridge: CUP, pp. 56-57

[3] "Krashen sees the learner's emotional state or attitudes as an adjustable filter that freely passes, impedes, or blocks input necessary to acquisition. […] The Affective Filter Hypothesis states that acquirers with a low affective filter seek and receive more input, interact with confidence, and are more receptive to the input they receive. Anxious acquirers have a high affective filter, which prevents acquisition from taking place. It is believed that the affective filter (e.g., fear or embarrassment) rises in early adolescence, and this may account for children's apparent superiority to older acquirers of a second language", JACK C. RICHARDS AND THEODORE S. RODGERS (2001) *Approaches and Methods in Language Teaching*, Cambridge: CUP, p.183

and pragmatic skills of the English language. The course is targeted to both absolute beginners and learners at the Breakthrough (A1) level of the Common European Framework[4].

Two main features of the course have been highlighted so far. First of all, it is based on the Common European Framework (A1, A2, B1, B2, C1, C2) and second, it is targeted to a specific group of learners, that is kindergarten and primary-school teachers, sharing common methodologies in teaching English as a FL to young learners, namely the format[5].

The LiReMar network of kindergartens and primary schools has adopted an approach to FL teaching/learning based on both multisensory experience of input and neurological bimodality, the latter claiming that both the right and the left hemisphere are activated in cognitive processes (Sisti 2002: 20-23), aiming to activate in young learners the same learning processes which were activated during the acquisition of the L1. Within this pedagogical framework, narrative formats, that is dramatised stories, are used to teach English as a FL to young learners. Narrative formats[6] consist of simple storylines featuring children's real-life experiences. Young learners are motivated to learn English through a multisensory approach to narrative formats. In particular after watching and listening to the teacher/narrator acting out the dramatised story, young learners act out the story themselves together with the teacher through mime and gesture while repeating the lines of the scripts. Since narrative formats feature experiences young learners are familiar with, learners can make inferences and predictions about the storylines. It follows that inferencing motivates them to speak in English. As Taeschner suggests: "Very simple stories are invented closely related to the basic real-life experiences of the child so that pupils can develop personal communicative intentions based on their previous inferences and presuppositions" (Taeschner 2004: 9). In addition, young learners feel comfortable speaking a FL thanks also to the reassuring affective learning environment learners and teacher experience.

In brief, a narrative format consists of the script of the dramatised story, including stage directions together with mimicry, gestures and facial expressions, a storybook with the pictures and the text of the story, and both the soundtrack and the lyrics of the musical based on the format.

2.2 Course content and activities

'L'inglese di base con Puck' is an online course designed for teachers who need to develop both theoretical and hands-on knowledge of English as a FL. It is based on a series of narrative formats featuring Puck, a child, as the main protagonist. Most of the teachers use Puck formats in class with young learners; the LiReMar kindergarten and primary-school teachers are therefore provided with study materials relevant to them.

Each unit of the course focuses on a format, which is functionally and linguistically analysed by means of concise functional and linguistic explanations. Learners are provided with essential explicit grammar explanations and visually-based vocabulary handouts focusing on lexical sets related to young learners' real-life experiences. Socio-pragmatic skills are also catered for by means of open-ended activities, such as letter writing, role plays and simulations. The linguistic and communicative functions featured in the course syllabus correspond to the B1 level of the Common European Framework.

Learners can access the scripts of the formats, concise grammar explanations, visually-based vocabulary handouts, and open-ended activities, such as open dialogues and paragraph writing, under the 'documenti' (materials) heading. Learners are expected to send their open-ended activities to an online tutor for feedback. The tutor is also available to answer learners' questions and doubts. Audio files of the

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[4] Common European Framework of Reference of Languages
http://www.culture2.coe.int/portfolio/documents_intro/common_framework.html

[5] "The term 'format' has been borrowed from studies of natural language acquisition and is defined as a routine of shared experiences between the adult and the child", Traute Taeschner, *The Adventures of Hocus and Lotus,* Teacher's Guide, p. 8

[6] "A narrative format has been identified […] as a sequence of events in which the previous event allows one to make inferences and presuppositions about the following event in the light of a final concluding event", Traute Taeschner, *The Adventures of Hocus and Lotus,* Teacher's Guide, p. 7

dramatised stories, the musicals based on the formats, and the lyrics of the musicals can be accessed under the same heading. The course thus presents learners with a wide choice of materials and gives access to input through different sensory channels catering for learners' different learning styles.

In the section called 'esercizi' (exercises) learners can find the following activities: reading comprehensions, grammar exercises and vocabulary-based activities. Learners are mainly provided with gap filling, multiple choice, matching, pre-communicative[7] and/or form-focused activities.

To promote pragmatic skills, that is both communicative effectiveness and social acceptability, learners are provided with role plays, simulations, and collaborative activities to be carried out synchronously or asynchronously in the forum. The forum thus provides learners with an interactive venue where learners can not only exchange ideas but also perform tasks requiring negotiation of meaning thus promoting the co-construction of meaning.

Learners can study the materials following either tightly structured learning paths, where the materials have already been organized in a precise sequence, or individualized learning paths, where learners can organize the materials according to their needs and thus manage their own learning process. As Cubillos suggests: "Technology should allow learners to take control of their own foreign language learning experience" (1998: 48-49).

While taking the online course, kindergarten and primary-school teachers were also given the opportunity to attend face-to-face instruction in English in four different locations. The 60-hour face-to-face course was aimed at training teachers to take the PET (Proficiency English Test) examination[8]. In this way teachers could integrate online learning with face-to-face instruction, the latter being especially targeted to adult learners and thus implemented within Knowles' andragogic framework[9]. On the one hand, the face-to-face course, mainly focused on communicative interaction, allowed teachers to train for the PET Certificate, that is a professional qualification, and to learn how to communicate effectively and appropriately in English. On the other hand, the online course provided teachers with FL learning as well as materials and activities they could use in class with young learners in their daily teaching practice. As Cubillos suggests: "Unless there is a clear connection between classroom learning and self-directed technology-aided experience, there will not be much incentive to work with new materials" (1998: 49)

Teachers attending both face-to-face instruction and the online course appeared to be mainly instrumentally motivated[10], since face-to-face instruction trained them to get a job-related qualification while the online course provided them with materials and tasks they could use in class with their young learners.

3. Learning styles and blended learning

Both individualized learning paths and structured learning paths have been designed and implemented to accommodate learners' different learning styles. As Brown suggests: "Learning styles might be thought of as 'cognitive, affective, and physiological traits that are relatively stable indicators of how learners perceive, interact with, and respond to the learning environment'" (1994: 105).

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[7] "Through pre-communicative activities, the teacher isolates specific elements of knowledge or skill which compose communicative ability, and provides the learners with opportunities to practice them separately. The learners are thus being trained in the part-skills of communication rather than practising the total skill to be acquired", WILLIAM LITTLEWOOD (1981) *Communicative Language Teaching,* Cambridge: CUP, p. 85

[8] Preliminary English Test (Local Examinations Syndicate – University of Cambridge)

[9] Knowles' Andragogy, http://www.learningandteaching.info/learning/knowlesa.htm

[10] "Instrumental motivation refers to motivation to acquire a language as a means for attaining instrumental goals: furthering a career, reading technical material, translation and so forth", H. DOUGLAS BROWN (1994) *Principles of Language Learning and Teaching,* Englewood Cliffs: Prentice Hall Regents, p. 153

According to the field-dependent (FD) and field-independent (FI) construct[11], FD learners are likely to prefer structured, externally organized materials while FI learners seem to prefer managing their own learning process (Hall 2000: 5-6). Therefore, structured learning paths may suit better FD learners who find it difficult to tackle non-sequentially organized materials; on the other hand, individualized learning paths are likely to accommodate FI learners who are given the opportunity to organize the materials they are expected to study while planning their own learning process. It follows that 'L'inglese di base con Puck' online course appears to provide for both FI and FD learners.

FI learners, who are likely to be "analytical, competitive, individualistic, task oriented, internally referent, intrinsically motivated, hypothesis testing, self-structuring, linear, detail oriented" (Hall 2000: 5), feel probably more comfortable working in an independent way on non-sequentially organized materials thereby also setting their own learning goals. Conversely, FD learners, who seem to be "group-oriented, global, sensitive to social interactions and criticisms, extrinsically motivated, externally referential, not visually perceptive, non-verbal, and passive learners who prefer external information structures" (Hall 2000: 5-6), are likely to benefit more from a structured syllabus, externally set goals and the social relationships with their peers. As a result, the blended learning model implemented for the LiReMar teachers seems to accommodate both FI and FD learners. The online course aims to provide FI learners with the opportunity to set their learning goals, control their learning process, and experiment autonomously with materials through individualized learning paths. On the other hand, FI learners, who are less skilled in interpersonal/social relationships, are given the opportunity to master socio-pragmatic skills in face-to-face classrooms. FD learners, who seem to acquire easily communicative skills (Brown 1994: 107), are likely to benefit from the emotional, social and interactional scaffolding provided by the teacher and peers in face-to-face classrooms; on the other hand, the online course offers FD learners the opportunity to become gradually more autonomous, which is a key asset in a lifelong learning perspective.

Conclusion

Overall, to design and deliver effective FL online courses current SLA methodologies need to be adopted. In addition, learners' cognitive and affective processes need to be catered for together with their learning needs. So far most FL online courses do not seem to be able to provide learners with suitable training to master socio-pragmatic oral skills even though IT is developing fast. However, distance education appears to provide learners with individualized learning, which plays a pivotal role in a lifelong learning perspective. Therefore, a blended learning model appears to be the best way to promote FL learning right now.

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[11] "Field independent style: the ability to perceive a particular, relevant item or factor in a 'field' of distracting items. […] Field dependence is, conversely, the tendency to be 'dependent' on the total field so that the parts embedded within the field are not easily perceived, though that total field is perceived more clearly as a unified whole" H. DOUGLAS BROWN (1994) *Principles of Language Learning and Teaching,* Englewood Cliffs: Prentice Hall Regents, p. 104

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DIDACTICLANG – DEVELOPING CAPABILITIES FOR LANGUAGE LEARNING

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Introduction

DidacTIClang (http://www.sprachenzentrum.com/didacticlang/index.htm) is a Comenius 2.1 Project, coordinated by Salzburg University (Christian Ollivier) and developed by language teachers from seven European universities and schools. The program aims to promote the use of ICT in language learning and teaching and motivates teachers and trainers to make the best pedagogical use of ICT in their own teaching environments. *DidacTIClang* proposes an internet-based didactic approach which strives to improve learning performance through ICT. The program is offered both as a face-to-face and distance learning course and is divided into the following four modules:

- Module A: How to use non-didactical resources on the web for language learning/teaching
- Module B: How to evaluate and use didactical resources on the web for language learning/teaching
- Module C: How to use collaboration and communication tools for language learning/teaching
- Module D: How to design interactive learning units

DidacTIClang focuses on developing learners' skills by using non-didactical resources on the web: i.e. any type of website and tool not designed for pedagogical purposes. By using such direct-source material we propose a number of activities which offer an "internet-added value". Supported by the internet, the activities are designed to enable students to develop strategies towards producing, understanding or translating texts and even developing intercultural skills. Learners become skilled at using search engines in an intelligent way in order to check their written work, how to use web sites to find technical terms or collocations, how to make use of translators in order to develop their grammar skills or use a translator forum to improve the quality of their own translation material.

Strategy can be defined as "a systematic plan, consciously adapted and monitored, to improve one's performance in learning" (www.mdk12.org/instruction/curriculum/reading/glossary.shtml). Teaching strategies empower the learner to work more effectively and to achieve the best result. Learning strategies are the basis for self-organized and autonomous learning which, in the long term, can lead to the development of lifelong learning skills.

Language learning skills developed with DidacTIClang

Written reception and the internet

DidacTIClang uses the Discursive Ability model developed by Filomena Capucho as introduced and developed by the researchers of the Département de Linguistique Française of l'Université de Genève (Avelino & Capucho, 2001: 255). In this model we distinguish three components of discursive and receptive ability. In addition to the linguistic dimension there are also two largely non-verbal components: textual and situational.

The *textual dimension* includes knowledge about text types and formats by which we are, for example, able to quickly identify a job advertisement or a recipe, even if the language is unknown to us. Additional information is delivered through iconographic elements, typographic emphasis (italics, bold letters, asterisks, etc.), sequencing in paragraphs and others. All these elements contribute to the process of understanding of a text.

The *situational dimension* refers to the "common knowledge" possessed by an individual. This might include knowledge of the topic treated in the text as well as socio-cultural understanding and language rituals (for instance eliciting information in teacher-fronted classroom discourse usually follows the same pattern of teacher question – student answer – teacher repetition of student answer).

In our mother tongue, we generally possess a broad textual and situational knowledge and use it subconsciously. Interestingly, this knowledge seems to be difficult to mobilize in a foreign language. *DidacTIClang* aims to help learners to activate the subconscious textual and situational dimensions in order to compensate for linguistic deficits.

The *linguistic dimension* refers to formal elements of a language such as phonology, lexicon or morphosyntax. Although the learner's knowledge of these elements in a foreign language may be limited, one can argue that, in a European context, linguistic ability is hardly ever zero, as international or transparent words are more recognizable and easily accessible.

To ensure receptive ability it is necessary to create a high level of motivation for the text: i.e. a positive attitude towards the language. Of course, cognitive faculties are also needed to process information as well as efficient strategies which help us to define meaning from our own knowledge and the known elements present in the text.

Didactically speaking it is important to begin by teaching the learner how to use internal resources. The first step towards understanding a text is to make the learner confident that the text contains some elements which s/he understands and to then enable him/her to put the recognised elements together so that they make sense.

How can the internet play a role in the process of written reception? The didactical goal is to stimulate learners to take into account what they already know and to reinforce or develop strategies that help them make use of this knowledge. Students should learn to identify textual and situational elements in the new text and make conclusions in order to start building a sense for the understanding of the text. The internet is an external resource which can help learners to reach this goal by offering resources or tools which enable better understanding or offer a better basis for text reconstruction.

Some internet resources to be used for written reception would be:

- The image search feature offered by search engines. Learners can develop a strategy for illustrating particular keywords in a text: i.e. a recipe and its ingredients. In another context, action words could be identified and a corresponding image found which illustrates the word's meaning in a foreign language.
- Searching for information in a search engine allows finding of texts on a given subject in the mother tongue or a more familiar language. Thus the learner enlarges his/her knowledge on the subject which might help him/her to understand the text in a foreign language. One of the more important strategies worth developing is the efficient use of search engines through an appropriate selection of keywords. It is important to make our learners aware of the possibilities of advanced search options: finding results with exact phrases, with all words; restricting domains by national codes; searching web pages in a given language.
- Online monolingual and bilingual dictionaries might offer useful information and learners should be aware of these resources.
- Online translators might help learners to obtain a general impression of the text, regardless of the poor quality that electronic translation might produce. We believe it is important to indicate different ways in which online translators can be used effectively to support the process of understanding and developing language skills.
- Human resources; one might contact someone through a forum, a chat group or via email in order to ask for clarification or pose questions requiring a deeper insight: i.e. cultural aspects of a foreign society.

Written production and the internet

We part from the idea that the production of text is determined by context and social interaction. A text's content and style varies according to the person/people addressed. It is dependent on context: i.e. it differs with regard to the place where someone writes, the status of the person writing, the moment, the circumstances, the topic, and the purpose of the text.

The *DidacTIClang* project adopts the Flower and Hayes cognitive model with slight modifications (cf. Fayol). The writing process involves three operations as directed by a controlled instance. Production strategies involve conscious preparation, formulation and revision. During preparation the individual recovers, selects and mobilises from his/her long term memory the knowledge and ideas s/he would need in order to write the text. S/he then organizes these ideas and attempts to establish pragmatic objectives for the text.

During formulation the individual concentrates on lexical material, the organisation of syntax and rhetorical elements which s/he has at hand to best express his/her ideas. The individual is challenged by the linguistic means available, thereby turning to compensation strategies (usage of simpler language, paraphrasing or describing aspects of what s/he wants to say).

Revision requires the author of the text to evaluate his/her text and adjust the final message to match original intention.

When writing a text the individual can draw on three different types of resources: his/her own internal resources, external non-human resources and external human resources. The internal resources – general knowledge, ability and strategy – may be rather limited or not particularly obvious for the user of a foreign language. However, this deficit can be compensated by the use of external resources. In the age of the internet, the learner of a foreign language no longer needs to work alone. It is, however, important to know where to find the help needed to fulfil a given task.

The figure below gives an overview of the process of written production supported by the internet.

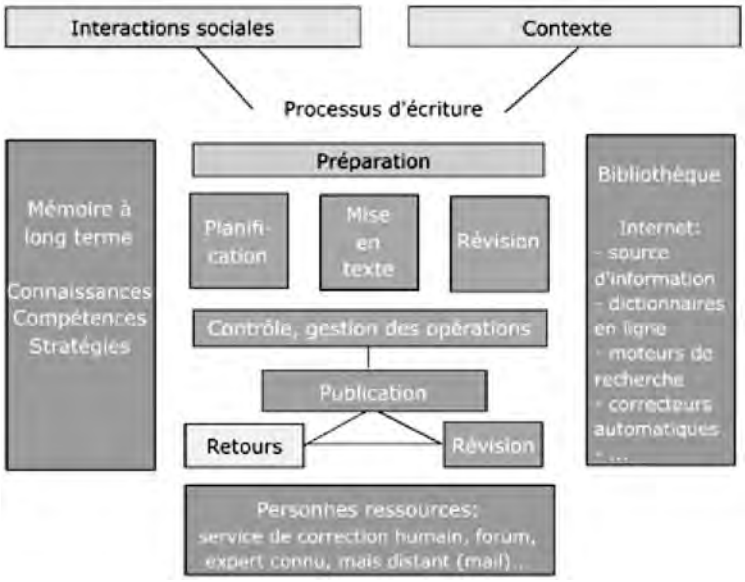

Figure 1. Written production process, DidacTIClang 2005

In Figure 1, the external non-human resources are collected into what we call the Library (Bibliotheque). The individual can make use of general information available on the web, online dictionaries, search engines or automatic correction facilities in all three phases of the production process. Internet resources could provide information on the topic (preparation) but also text elements and useful structures (preparation and formulation of the text). Internet resources may also help to evaluate and correct the text (revision). The following list contains a number of internet tools useful for the production of text:

- Online dictionaries
- Online verb conjugators
- Websites offering general information
- Online encyclopaedias
- Sites with similar text types (we are convinced that this is one of the most useful resources making it important to develop the learner's ability to look for sites with similar texts, using them for formulation and correction)
- Spelling and grammar correctors
- Search engines which allow the verification of the existence and frequency of text elements

So far we have only mentioned non-human external resources. There are, however, external human resources such as internet correction services: e.g. *Orthonet* for French. A further resource is the request of help by posting messages in a specialized forum or writing to a more competent source which has been contacted during a chat session or via email.

A new didactic approach to text production has to reinforce the preparation of and reflection on a text. Learners should receive as much support as possible in order to make use of strategies designed to compensate for their own linguistic deficits. It is important to make them familiar with the external resources available on the internet and teach them how to use these means efficiently. These strategies lay down important foundations for lifelong learning.

Oral interaction and the internet

Oral interaction can be defined as the language user acting alternately as speaker and listener. Interaction means that two or more interlocutors exchange information whilst at the same time negotiating and constructing meaning. A social relationship binds the interlocutors. As with any other language activity, this interaction takes place within a certain context, thereby influencing the interlocutors' behaviour and choice of words.

It is important to distinguish two phases in the interaction process: planning (identifying information, judging what can be presupposed, planning moves) and executing (both interlocutors are involved in production and reception; they take the initiative, co-operate, deal with the unexpected or ask for help). As with written production, the interlocutors monitor what is happening through constant evaluation during the planning and execution phases. If the interaction process turns out not to be successful, the interlocutors use repair strategies: they may ask for clarification and or clear up misunderstandings when necessary.

The *DidacTIClang* project proposes the use of dynamic websites to train interaction mechanisms. Dynamic websites are offered in order to provide online-access to information and transactions related to obtaining goods and services. The use of dynamic websites is typically linked to a very specific intention. The information retrieved should help the user to make a decision, sometimes on aspects of everyday-life: which train to take, which hotel to book etc. In a larger context, dynamic websites can be used to plan and organise a journey. The use of a dynamic website is generally driven by clear and specific goals, knowing why it should be used and what can be found within it (context-knowledge).

From a didactic perspective, dynamic websites offer learners the opportunity to work with authentic language in its original, communicative context. Dynamic website language use is reduced in terms of structure and lexicon, the information provided being presented in a well-structured manner and the text offered being supported or replaced by images if and when advantageous to the user. Presentation is driven primarily by user-friendliness. Such concise and simplified presentation can bear highly positive pedagogical fruit. The language learner enters the same environment as the native speaker, leaving no need for adaptation.

Though dynamic websites are originally intended to replace human interaction when obtaining goods and services, in the context of the language classroom they become a useful resource for guiding the language learner through certain types of dialogues in special role plays. The dynamic website may

serve as a framework for communication. When we design a communicative task with internet support we suggest creating an "information gap", allowing only one learner to access the information on the website. While one learner takes the role of the customer, the other one takes the role of a clerk, or a travel agent, etc., thereby using the interactive nature of the website to enter and obtain information. Both the information gap and the conversational framework provided by the website support the learner in developing a dialogue in terms of coherence, logical ordering, thematic organisation and turn-taking. By completing online forms students do not only use language in context but also reactivate previously acquired language knowledge, particularly lexical. Learners might have to apply comprehension strategies in case they do not remember or understand some words. It is therefore necessary to raise learners' awareness of strategies which allow the deduction of meaning of lexical items needed in order to complete actions successfully.

Dynamic websites offer a simple structure which learners are well acquainted with. They are also familiar with the medium of communication (e.g. buying a train ticket) and are thus easily able to perform the task at hand, provided the necessary linguistic material is available. The internet provides the learner with the necessary information (including vocabulary and some structures) and establishes the communicative framework for the interactive task.

Mediation and the internet

In the process of learning a foreign language, mediation has two aspects: cultural and communicative. We know that language acquisition is not only a process of developing linguistic knowledge but also has a socio-cultural dimension. Intercultural awareness is an essential component in the development of linguistic ability, together with the acquisition of linguistic, sociolinguistic and discursive skills.

We believe that intercomprehension strategies can act as a first step towards an effective mediation process. We apply techniques in order to achieve an understanding of languages from the same language group. These are then combined with the decoding of information related to text type, context and communicative intention, recognizable words and lexical units, as well as morphological and other formal features.

Alongside intercomprehension techniques, we develop cultural awareness by analysing the relations between knowledge, intercultural competence and experience. Cultural mediation should provide an analysis of cultural identity and cultural representation that goes beyond cultural stereotypes.

The design of mediation tasks within the framework of the *DidacTIClang* program is based on the premise that mediation skills are needed in either a plurilinguistic or pluricultural situation as well as linguistic conflict or incomprehension. Certain mediation skills are necessary when learners are faced with difficult language situations such as interpreting newspaper headlines, technical texts or jargon, or are submitted to publicity where a predominance of stereotypes are found (thereby creating cultural gaps).

A selection of activities which could be applied to this area are translation/interpretation, summarising, paraphrasing and working on cultural awareness activities. Visualisation of highly complex texts is often needed to allow learners to fully comprehend a situation or a concept.

The European Framework suggests the following activities for mediation:

- Translating (or summarising) a second foreign language into a first foreign language
- Participating in an oral discussion with several languages
- Interpreting a cultural phenomenon in relation to another culture

Language learners automatically raise their language awareness when translating a text. The internet can be of great assistance in the translation process. Learners who are asked to translate a given text into their target language make use of a number of different skills in order to produce a first draft: i.e. cognitive, linguistic and reflective abilities. Additionally, they are able to use several tools available on the web, such as electronic dictionaries, search engines, web sites with topic related texts and translation tools. Although the quality of machine-translated text is generally poor, the output can provide a good source of raw material for the comparison of two different language systems. Analysing and discussing

the machine-produced text also gives a deeper insight into the differences between the two linguistic systems and helps the learner to increase his/her language awareness.

In order to refine the translated text, learners might wish to make use of human resources which can be addressed via the internet: i.e. they are able to request support from a translator forum by sending a first draft or asking relevant questions.

The main purpose of mediation activities is to build language and cultural awareness. Thus the process described can only be a part of the learning process. It is important to reflect on the outcomes of such activities in group discussion and according to clearly defined objectives, thereby leading to an increase of the learner's language awareness and consequently his/her mediation abilities.

Conclusion

It is also possible to extend the didactic approach of *DidacTIClang* to other language skills: grammatical, intercultural and lexical.

A similar framework can certainly be applied to other language abilities. The development of a particular skill should be motivated initially by making use of the learner's general knowledge and context. A further step should be to encourage the development of certain techniques and strategies, using the wide variety of resources available on the web.

Thus, the "internet-added value" in the didactics developed by *DidacTIClang* consists in increasing language learners' awareness of the variety of resources available on the internet and offering them intelligent ways to use these resources in order to achieve best results. This provides our learners not only with autonomy but with powerful strategies for lifelong learning.

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THE VIRTUAL CLASSROOM WITHIN BLENDED LEARNING: USING SYNCHRONOUS CONFERENCING AS A SUPPORT TOOL

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Abstract

The University of Bergamo has been delivering a computer module with a blended learning element for three years. Last year, through a partnership with ABB Italia, a "Virtual Classroom" was established whereby synchronous events were scheduled using video conferencing technology. We were interested to see what impact this had on the students, especially as in a blended learning module the students have face-to-face sessions with the lecturer. We wondered whether the synchronous event would have any value and if so what? This paper describes the experience both in qualitative and quantitative terms, from the students and lecturer perspective.

E-learning and different types of university students

Approximately 30% of the students enrolled at the Faculty of Economics at the University of Bergamo also work full or part-time. The University's e-learning programme has specially targeted these students and has been developed as a support to traditional classroom lectures, thereby falling under the category of blended learning. Courses are created with lectures held in the evening combined with a significant on-line element so that working students may better organise their own time and other commitments. However, we should be aware, of that the category of student-worker also includes those who return to study after some years absence or those who choose to visit shorter University courses in order to enhance their own professional career development. As Mintzberg noted (2004), students now call for more intermingling of real world experience with the learning process. Mostly they fall into the category of mature students and have only enrolled and continued with courses where they have found the support and flexibility they need to complete their studies. Amongst these mature students, we perceive a different mentality towards their study, their peers and their teachers (Cavalli and Lorenzi, 2000), whereby they expect a more collaborative and interactive environment. Student-workers often enrich a course by bringing real life situations in it, encountered in a professional environment and, by incorporating these into course, the teaching becomes more student-centred. As noted by Stacey, learners seem keen to share resources, advice and literature in an electronic environment (Stacey, 1999). As well as changing didactic processes, teaching methods themselves are changing to accommodate a different type of student. Students and teachers work together to create a course that is more relevant and fluid. This type of learning experience is particularly reinforced within a blended learning mode where the mix of physical contact with lecturers and other students is reinforced by on-line support through forums, discussion rooms and synchronous activities.

Synchronous activities and e-learning

ICT technologies have produced a range of tools that enhance the learning experience through a virtual environment. The most common ones in use in a Higher Education context are:

- Synchronous: chat (both text based, but also audio and video) and "virtual classrooms".
- Asynchronous: e-mail, discussion rooms, sharing electronic files.

It is worth noting that the development of synchronous activities is a relatively recent phenomenon compared to asynchronous activities as more users now have high speed / low cost Internet access. So far synchronous learning has had little take-up within the University, possibly because many lecturers are wary of engaging with the technology. The aura of being a difficult environment to control is hard

to shake off, however the use of a "virtual classroom" (that is, real time classes held over the Internet) is particularly stimulating for the students as the dynamics of a traditional classroom are reproduced and students can see, hear and interact with each other and their lecturer as they would in the physical world (Hilz, 1997).

The partnership between Bergamo University and ABB Italia

ABB Italia is the Italian subdivision of the ABB Group. ABB is a global leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 103,000 people. Sensitive to the needs and expectations of the market within which it operates, ABB Italia decided to finance a initiative to support teaching within the economics degree delivered by Bergamo University (Agosti, 2005). Like many other large companies, ABB Italia is aware of the difficulties that students, who also work, have in organising their time in order to fulfil both employment and study obligations. It was decided that together with the University of Bergamo, ABB would share its expertise in the field of flexible teaching tools. The University of Bergamo is a medium sized public university in Italy, enrolling approximately 14,000 students annually. The university offers a wide variety of opportunities for training and research through 18 three-year degree courses and 11 two-year specialization courses in arts and philosophy, economics and business administration, engineering, foreign languages and literature, and law. The university offers e-learning courses as support for the traditional classroom, linking its teachers with online multimedia. Teachers can choose from a variety of learning approaches to deliver course materials, and they can use the software's powerful authoring tool to create courses on their own, without programming skills. The university's e-learning environment currently supports 1,000 users, all who fit within the blended learning model. The university has favoured blended learning over complete distance courses in that most of its students are not remote and have shown that they do want some face-to-face contact with lecturers and peers. It is hoped that a "greater reliance on technology might result in several benefits: (a) equivalent or improved instruction, (b) an engaged model of learning, (c) accelerated completion of courses, (d) self-paced or personalized instruction (e) reduced dropout and re-enrolments in the same courses, and (f) reduction of course duplication and redundancy" (Marsh *et al.* 2003).

In this case study, the collaboration was born from the experience, technology and commitment that ABB has in the management and production of synchronous e-learning courses and a well-established e-learning structure at Bergamo University. The Economics Faculty at the university was able to use the ABB Virtual Classroom software through the Interwise platform. This allows lecturers to prepare and then deliver a lecture or tutorial on the Web with students who are linked through their offices or their homes, be it in Italy, or as happened on this particular course, abroad. Initially the students showed some apprehension brought about by the novelty and technological characteristics of the Virtual Classroom. However, once they had experimented they began to appreciate the new possibilities available to interact with both lecturer and fellow students. The Virtual Classroom provided by ABB Italy (and powered by Interwise) operates synchronously, i.e. teacher and students have to be present concurrently. The application used is extremely user-friendly and the students access the sessions through a Virtual Classroom portal on Internet (Figure 1).

The Virtual Classroom within a computing module

What we call Virtual Classroom is a software application that simulates the interactivities and behaviour occurring in a traditional class; namely presentation of materials, brainstorming, questioning, polling and sharing of documents/resources. All these activities are carried out with the support of voice communication (VOIP) which enables a very natural kind of interactivity among participants. The Virtual Classroom works in the same way as a regular lesson, that is the lecturer creates a weekly session and any student who wants to participate enrols so that the lecturer knows who will be present. It was decided to make enrolment in the Virtual Classroom optional so that students could decide to participate at the last minute. However, students were asked that if they did enrol in a particular session that they guarantee their presence even if, being student workers, they may have had other commitments to attend to. This was rarely the case in the study described here and a constant presence of a student cohort meant that the lessons were enriched by student interventions. Each session was scheduled for

one hour, however most lasted almost two hours due to the interest exhibited by the students. This of course is another positive factor of a synchronous event out of office hours, one is not inhibited by time pressures. As mentioned, the Interwise software can be used both online and offline, so that any student who has the software can review previous Virtual Classroom sessions that have been made available by the lecturer. This is a vital component for various reasons:

- Students can revisit parts of the lessons that they had difficulty comprehending.
- Students who did not actively participate in a session can watch recordings.
- Lecturers can go over sessions and be more aware of the problems and difficulties faced by the students.
- A wealth of material is created that can be used in subsequent modules.

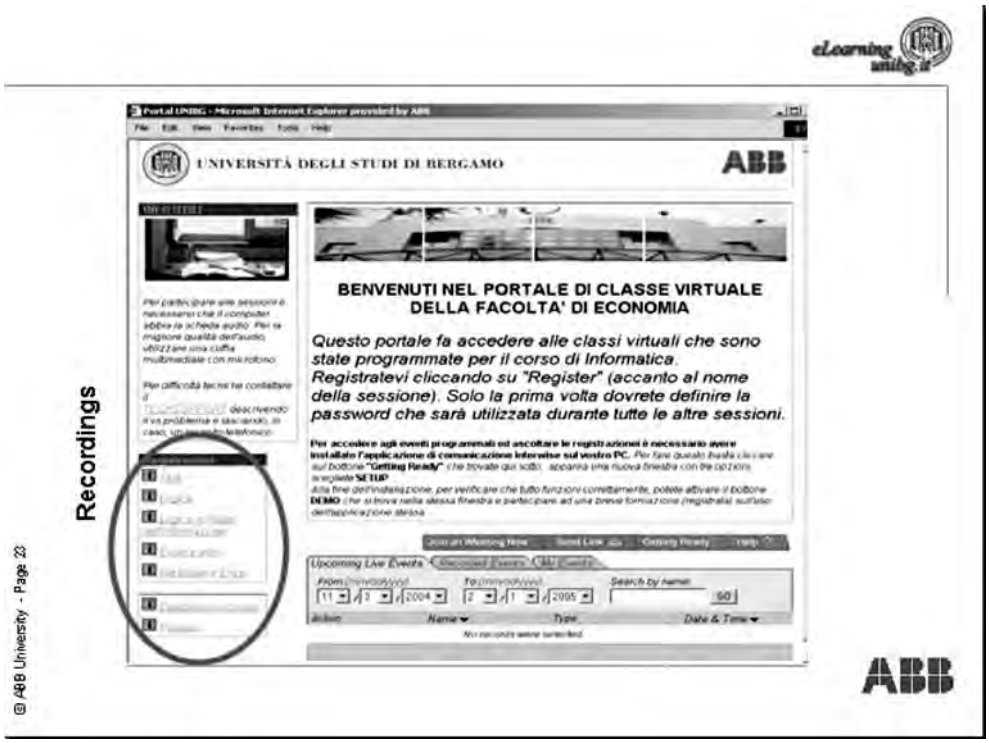

Figure 1. The Virtual Classroom portal

On entering the session, while the connection is made to a communication server, the participant system is checked and, if the communication software is not installed, an automatic installation starts. When connecting to the event the material prepared by the teacher for the session is temporarily downloaded onto the student's local machine. In this way the performance of the teacher-student interaction during the live session is greatly improved as, for the most part, materials are accessed that are present locally and not transmitted in real time from the teacher's desk. Even participants using a traditional dial-up connection to the network can take part in live online sessions. In short, in order to participate, all that a user needs is internet connectivity, a sound card for voice reception and transmission, a microphone and loudspeakers. Because the system downloads everything onto a local network there are less technical problems. This is vital in an online environment. We have seen that if students have a difficult experience with technology on an e-learning module then they are more likely to give up this type of study and move back to the "safe" mode of classroom delivery. Therefore it is vital to try and have as few technical problems as possible. The only drawback we found for this technology is that, presently, it operates with Microsoft Windows based clients, therefore all users utilizing Apple Macintosh can take part in the sessions only when running their systems in a Windows simulation mode (which downgrades the performance for these users).

The experience in this course proved that the technology was extremely efficient and easy to use, an important factor for both students and lecturers who may feel that their technical skills are not up to the task of participating in a video conferencing session. A few students experienced some technical

difficulties due to an insufficient band width. However they were still able to follow the class in a text form and so the session was not interrupted. On the contrary of what many people may think, the use of voice during synchronous interaction does not require the participants to be connected to a High Speed internet network. The Virtual Classroom was part of a first year computing module within the Economics Faculty as an optional extra within the e-learning part of the blended learning mode. This course is available in two delivery modes; the first is a traditional mode of classroom lectures which demand a physical presence on the part of the student, the second is delivered in blended learning mode with a mix of evening lectures and on-line support. 87 students enrolled in the second mode, 95% of whom were also in employment. 44 of these students activated participated in the on-line part of the course by posting messages and other contributions, while 25 students actively took part in the Virtual Classroom. The Virtual Classroom was held 12 times in the second part of the courses and sessions were always scheduled for the evening. The lecturer used the Virtual Classroom as a support tool, rather than a replacement to traditional lectures. As shown in Figure 2, questions would initially be posted in the discussion room by the lecturer and students invited to post comments, ideas etc. After some time the lecturer would again post on the discussion board in order to develop the question further and finally would use all the material collected in a Virtual Classroom session. In this way the on-line part of the courses assumed a homogeneity and became a cohesive and distinct support to the module as opposed to a series of disjointed postings as can happen with a purely asynchronous environment. The use of the Virtual Classroom allowed students to focus on certain topics and each session remained recorded so that students could revisit any topics they were unfamiliar with.

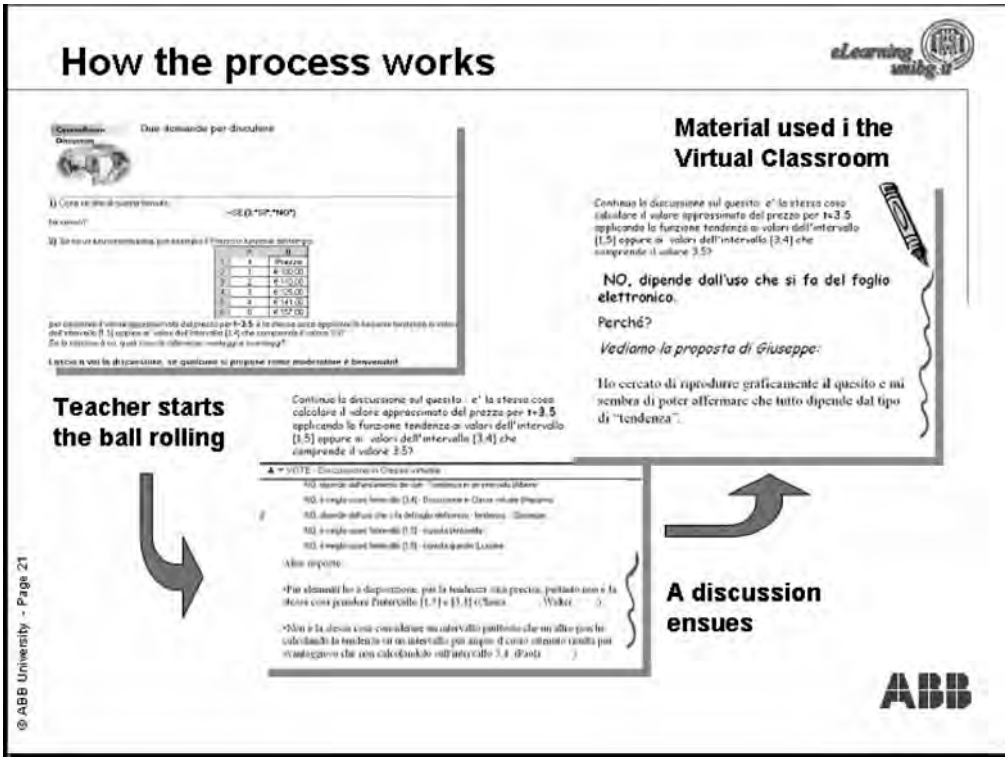

Figure 2. The move from an asynchronous to a synchronous environment

Observations on using the Virtual Classroom experience

Initially students were wary of participating with new ideas or topics, but rather seemed to ask the lecturer to repeat explanations or go over topics already described, suggesting that at the start they were not listening to or reading other people's interventions. However, as the course progressed, students became more accustomed to interacting with each other and the lecturer in an on-line community and their interventions became much more creative and personal. Participation and attention in the Virtual Classroom were considerably heightened compared to a regular lecture. Students were more active in subsequent weeks and seemed to have retained more than they would have done in a traditional lecture. Less distractions and more interest were generated by the Virtual Classroom. Comments made by students on the Virtual Classrooms included:

- These lessons are an excellent way to remove and doubts or uncertainities I had. I feel like the lecturer is more aware of me and that I have more contact with the other students.
- I took part in a Virtual Classroom session last week and I found it very interesting. My questions were answered indirectly by other students and I am sorry that I didn't take part in any classes before.
- I am very pleased with this type of teaching. It allows me to take part properly from places that suit me. I wish more lessons could be done like this.

We could draw some conclusions by reviewing the final marks of the students on the module as a whole. The general average for all the students who took the course was 23.3 (out of a maximum of 30) and the average of the students who enrolled on the blended learning course is relatively coherent with that at 22.5. However if we look at the students who also participated in the Virtual Classroom the average rises to 26. We can ascertain that those who took part in the Virtual Classroom did better than those who did not. 91% of the students who participated in the Virtual Classroom then proceeded to pass the final course exam.

"Customer satisfaction"

At the end of the course a questionnaire was distributed to all the students who took part in the blended learning mode in order to assess their reaction to this type of study. Students were encouraged to give both positive and negative comments. Students were asked why they decided to enrol on the blended learning mode and all cited work and time commitments. Furthermore 10% also said that family commitments made traditional study difficult. Only 3 students said that their main reason was due to difficulty of access to the university because they lived too far away. In effect most of Bergamo University's students live within a short distance to the university, showing that these are not traditional "distance" students and therefore a mixed mode where both a physical presence and an on-line component is available perfectly suits their needs and situation. Most students log on to access on-line materials, both in the form of lecture notes and as extra materials to their studies. Downloading materials at home when one has time commitments is a valuable resource an on-line community can provide. Students also noted the fact that they could undergo tests and exercises throughout the course at their own speed as an important reason for logging into the course and most students said they logged into the course at least once a day. With particular reference to the Virtual Classroom, 90% of respondents said that they found the service "excellent" with regards to both the quality of transmissions and the contents of the sessions. Almost 100% of the students said that they greatly appreciated the availability of the Virtual Classroom, especially in that one could watch recordings of previous sessions. This comment echoes other comments made as regards time management and the availability of materials. Students who have other commitments need the flexibility to review materials as and when they wish. Many students also commented on the fact that they felt that the lecturer made herself very available within the on-line environment and dedicated a great deal of time to the students, both in the asynchronous mode and in the Virtual Classroom. Negative comments tended to focus on lengthy connection time and the related costs. However many students indicated that they logged in using ADSL or ISDN connections. Virtual Classroom sessions were held in the evenings when costs are generally lower. Blended learning certainly shows itself to be an environment particularly suited to students who have serious commitments apart from their studies but who are also able to frequent the University on occasion. It maintains a physical contact which allows that students keep their motivation and focus on the course, while providing an alternative support environment that the student can control in the hours that suit him or her best.

Student evaluation of the Virtual Classroom

Many students added personal comments to the questionnaires they completed, especially with regards to the use of the Virtual Classroom. Most had not come across this type of technology before and despite initial reservations found it to be a valuable learning tool. One topic on which comments focused was the flexibility of the Virtual Classroom and the ability to use it as a tool that enhances time management issues:

- The Virtual Classroom is a great resource for those of us who hold jobs and have little free time to dedicate to studying.
- I found that logging in from home helps me to concentrate more and I use my time more effectively.
- I found it easier to focus on the Virtual Classroom instead of the real classroom where there are a lot of distractions.

Another topic focused on the fact that students could access the Virtual Classroom at any time to view recording of sessions:

- I found that I listened to the recordings of the Virtual Classroom over again as it really helped with my studying.
- I missed a few classes and it was helpful to be able to go over lessons.
- Students can go over recordings when they are free of work commitments.
- I used it some time later to go other themes that I needed to clarify.

Lecturer experience

The experience of the lecturer in the Virtual Classroom is also of significance. In this scenario an intense communication was established where single interventions are highly valued thanks to the greater attention paid by all participants within the session. A new type of interaction is established between lecturer and student that, especially with regards traditional university teaching, constitutes a cultural revolution. Dialoguing with students via the web, perhaps during evening hours, is a complete break with conventional roles and therefore constitutes an innovative element that can have an important impact on a course, especially if it is placed within the blended learning context. Materials are prepared by the lecturer based on students requests and difficulties. Within the Virtual Classroom, time is "expanded" as the lecturer was able to concentrate her comments giving a huge amount of focused information and replying to real questions and problems put forward by students. As mentioned above, the students were so interested that sessions lasted much longer than scheduled. Space is also expanded. The use of different programs allows lecturer and students to move into different environments changing their mind each time. This can happen in the traditional lecture hall. However in a virtual context the lecturer accompanies the students on their road of discovery rather than forces them to go where she would like. Obviously to make the most use of this facility a lecturer needs to be willing to listen and also needs to be able to pick up faint signs of distress that come from the students. It is imperative not to allow anyone to remain inactive for too long and therefore it is vital that the session is interspersed with questions, observations and suggestions. It is only in this way that a session can proceed dynamically with as few misunderstandings as possible. In the long run it is also fundamental for the lecturer that this type of interaction with the student is recognised as a valid didactic method in the same way that classroom sessions are.

Conclusion

We found that the Virtual Classroom had an extremely positive effect within the blended learning element of the course. Despite the students having the possibility of face-to-face time with the lecturer, they participated enthusiastically in the synchronous sessions. The lecturer also reported a much more intense and productive session within the Virtual Classroom than in the actual classroom and has chosen to use this technology again in this year's course. With the rise of technology and the changing face of students within university structures, it seems only a matter of time before blended learning and the synchronous Virtual Classroom become commonplace within university modules.

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CAAD AND E-LEARNING: A BLENDED APPROACH

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Introduction

This case study was conducted by the Senior Lecturer responsible for CAAD course in FAUP with the support and active collaboration of IRICUP. It describes the discipline CAAD an optional course of the 5th year at Faculty of Architecture of Porto University (FAUP) while integrating the e-learning project of the university. The online delivery of contents was made using the commercial platform WebCT.

The course evolves in a collaborative environment – teacher/student and student/student – so that interchange of ideas and design communication is made easy and an efficient learning context is created. The theoretical and empirical bases of the course highlight the concern that computers' potential for communicating urban design should be used with critical awareness. Thus the goal is to point out specific attributes for different representation methods and to make students think why they use different computer techniques and representations for their design.Within this context, it was important to adopt a set of teaching methods, communication techniques and specific software that allowed this course to be distinct from the traditional methods of teaching: expositive lecturing and students adopting a more or less passive role in the process. After innovating the tools that are used in the process of T/L one cannot forget to change the methodologies to encourage students for discussion and to make them adopt an active role in the process. In my point of view this must be the main goal.

This was achieved through several types of information and software utilities, not only on a distance perspective but also in the face-to-face interaction in classes where a problem solving approach for each group as their communication projects evolved was used.

The results from this case study highlighted that the learning process that rises from the creative use of WebCT strengthens the teacher's capacity to work as a team. This means that this technology worked as a real catalyst for a new teacher/student interaction, making communication much easier and giving the students a more active role in the learning process. It was particularly noted that the physical distance between teacher and students and the more or less small number of face-to-face classes did not constitute, as in the past, such an impediment for allowing communication between teacher and students to take place.

Objectives

One of the objectives was to experiment an e-learning platform and integrate the e-learning project of the university. After one year of work I have gained acquaintance with the strategies of the institution and meet other working colleagues that share an interest for technologies in education.

About the use of WebCT and taking into account the specificity of this CAAD course, we consider important that the use of the platform would encourage a new way of teaching and ease the process of creating a community of inquiry. Thus we mark out the following list of objectives to achieve:

- Encourage a critical awareness in students and make them question the use of different representation methods – digital and non-digital – and the different techniques for communicating urban design; promote exercises which lead to a critical awareness of the learning process and the students' empirical work;
- Allow the exchange of ideas and provide significant autonomy for students to develop their empirical work, encouraging the additional contact of students with teacher beyond classes;
- Facilitate the publishing of stimulating didactic material, the exchange of ideas and interactive tasks;

- Facilitate the access to different types of information and create a global and specific bibliography with some interactive capabilities.

Strategy and Model

The pedagogical strategy and adopted methodology have as fundamental pillars: encouraging and facilitating the communication and exchange of ideas between teacher and students; making possible for students to have an active role in the whole pedagogical process so that their interest for the course's content is sharpened, group work and interaction are promoted and their autonomy and responsibility towards developing and finalizing their empirical work is strengthened.

Accordingly, in a first stage, the aspects related with the structure and function of the CAAD online course – objectives, methodology, program, bibliography and online course library – were described to the students and some tutoring about the tools was done. The sequential hierarchy structure of some of the course's content, as well as other type of structure i.e. tree structured information through several links were explained as well as how the students should upload, download and manipulate their communication projects in the platform.

I must say that the empirical work (student's communication projects) developed around and within the WebCT platform was, in fact, the main catalyser of class' synergies.

In a second stage, didactic materials and theoretical content structure were given to students through the platform to facilitate the linking of all these different but integrated domains. In this way, we try to obtain the highest possible degree of integration of WebCT, intranet and www in our course. The major teaching benefits that these allow are the promotion of a swift or intense exchange of information, ideas or experience between people. In this way, it is possible to introduce into the course the concept of collective authorship and interest-rating system. Collective authorship means that each communication project is centred in group work. The interest-rating system means that each group can vote at the end of each phase on another group's work and some communication projects may be selected by many groups and others not. In this way we also promote an atmosphere where creative collaboration is the rule and not the exception because the students are invited to look at the work of others and search them for the qualities which can be developed in the next phase. The students' relationship while working can be enriched in this way and more energy applied to the completion of the design project in hand.

E-learning Tools

Both linear, hypertext and tree structured information (*mindmap*) was used, as we believe they are all needed. Different types of digital material were employed to support theoretical and practical classes. It was seen the importance of demonstrative animated videos for learning some software operations as well as other similar animations for other products. A different functionality, which was also of great importance, was the making of an online content library *Lincoteca*. This was so because it allowed for students to research content pages and sites very related with the course as well as other information and links which were new.

WebCT and CAAD site were, in fact, a complete integral part of the course. In this way, to allow an area of the platform where data storage, sharing of information and all the sites of each group could be placed and assessed, thus we used the e-learning operator *students presentations* (see Figure 1). This tool allowed access to a disk space of the server from where every student could visualize the work of others, allowing complete autonomy and responsibility of students in relation to how their work evolved.

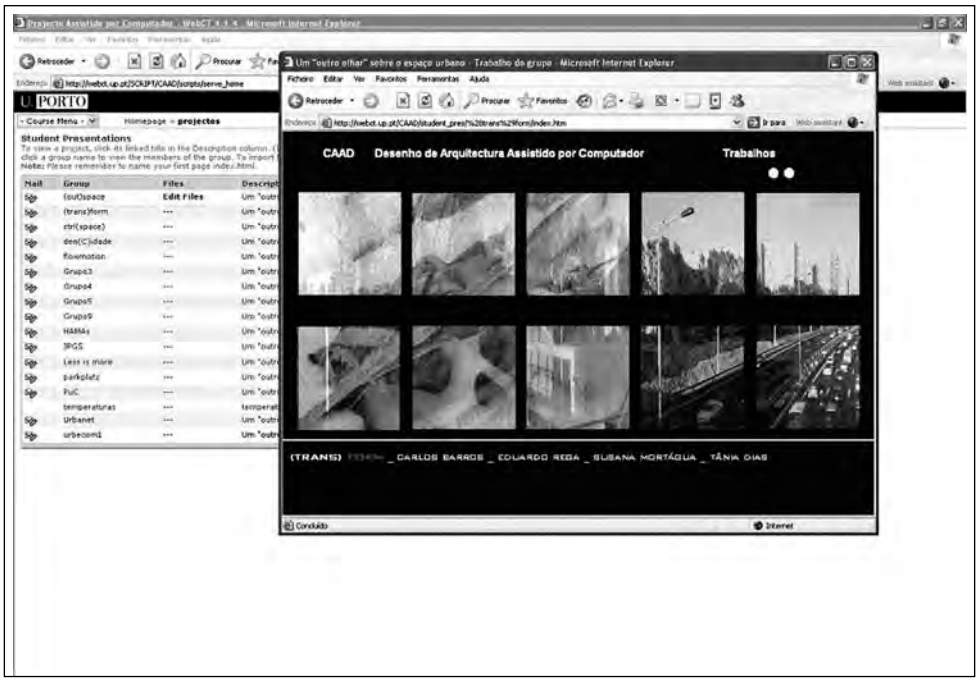

Figure 1. Students presentation and homepage a group in CAAD site

It was our intention to explore thoroughly all the platform tools and to make use at the same time of software in the Internet considered of interest for CAAD. The main objectives, in this case, were:

- Allow synchronous communication between teacher and student beyond the classes' time. For this purpose the chat tool was used;
- Create a place in the platform where each student would write an abstract about the group's work and his collaboration. For that purpose the quiz tool was used;
- Create a place within the platform encouraging the exchange of ideas and informal assessment of group works from students. For that purpose we employed a Web tool and linked it to the platform through the quiz tool. This allowed students to vote informally indicating which work they thought more interesting, and write any comment they thought to be important and visualize graphically the results of the pool;
- Create a tool that could help the public to navigate through the CAAD site: [*navigation help*] was placed in *Course menu* to help people from outside University or other places (as guests) which visited the CAAD site – http://webct.up.pt/public/CAAD/index.html.

It was important, besides other things, to know if the e-learning platform had, in fact, influenced positively the students learning process and if that had significant results in terms of their final marks.

Results

To obtain more accurate results the number of students that never came to classes were not contemplated in this study. Being conscious of the importance of e-learning platforms in our technological societies and of the necessity to collect great number and variety of case studies about their use, we hope that the present case study and its qualitative and quantitative data and analysis may contribute to yield some light over these matters.

In the first place, we compared the marks obtained by students of precedent year [2003-2004] with the year 2004-2005. This was so because the subject matter of 2004-2005 CAAD program started to be lectured only at 2003-2004 and only in 2004-2005 the e-learning platform was used. The results showed that there were no significant differences between the means of students' marks from different year [*Mann-Whitney; p=0.05*], also the students' highest and lower marks did not show any significant difference. It is important to draw attention to the fact that while in 2003-2004 there was no e-learning platform, there was an online component in CAAD. This fact, by itself, may well explain why no significant differences were found, although the p=0.05 value may be suggestive.

With the statistical data that we had, it was important to know if there was any influence between (i) the student final mark, (ii) the student number of hits to platform, (iii) the student number of read documents and (iv) the student number of sent documents. Thus we proceeded with the following statistical analysis.

After applying Spearman rank order correlation tests between (i), (ii), (iii) and (iv), we obtained the following results (Table 1). The results show, besides other things, that a low positive correlation exists between the students final marks (i) and the students total number of hits (ii) [$r^2=0.071;\ p=0.036$]; students final marks and number of read documents [$r^2=0.27;\ p=0.0$] and students final marks and number of sent documents [$r^2=0.18;\ p=0.0$].

Table 1: Results of Spearman rank order correlation tests

Correlations						
			Final mark	Total hits	Read documents	Sent documents
Spearman's rho	Final mark	Correlation Coefficient	1,000	0,268(*)	0,525(**)	0,433(**)
		Sig. (1-tailed)	.	0,036	0,000	0,001
		N	46	46	46	46
	Total hits	Correlation Coefficient	0,268(*)	1,000	0,717(**)	0,331(*)
		Sig. (1-tailed)	0,036	.	0,000	0,012
		N	46	46	46	46
	Read documents	Correlation Coefficient	0,525(**)	0,717(**)	1,000	0,464(**)
		Sig. (1-tailed)	0,000	0,000	.	0,001
		N	46	46	46	46
	Sent documents	Correlation Coefficient	0,433(**)	0,331(*)	0,464(**)	1,000
		Sig. (1-tailed)	0,001	0,012	0,001	.
		N	46	46	46	46
* Correlation is significant at the 0.05 level (1-tailed).						
** Correlation is significant at the 0.01 level (1-tailed).						

We believe that the positive results obtained may be explained, besides other motives, because of the following reasons: (a) the objective and real existence of e-learning tools and (b) the dynamic that was created in CAAD.

It is important to refer that from all the different tools and information available through the e-learning platform (content pages) and CAAD site pages – subject matter for each web communication exercise, theoretical data, tutorials, specific analysis and examples, online bibliography, and other material alike – we noted the following:

- Generally, the students that showed to have more total hits, were the ones that used more the e-learning tools, *organizer pages* and *content pages*;
- Generally, all students in the class show a significant and consistent use of *quiz, calendar* and *mail* tools.

In the end of the semester a pedagogic inquiry was given to students and they were encouraged to complete it. From the total number o 58 students, 30 completed the inquiry. The students when asked about the positive aspects of the platform answered in majority, besides other things, (1), that the use of the e-learning platform had as result a higher interaction between teacher and students. Then, (2), there is a majority of students that agree that the use of communication tools allows a closer communication between teacher and students. Lastly, (3), there is a majority of students that think that the existence of an online infrastructure helped to motivate students and heightened the course performance.

Conclusions

It was clear that the new generation knows well and is familiarised with technology and that the learning process through an e-learning platform, when used efficiently, strengthens our capacities for working as a team and functions as a real catalyst for a new relation and interaction teacher/student(s). In fact, the positive way that this academic year evolved, when this was the first time an e-learning platform was adopted to teach CAAD, shows, besides other things, that it is possible to adopt with success a blended learning approach with these technologies with the objective of creating a significant community of inquiry.

It was possible through the use of the platform to develop a learning strategy that (a) facilitated the learning process, (b) motivated the students to work and (c) promoted communication and interaction between students and teachers. In fact, after analysing the results, weight is given to the following ideas and conclusions.

The number of visits to the CAAD site showed to be significantly correlated with the final marks obtained by the students (see Table 1). It was possible to create an online structure that allowed students to have a greater autonomy, flexibility and responsibility in the learning process: they played a new active role in this process. The results also support this thought: the majority of students said that consulting and accessing the didactic material of the course was encouraged by the use of the e-learning platform and that its structure and interactive possibilities helped the learning process (see 1, 2 and 3 above).

It is important to say that the use of the platform also helped to achieve a significant blend between the learning objectives and the pedagogical methods. This means, for example, that the e-learning platform gave the students the necessary tools for communication and representation that allowed them to evolve in group work and to communicate between them and the teacher more efficiently.

It is also relevant to point out that technologies should always be analysed critically having in mind the scientific and pedagogical objectives of the course and not the other way round. If this does not happen, the risk of falling into a kind of technological tyranny is higher. We believe that this did not happen in CAAD and that important steps were given in order to develop a community of inquiry within a blended learning process. This means, besides other things, (1) encouraging and facilitating communication and exchange of ideas between students and teachers through the platform and in classes, (2) making it possible for the student to have an active role in the learning process, encouraging them to develop group projects and to debate ideas and (3) monitoring the web communication projects, helping to integrate in a critical way the technical component and the artistic and the practice with the theory: analysing critically the works with students, analysing the best ways to use the software tools for achieving the objectives of each communication exercise.

It seems clear that the pedagogical model behind the subject matter of the CAAD course and the learning modes adopted are more linked to the idea of making students an active part of that process than in the traditional lecturing process. In fact, there was a significant concern in trying to explore and use an interactive learning process focused on the groups, encouraging critical analysis and feedback and leading students to gain autonomy and play an active role in the learning process. All this is not new because CAAD and Design teaching in many institutions show us that computers can and must be used as means of expression and not as ends by themselves. It can also be seen how the creative work is enriched if the right conditions for communication and interaction between the principle players of the learning process, students and teachers, are achieved (Neuckermans 1999).

To finalize, we draw attention to the results obtained from qualitative and quantitative student's responses to pedagogical inquiry, and also for the final marks obtained and frequency of the e-learning platform use. These results point out clearly, besides other things, that the integration of this platform in the CAAD learning process allowed achieving more efficiency. This efficiency can be seen by the final marks of students and most importantly by the pedagogical process that was adopted. Two important vectors of this process can characterize it: (i) higher motivation and (ii) higher participation. This means that the learning process efficiency is also the result of the rich cognitive and emotional context created and that quantified tests and evaluation scales should naturally also reflect that richness: the result of an interactive process between students and teachers.

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THE NETWORK OF MULTIGRADE SCHOOLS OF EUROPE – NEMED

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1. Defining the term "Multigrade Schools"

There are many terms to describe multigrade schools in relevant theory, as 'multilevel', 'multiple class', 'composite class', etc., and in the case of one-teacher schools, 'unitary schools'. All these terms are aiming to describe the coexistence of more than one age group in the same class under the same and only teacher.

Answering the question "why this type of school do still exist" in a society that strives for equal education for all, we should mention many factors explaining the phenomenon. Among them the stronger are social and economical factors that demand the creation and maintenance of multigrade schools. The paradox of that peculiar school formation is that not only they do not violate the apophthegm "equal education for all", but, on the contrary, they ensure it. Multigrade schools play an important role since they provide access to primary education in rural and isolated places of many countries around the world. The existence and operation of such schools increases the chances of the international society to implement the ambitious goal "education for all". Apart from their social role, multigrade schools constitute a very interesting field of research in educational matters, promoting scientific debate on various educational issues.

Still, there are significant disadvantages, basically due to multigrade schools' geographical position. It is important to mention that the basic generation's cause of multigrade schools is the same cause that creates the frame of the negative conditions: sparse population results the insufficient number of children per school demanded to justify the institution of a conventional school. Therefore, sparse population results inevitably a multigrade school's solution. At the same time, sparse population implies safely that we stand far away from an urban centre. Therefore, we stand away from many urban facilities. In other words, distance from the centre creates multigrade schools and also condemn them to very demanding conditions. Since multigrade schools mostly operate away from urban centers, the unconstrained conclusion is that these schools usually operate in underdeveloped areas, and as a result they form the most abandoned part of the educational system.

It is noticeable that multigrade teaching is surprisingly very common. Yet only a few Ministries of Education, Curriculum Development Agencies and Teacher Education Institutions take their role into account. Their functioning within the educational system is marginal due to geographical constraints, socioeconomic features, lack of sufficient school equipment and mainly lack of staff. In general, in the field of multigrade schools practice and research very little progress has been made.

Of course another impressive notional balance is the following: as mentioned above, multigrade schools suffer from the geographical/social conditions of the areas where they function. At the same time, multigrade schools are radically improving the condition of these areas, since they function as a means to smooth isolation and exclusion. At the same time there are grounds in support of the view that these schools, apart from the educational role, could play an important societal role, since they could function as "social community centres".

2. Description of NEMED Network

The NEMED network combines the skills of a wide range of people with different backgrounds who cooperate to develop it: educational experts, academic tutors and teachers aiming to improve the quality of education offered in multigrade schools, are brought together to constitute this network. The focus of the network is on the promotion of communication between its members, on dissemination of teaching models, good experiences of multigrade teaching practice, on development of teaching attitudes and on provision of educational material appropriate for multigrade teaching.

The working core of NEMED network is on its structure: six groups of different research areas are formatted. All six groups have a common denominator, that of multigrade schools. Specialization of NEMED's structure in groups aims to bring filtered and detailed information on the most important thematic approaches regarding multigrade education. The academic institutions, as members of the working groups, have indicated a number of multigrade schools per country (of the institutions' origin) that will participate in the research as connected schools with the working groups.

The most significant deliverable of NEMED research is expected to be the overall "Report on Multigrade Education" based on the working group reports. This report will be the quintessence of NEMED network. The report will be comparing existing policies on multigrade schools, focusing on the most effectual and on the most popular ones and will try to suggest innovative policies, not yet implemented, resulted from NEMED groups' research teams.

The training framework of NEMED is based on ODL techniques and in situ training for the teachers. ICT plays an important role since NEMED training scheme is heavily based on technologies and their implementations in educational procedures. NEMED consortium believes that ICT is a multigrade teacher's most powerful tool. Network has the equally important aim of providing continuous support to multigrade teachers of the participating schools, assisting in parallel the communication between inaccessible multigrade schools. The provision of educational material, multigrade teaching training and in service support based on the use of modern ICT are means by which multigrade teachers will be assisted and the participating academic and training institutions are going to support this. Emphasis is given in (a) training on the methodological approaches (b) application of these approaches to multigrade school environment and (c) familiarization with the use of ICT in the framework of the multigrade teaching.

A user-friendly web educational and networking portal is developed and constantly enriched aiming to become the digital core node of the network community. Training, virtual library of archives, databases of suggested URLs, continuous communication and exchange of ideas and materials are all supported by NEMED portal. The portal will be the area where working groups work, research, organise, administrate and train, and the area where school teachers are receiving training, participate in e-surveys and interact with institutions and with each other. It is worthwhile to mention that all groups than one will be developing training material: policies group is automatically excepted since its main role is recording policies, not training. Of course, the overall report will be freely obtainable by all trainees and in that way they will be receiving if not an indirect training, then direct information.

3. Objectives

NEMED network's objectives are found in a range of different areas, research, in service training, evaluation and the network itself.

1. First area is research. Within this frame an extended survey will be conducted, an overall report will be delivered and Multigrade education will be brought to educational community font. In more details: a) Stimulation of the effort of bringing multigrade education to the education policy front and contribution to the upgrading of multigrade teaching and learning. b) Performance of an extended survey on multigrade teaching and learning issues as well as on the multigrade educational conditions in Europe. c) Proposition of specific suggestions concerning the improvement of multigrade education in European level. The report, additionally to recording existing policies towards multigrade schools, aims to propose progressive, enterprising, not yet implemented practices.
2. Second area is in service training and support for the teachers, with the implementation of ICT tools. A well trained multigrade teacher results the reassurance of equal education for all. Multigrade schools' most disheartening disadvantages can be healed if ICTs are exploited, following best practices' guidelines. NEMED's networking platform provides professional training opportunities and access to educational resources. In addition the Network will present to teachers (a) the use of the INTERNET as a tool of constant interaction between educators and trainees and (b) the Open and Distance Learning (ODL) techniques as basic media of communication and collaboration.

3. Evaluation is the mature phase of training: all methods, means, procedures, results will be critically examined and presented. Evaluation will occur also on the application of ICT-based methodologies and practices addressed to multigrade schools, network's function and new methodologies of good multigrade practice.
4. Last sphere of objectives is the network's nature itself: its development, sustainability and constant improvement. This procedure includes enrichment in material, enhancement of web services, user friendliness and functionality. It also includes reinforcement of motivations for teachers to become members, improvement of communication between institutions and school net. This area of network's maintenance is also aiming on creating a self preserving model of the on line, asynchronous, ODL training procedure.

The NEMED network aims on utilizing outcomes of other Comenius projects, develop collaboration and include other Comenius partners in the Network. In addition, the partnership aims to support further the continuation of the network by own resources and by trying to ensure additional funds from other external resources.

4. Working groups

Group 1: ICT and multigrade schools

This group, led by *University of Aegean*, is focused on the best practices of ICT enrollment in a multigrade teaching environment. ICT is proved to be of crucial importance as an educative ally. But in the case of multigrade schools, ICT can really transform teaching and learning conditions into a very competitive and efficient educational procedure. The most intense disadvantages of multigrade school can be cured if ICTs are exploited, using best practices. For each distinct multigrade problem, ICT promises to raise back a solution. Isolation due to geographical position is less severe if internet connection exists and telecommunication devises and software are installed. Lack of frequent interaction with educational society is also less severe, due to the existence and use of relevant forums, digital shareware libraries, databases that allow exchange of suggested educational software, educational portals, and material.

The lack of books specially designed for multigrade schools is tackled if multigrade teacher is trained to develop his/her own original e-educational material, adjusted to the needs of his/her specific students.

The lack of interaction between a multigrade school and the rest educational community is also handled if multigrade teacher cooperates with national and international projects using a satisfactory internet connection to cover most project obligations.

Lack of training possibilities (due to both distance from an urban centre and small school's personnel to function as a substitute for an absent teacher) is easily taken care of, exploiting ODL techniques that allow in service training.

Lack of teaching time is improved, since administrative tasks of a teacher can be simplified with the assistance of ICT office tools, such as documents templates, students' records, correspondence with central educational authorities and more. Less administrative time results more teaching time.

Dead time (time when some age groups remain unattended) is improved implementing specially designed educational environments supporting self learning and self evaluation.

Many multigrade learning and teaching techniques have their equivalent procedure using ICT tools.

Group 2: Management of multigrade classroom

This group, led by *University of Bucharest*, aims to train multigrade teachers in all parameters which accommodate teaching routine. Classroom's arrangement of furniture, formations of pupils' groups and other parameters can solve many administrative and teaching difficulties, minimize lost time and maximize teaching efficiency.

A multigrade school's teacher is often expected to be the headmaster as well. This shrinks impressively teaching time, so that administrative obligations will be taken care of. With the assistance of ICT, administrative tasks are crucially diminished in time demand.

Also, multigrade teaching methodologies will be examined by this group: Peer learning, self learning, whole class teaching and more teaching strategies and the theory supporting them will be presented here aiming to support freshly appointed teachers with small experience and often no training in multigrade teaching procedures.

Disobedience problems and the adequate methods to control them will be examined as well.

Group 3: Links of multigrade school with local community – multicultural settings

This group, led by *Ellinogermaniki Agogi*, will examine the role of local authorities in a multigrade school's function. It is known that multigrade schools' needs are delayed in their processing by ministries of education. So, as far as financing additional needs is concerned, the role of local authorities can be of high importance. This group also investigates the role of multicultural settings in multigrade classroom and also aims to research a number of ways in which the concept of multigrade education is interweaved with issues relating to the societal and cultural characteristics of the local communities in which multigrade schools operate, and propose relevant teacher training and student learning activities for multigrade schools in Europe. Two major strands of work have been identified and followed since the conception and operation of the working group:

a) The multiple roles which multigrade school teachers can play within the small rural communities, and b) The new conditions faced by multigrade schools due to the increased mobility of populations and the rich mixture of cultures characterizing today's Europe, not least in rural areas.

Group 4: Learning modes in multigrade environment

This group, led by *University of Lisbon*, emphasizes the wide range of different learning modes within multigrade learning frame. In Multigrade classes, where students from different levels are involved, psychological heterogeneity is expected to be greater than in normal classes. If the issues of variation between pupils and of ways of dealing with this variation are important in any class, they are critical in Multigrade classes. In Multigrade education one of the most important dimensions of psychological heterogeneity is Learning Modes, which refer to the variation observed in the learning process (e.g. some pupils prefer to learn by hearing, others by seeing and others by touching).

The implication is that multigrade teachers should be aware of the different learning modes present in their classes and should develop competences for dealing with learning modes. Specifically, the subject of Learning Modes can be of interest to Multigrade education in at least three different ways:

- By being aware and informed of different learning modes, multigrade teachers can be better able to pinpoint and understand the variation in learning that typically occur in multigrade classes.
- Considering that students improve by using preferred learning modes (e.g. visual learning) or by using a variety of learning modes (e.g. visual and auditory learning), multigrade teachers can benefit from knowing how to vary their teaching practices, as a way of reaching more students.
- Taking into account that in multigrade class (where individual variation is higher and teachers must often attend separately to various sub-groups), students must be particularly able to: independently self-regulate their learning; to be intrinsically motivated to learn and achieve; to actively comprehend contents in an organized way; and to learn in a collaborative way, multigrade teachers can benefit from knowing how to promote such learning modes.

Group 5: Educational resources for multigrade schools

This group, led by University of Barcelona, aims to train teachers how to trace useful educational material, how to evaluate it and how to develop it for their own needs. The lack of specially designed

books for multigrade schools can be overcome if trained teachers can develop their own educational material that meets pupils' needs. The multigrade classroom is a diverse heterogeneous group which is sustained by collaborative learning parameters, positive interdependence among all of the students, and the establishment of some shared social values necessary for the well-structured and organized operation of the multigrade classroom.

Diversity is the norm in the multigrade classroom. But diversity also entails a characteristic learning structure, different to the found in the homogeneous classroom, the most usual grouping in the ordinary urban school. Multigrade students have to be autonomous to be able to make learning progress, and the degree of autonomy has to be higher according to educational level and, obviously, according to the diversity of the classroom itself. Thus, self-organization of work and time as well as optimization of the class resources and materials increase the autonomy of the multigrade student with respect to the teacher.

Group 6: Policies on multigrade schools

This group, led by *University of Aegean*, is the quintessence of NEMED project since its distinct role is to record and to compare different policies concerning multigrade schools, throughout Europe. NEMED project focuses on the record of policies regarding multigrade schools on an international level. This project not only aims at the recording of current existing prevalent policies through out Europe, but also at the development of a report suggesting new approaches to the designers of educational policies. This overall report will be published on NEMED's platform for all interested parties to read. NEMED addresses different target groups. Teachers-partners (from NEMED's schoolnet), teachers-visitors (outside schoolnet), students, parents, institutions-partners, policy-makers, educational institutions are all target groups of NEMED.

Policy groups will be based on theories relevant to policies designing. NEMED will use an as widely extended database as possible so that a wide spectrum of common, international practices with geographical emphasis to the project partners' countries. Partner countries will be preceded and given emphasis to, as far as material from these territories will be more abundant, since provided by partners themselves.

Teachers-partners from schoolnet can also benefit from studying this aggregate report since they will have the chance to compare, to analyze, to tabulate and categorize all data referring to multigrade education. The chance of a teacher to have access on a database, which concentrates a harmonically orchestrated archive, helps him/her to organize his/her theoretical background on a more elaborated way as far as multigrade schools' theoretical background and practices are concerned.

5. Target groups

Targeted groups are both teachers and educational communities with interest at multigrade education. The first group is expected to be trained and be provided with abundant material of interest, with a vast database of suggested URLs, educational CD ROMs' titles, educational software titles or free versions and tutorials, forums for teachers, educational web platforms, research data banks, archives and more. However the development of the network is going to be indirectly beneficial for the students in multigrade schools. The main innovation is that until now there has not been such an extended network for multigrade teachers, with such a geographical dispersion. This innovation, except of the practical utility (provision of training and information, conduct of research, etc.), is characterized by a second, psychological utility: the multigrade education feels that it receives attention.

Second group is the academic world (scholars, pedagogues, researchers, teachers of other non-multigrade schools, teachers' trainers, curricula designers and decision makers, educational ministries and local authorities) which is expected to be sensitized and motivated to play a more emphatic role in multigrade schools and to take action in the field of multigrade teaching and learning with the aim to upgrade quality of primary education in Europe.

6. Outputs of NEMED

The main outcomes of the proposed network are the following:

The Network of Multigrade Education: The creation of a Network of educational professionals, teachers, training and academic institutions that focuses on multigrade education is by itself an outcome. Multigrade schools were selected to become partners of the schoolnet. These schools are situated in all countries representing NEMED institutions' partners and will be receiving in situ training, will be locally assisted by the national institution participating in scientific team, will be interacting with research techniques and will be energetically contributing to the extraction of reliable, empirical results. It is strongly believed that the network on multigrade teaching will contribute a lot to the improvement of multigrade educational conditions in Europe.

The Web Educational & Networking Portal: The web educational portal is the core knot of the network's function and is designed for serving the interaction between working groups themselves, network teachers between them and working groups with network teachers. The portal is developed as an integrated communication tool providing direct access to communication, information and professional support and it is constantly enriched and improved. NEMED network URL is: www.nemed-network.org

Training for Teachers in Multigrade Schools: Teachers participants form groups that will be working on at least two subjects of the groups as described earlier. In that way, each institution partner will locally support the schools selected to be members of the network. The advantages of in situ training are both obvious and already exposed. In addition, especially for multigrade teachers, training is an imperative need, since the vast majority of them have not been trained for the special conditions of multigrade education.

Working Group Reports: The working groups will cooperate implementing Distance Education techniques, in a synchronous or asynchronous mode, using the communication tools available at the web portal. The members of the working groups are having face to face and virtual meetings to record progress and conclude on their future actions. The major outcome of the working group will be the "Working Group Report" on each research theme. All themes are of tight connection with multigrade education, in other words all thematic areas are multigrade education's important quality parameters.

The "Report on Multigrade Education": The "Report on Multigrade Education" is to include parts where specific measures for upgrading multigrade education on European level, are going to be proposed. It is considered as the main contribution of the network in the effort on pressing national educational authorities and the international academic community to pay attention to multigrade schools and take measures for providing quality education in these schools.

Evaluation Report: The Evaluation Report will include a detailed description of the methodology, the tools that were used to measure the different aspects of the network's performance, the results and discussion. The evaluation report, besides showing the value of the Network, will suggest directions for further research in the field of teaching and learning in multigrade schools.

Other outcomes: In addition, a series of other products are to be developed such as:

The Network's Website that will provide: information on the project's background and idea, access to the WENP, access to training material and reports of the working groups, a description of the project's products and outcomes, links to related sites, etc.

Leaflets and posters will be produced, for dissemination purposes, containing complete information about the network. The proceedings of the workshops and the training material on multigrade teaching will be included in a CD-ROM.

7. Evaluation

Evaluation of the activities of the network will be taking into account the following aspects: evaluation of the network's function and working group activities, evaluation of the teachers training scheme and ethnographic evaluation.

8. Dissemination

As far as dissemination is concerned the NEMED Network is making use of all available dissemination channels. The dissemination strategy includes specific measures for the dissemination of the products and the outcomes of the network. The following specific measures have been planned and are in the process of implementation in various levels the most important of which are: Development of the project's web-page, provision of access to the WENP, press releases, leaflets and posters, organization of annual workshops and closing conference, presentation of the project and its anticipated outcomes in conferences, seminars and workshops, distribution of the Report on Multigrade Education.

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THE METHODOLOGY FOR LEARNING BY EXCHANGING EXPERIENCE IN THE BOLDIC NETWORK

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Introduction

The spread of information technology and the related restructuring of the global economy have introduced a new type of society, the knowledge society, where networking is increasingly becoming the core type of organisation. In this process of change it becomes apparent that our conceptions of knowledge and learning have been too limited and related to another social framework. We are bridled with a traditional concept claiming that knowledge is gathered or developed by the university, distributed to and disseminated by education then applied in practice. There is a growing understanding that practice and improved practice is not merely a question of applied theory. The dichotomy of practical and theoretical knowledge is discussed (Jarvis, 1999). The dynamic personal and interpersonal experiences are valued as sources of practical knowledge. In that way experiential learning (Kolb & Fry, 1976) becomes a priority. The question arises, does that mean that we have to give up codified explicit knowledge? The immediate answer is no, we have to redefine the relations between different domains of knowledge and forms of knowledge. Wilson among others (1996) discusses a shift from the disseminative to the constructionist conception of knowledge. Learning, teaching and knowledge conceptions interrelate, i.e. the perception of learning as a quantitative increase of knowledge or as remembering/recall interrelates to disseminative conception of knowledge. The perception of learning as interpretation and as social interaction characterizes the constructivist conception of knowledge. The results from the BOLDIC project pinpoint the interrelationships between different types of knowledge. In addition, these results break ground in the process of developing networks with access to different kinds of knowledge creation or learning.

The spread and practice of international networking manifests these changes in learning culture. The BOLDIC project "Baltic-Nordic Network for Exchange of Experience" (www.boldic.net) aims at the initiation of a new tradition of exchange of experience in the area of ODL. Can such a personal and unique unity, as experience, be exchangeable? What kind of outputs can be extracted from the experience and exchanged in the international network? How can the learning process facilitated by exchange of experience be conceptualised and supported? All these questions were raised when initiating the BOLDIC project. The need for a clearly defined methodology was identified. The participants realized that such a methodology had to be a form of emerging methodology where inspiration could be found in theory and so-called "Best Practice" in similar networks.

The authors of this paper aim to outline of the methodological framework for exchange of experience in an international network. Two aspects of the problem are discussed in this paper: 1) the theoretical bases of learning by exchange of experience in an international network; 2) the methodological framework as an integration of theoretical approaches incorporated by the BOLDIC network model.

Theoretical bases of learning by exchanging experience in the networks

The problem of knowledge as an exchange object

Even though we talk about the "Knowledge Society" there seems to be little research in the theory and understanding of knowledge (Luhmann, 2002). The actual concept of 'knowledge exchange' is problematic. One side of the problem becomes obvious in contrasting that concept with different approaches to knowledge. Another side shows up in analysis of nature and diversity of practical knowledge. We should take into account disseminative and constructionist approaches to knowledge (Luhmann, Wilson, 1995) when discussing this issue. It is reasonable to think of the exchange of

knowledge in the frame of disseminative approach, where knowledge is perceived as a package of content. Here the emphasis is on knowledge 'transfer'. But the concept of knowledge exchange is uncoordinated to constructionist approach to knowledge. Use of the concept of exchange supposes pre-existence of an object, which can be exchanged, but the constructionist approach argues differently: the constructionists argue "knowledge" is constructed or created in the process of learning.

The academic culture has its tradition "to package" knowledge into academic disciplines and to share it through the medium of texts or lectures. Much practical knowledge is complex and rich, making it difficult to categorise it into academic disciplines. Jarvis (1999) distinguishes practical and theoretical knowledge: the first can be acquired in the primary (i.e. personal experience) and the second one in the secondary experience (i.e. experience of others, which is presented in written or spoken form). According to Jarvis, knowledge of the practitioner consists of content and process knowledge as well as of values and beliefs. These contribute to a frame of meaning for effective practice. Practical knowledge has a strong tacit dimension in all of its parts. This realisation makes packaging and exchange much more problematic in situations of knowledge extraction.

One way, which has been used in industry and within the public arena, is to use the "Best Practice" approach. Unfortunately, there are severe limitations to this as well. How is "Best Practice" identified? Which criteria should be used? But the significant problem is the "cut & paste" of good practice into another context. This is seldom or never the solution. The "Best Practice" does not contain the complexity of a given practice and telling by applying "Best Practice" into another context is an inadequate complexity reduction. The modern world does call for reducing the complexity vs. the surrounding world not by simplifying, but by developing you own complexity (Boisot, 1999).

The distinction between "Know OF – knowledge of people and places", "Know THAT – factual knowledge" and "Know HOW – practical knowledge" offers insight in what knowledge could be (Flew, 1979). Practical knowledge here is perceived broadly as a composition of knowledge how to perform (i.e. motivational theory, knowledge about practical strategies, tools and methods) and the ability to do (i.e. master of action, application, generation and design in real practical situations). Here it correlates with the concept of competence as defined by the EU: "The ability to meet individual or social demands successfully or to carry out an activity or task"[1]. But it is difficult to imagine knowledge (and especially competence) as separated from the context, where it has been developed.

The concept of embedded knowledge arises and Bandaracco (In Monge & Contractor, 1999) distinguishes two types of knowledge: 'migratory' and 'embedded'. Migratory knowledge exists in the forms that are easily moved from one location, person, or group to another location, person or group. Embedded knowledge resides in relationships, norms and attitudes and is more difficult to transfer. All these different types of knowledge can be extracted, "packed" and exchanged in different ways. Effective methods for extraction and exchange of all these types of knowledge should be defined.

Perceiving knowledge seeks methodologies that move beyond a mere exchange of explicit knowledge. In our view one possibility is to combine Kolb's approach with the theories of Carl Otto Scharmer (Scharmer, 2001). Scharmer transcends the 'simplistic' separation between explicit and tacit knowledge. He works with three modes of knowledge: explicit, tacit and emerging. Explicit knowledge is codified, generalized and depersonalized, and it can be exchanged over time and distance. The traditional concept of academic knowledge lies within this category. But he continues by defining knowledge which is embedded and developed in practise. This he calls "knowledge as process". This is very much the similar to knowledge which Lave and Wenger deal with in their theories about communities of practice. Knowledge as process is bound to the individual time and place. When competent professionals co-operate in trans-disciplinary networks such as we have seen in the BOLDIC project, new emerging knowledge could develop which transcends the accumulated knowledge of the participants. Scharmers defines this exciting possibility as "emerging" or "self-transcending knowledge".

The theory of experiential learning explores the process of knowledge extraction from experience and use of new knowledge for the development of practice (Kolb and Fry, 1976). Four main stages are distinguished in the process of experiential learning:

[1] http://www.statistik.admin.ch/stat_ch/ber15/deseco/deseco_strategy_paper_final.pdf

1. concrete experience;
2. observations and reflections;
3. formation of abstract concepts and generalizations, and
4. testing implications of concepts in new situations.

In summary the second and third stages could be said to represent extraction of knowledge from practice when the fourth and first represent the developing practice as a consequence of new knowledge.

Knowledge exchange as communication links inside networks

Each act of knowledge exchange is an act of communication. Theories of communication should be employed for exploration of the exchange process. Stuard Hall (1980) in his theory of "mass communication", highlights the processes of encoding and decoding, revealing non-equality of transferred and received knowledge as well as stressing the importance of active interpretation of codes in the situations of communication.

His theory directs our attention to the three principal problems of knowledge exchange:

1. the problem of encoding different types of knowledge; (the factual knowledge can be transformed into information much easer than "know how" or attitudes and values);
2. selection of the codes that could be interpreted in the adequate way from both sides (encoder and decoder), representing different cultures; that problem becomes crucial when exchanging knowledge in the international arena, and
3. assuring mutual understanding when coordinating two different frameworks of knowledge. Shared meaning structures (e.g. theoretical models) and two-way communication are required as a base for coding and decoding more complex forms of knowledge.

P. R. Monge and N. S. Contractor (1999) explore definitions, organizational forms and theoretical models of communication networks. Communication relations are in the focal point of networks analysis. Participants in communication networks establish one or more communication relations such as: "provides information to", "gets information from", "communicates with", "collaborates with", "subcontracts with", and "forms joint ventures with", etc.

Communication linkages are dependent on type of knowledge that is exchanged in the act of communication. Bandaracco (In Monge & Contractor, 1999) distinguishes two types of knowledge linkage: product linkage and knowledge linkage. Product linkage is created for exchange of migratory knowledge whereas knowledge linkage is created for learning and joint development of new embedded knowledge.

Product linkages inside networks are explored by exchange and dependency theories. Social exchange theory (Homans, 1974) seeks to explain human actions by calculus of exchange of material or information resources. Access to resources is associated with power. Emerson (1962) argues that people, groups and organizations have power to the extent that they have access to alternative sources of valued resources and have control over resources valued by others in the network.

When discussing "Resource dependency theory" (Pfeffer & Salancik, 1978) argue that organizations structure their resource linkages in order to buffer themselves from the unpredictable organization's environment. Organizations can choose any of two strategies: 1) network extension (increase the number of exchange alternatives) or 2) network consolidation (forming coalitions with resource providers). Burt (1992) argues that people accumulate social resources, or "social capital," which they then invest in social opportunities from which they expect to profit. The network linkages enable and constrain the flexibility, autonomy, and therefore the effectiveness, of organizational members. Market as a network organization can be analysed as aggregate of product and resource linkages.

Knowledge networks are conceptualised with reference to the concept of "Distributed Knowledge" that exists among many participants inside network (Gore, 1996). The flow or diffusion of knowledge inside

network increases level of knowledge among all actors. Alternatively, distributed knowledge may refer to the parts of a larger knowledge base, each possessed by separate participant in the network. The knowledge linkages inside a network enable integration of knowledge and collective accomplishment of complex tasks.

Monge and Eisenberg (1987) introduced the concept of semantic networks. The essential feature of this perspective was a focus on the shared meanings that people have for message content when communicating. Linkages can then be created between people who share similar interpretations of same messages. The resultant network links the groups of people who share common understandings. The appropriate codes for exchange knowledge can be refined in such a network.

The micro-social theory (Marwell & Oliver, 1993) emphasizes collective action. Its main focus is on expected benefits from coordinated action inside a network. Two main benefits are discussed in the theory: the mobilization for public good and the adoption of innovations. Extensive communication inside a network maintains solidarity and enhances members' involvement in collective action. Knowledge as a process can be developed in such a network.

The methodological framework for learning by exchanging experience in the network

The methodological framework for learning by exchanging experience in the network is constructed while combining different model of experimental learning with typologies of communication relations described in different network theories.

The first model describes extraction and utilization of knowledge in the life cycle of experiential learning. Knowledge extraction starts from collection and inventory of best practice examples. Factual knowledge is extracted at this stage. Reflection, evaluation and conceptualization lead to development of personal theories about practice. The knowledge utilization starts from exploring perspectives for development practice, modelling ideal practice and raising ideas about how to improve it. New ideas are tested in practice when developing new projects and implementing them. That leads to gaining new experience as a source for new knowledge.

The acts of communication and exchange can be initiated at each stage of experiential learning, and exchange can reinforce the learning process. Three levels of exchange are distinguished in the second model (see Table 1). Each level can be described by: the purpose of the network, target groups that are linked within the network, support processes, content circulating inside the network, structure of the virtual platform and solutions to technical implementation problems. It should be emphasised that we are talking about the exchange between partners relating to a given practice. The communication within the network could thus be described as moving from meta-descriptive, to reflective to a tentative prescriptive theory, which then would be tested out in practice and thereby validated as (emerging) new knowledge.

Table 1: Matrix for the Three Level Network used in the BOLDIC Project

	1st level OUTPUTS FROM EXPERIENCE	2nd level REFLECTED EXPERIENCE	3rd level LEARNING BY SHARING EXPERIENCE
Purpose	To support collection, structuring, storing, updating and dissemination of information about existing products and expertise in area of ODL	To support extraction of knowledge from own experience, articulation and sharing of it	To create knowledge in the process of exchange of experience and to support development
Target groups	Learners (searching for services); ODL institutions (marketing or searching for resources); ODL actors (searching for solutions); Researchers (searching for data)	ODL institutions and professionals searching for learning from experience of others'; Investors to the field of ODL (EU commission and others); Researchers	ODL institutions and professionals searching for… • learning by communicating; ideas and sharing experience; • new forms of cooperation/networking; • new perspectives for development
Supported processes	Collection, structuring and sharing information about outputs from experience; Exchange and pooling resources; Adoption of best outputs from experience and solutions	Reflection, evaluation and conceptualization of practice (reflective learning); Learning from each others' practice (resource-based learning); Adaptation of best practice approaches	Learning by exchange of experience, building shared ideas and concepts, and exploration of new ideas (collaborative learning); Development of ODL professionals and actors; Development of the network
Content	Information about… • Courses, • Experts, • Quality systems; • Tools; VLE, etc.	Case studies; situational analysis; Models and principles, derived from best practice; Definition of problems, etc.	Materials for discussions (comes from the 2nd level); Tracks of communication; Concluding remarks after discussions (goes to the 2nd level)
Structure	Metadata for courses; Metadata for experts; Metadata for quality systems and solutions; Metadata for tools; etc.	By type of texts: case studies, large-scale surveys, national overviews, methodological considerations etc.; Criteria based structure could be applied to case studies, etc.	Thematic based (moderated discussion structured around topic); Problem/Question based (self moderated discussions); Activity based (discussions structured around project ideas)
Technical implemen-tations	Web page; Data base with search engine; Decentralised update of information	Web page (*can be interlinked with the 1st level*); Web streaming; Electronic journal/brochure; Virtual library (links to useful materials)	Moderated discussions on "hot topics" (*interlinked with the 2nd level*); Online and video-audio conferences; Free discussions; etc

The three-level exchange model reveals the internal structure of the network that is created for the purpose of learning by exchanging experience. Full functioning of exchange at the higher levels requires the foundations that are laid down at lower levels. There will be a fourth level, which will especially address the development of emerging knowledge. Intensive studies of network theories and experiments are needed for outlining organizational structure of such networks. The authors intend to move the research on learning networks further in a later paper discussing the relationship between network theory, learning & knowledge. We will tentatively develop a generic model, which could be applied in understanding and developing such networks.

Conclusions

In this paper we have tried to develop a framework for understanding of knowledge-sharing in a trans-disciplinary and trans-national network. We have seen how this exchange of experience developed into different interrelated processes; knowledge adaptation, knowledge sharing and the development of emerging new knowledge. There are different kinds of knowledge and different kind of processes.

We have learned that the design of a knowledge management system as the virtual platform for a network should reflect these different processes, even though there is no causality between the designs of a given system. It means that you cannot ensure a specific process by design. But you can scaffold the intended process. Therefore there should be knowledge of learning and knowledge integrated into the design process.

We have also realized through the project that there have not been developed sufficiently coherent theories, which address the challenges within the development of learning networks and their methodologies. In our own design process we have had to be rather eclectic in order to develop a theoretical understanding of the subject.

Our reflections lead us to different recommendations for the project:

- The framework(s) for knowledge adaptation, knowledge sharing and development of new emerging knowledge should be further developed in so-called "Concept Communities". This should be organized as a horizontal process, where different practitioners explore, design challenge and re-design networks that scaffold processes of knowledge.
- The methodology which we tentatively have developed here should be made more functional. A handbook may achieve this objective.
- Different networks should be identified, bought together and amalgated in order to develop the methodology and the framework. These networks should include partnerships between industry, research and education.

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EXPLORING E-TUTOR COMPETENCES: THE LINK BETWEEN AN EFFECTIVE WELCOME MESSAGE AND THE LEVEL OF DISCUSSION IN A UNIVERSITY VLE

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Introduction

This paper explores the connection between an effective welcome message at the online course homepage with the level and quality of the online discussion between tutors, students and peers as experienced in Lancaster University Virtual Learning Environment (LUVLE). Also, we identify six themes that all welcome messages in this study share and promote online communication. The factors we consider important are the tools of the virtual learning environment that affect the role and competences of the e-tutor and vice versa as well as the motivation that students have when they begin to use the virtual learning environment. We conclude that the welcome message written by the lecturer/administrator is the first interaction with student when they access the VLE and thus promotes online collaboration. Finally, we suggest the design of a welcome message template in LUVLE that helps e-competences of tutors in Lancaster University which can lead to effective discussion and online negotiation of meaning. This study forms part of the actions and processes of the E-learning Project situated in Lancaster University.

The virtual learning environment is a time and space free environment that promotes communication, group work online and finally student employability that builds on student career development (Hoskins and van Hooff, 2005). Therefore, in order to expect more and more informed participation it is useful from the very beginning to motivate and show examples to students of how the virtual space influences their performance (Hoskins and van Hooff, 2005) and supports their learning experience in higher education.

Background

A large amount of papers and studies have referred to the role of the e-tutor as a source of motivation as far as online communication and discussion is concerned. Unmotivated students do not feel the need to contribute in a discussion whether this is face-to-face or virtual. Thus, it is the tutor's role to engage students in the VLE and the online discussion. Exploring the roles and competences of the e-tutor several writers distinguish the pedagogical/communicational skills from the content expertise/ technological ones (Denis, Watland, Pirotte and Verday, 2004) and suggest that the first contribute especially to collaborative learning. However, the clear-cut communicational models available for training skills in a web-based environment do not apply totally in a blended environment where communication occurs in both online and face-to-face environments and the tutors may experience difficulty in identifying their roles.

Accordingly, the use of the online discussion varies on quality and quantity. Not all tutors follow the same teaching models or have too much workload that leaves them with minimum time to manage the virtual environment. Also, in a blended environment, online participation is either optional for students or is required by the student for an online component of a face-to-face course, measured against three subcategories of participation: (i) interaction with content; (ii) communication with staff/students; (iii) interaction with content and communication (Jenkins, Browne and Walker, 2005). This leaves us with a large number of LUVLE sites that use the discussion tool on diverse levels and affect both tutor's and learner's communicative skills and expectations.

Rationale

LUVLE, Lancaster University Virtual Learning Environment is an in-house digital environment that is based on Lotus Domino server. It is customisable and password-protected and it has been designed and developed to support the collaborative learning taking place at Lancaster. Collaborative learning takes place when students "work together in groups of two or more in some way to aid their learning" (p. 18 Battezzati, Coulon, Gray, Mansouri, Ryan and Walker, 2004). LUVLE is an integral part of many face-to-face modules providing a blended environment and supports many thousands of undergraduate and postgraduate students in their learning experience in higher education apart from the web-based distance courses. Accordingly, it is integrated with other administrative tools and services in Lancaster University, such as Lancaster University Student Information, which helps the smooth and time effective management of the environment. The main tool within LUVLE is its discussion forums that are used to support and/or enhance the student experience in many different ways. Furthermore, one of the options in the LUVLE template is the composition of a welcome message that appears at the homepage. This facility is available to all academic members of staff who have administrative access to a LUVLE site. Still, the use of the welcome message is on a developmental stage as more and more tutors decide to use this space in a friendly and imaginative way.

Research question

The first stage in Gilly Salmon's model is that of access and motivation (Salmon, 2002). It is the tutor's responsibility to explain to the students the purpose of the site, how it is going to be used in the course and why should the students access it and contribute in it. The welcome message is an area that the students can refer to in order to remind themselves of the most important information in the module as well as get motivated to contribute to the discussion or information sharing with peers and tutors. Therefore, it is important to mention that the welcome message is promoting collaborative learning.

However, the welcome message is and should be just part of a series of motivating prompts and feedback from the tutor. As Salmon suggests (2002), 'motivation is not something that you can set out to create on its own' (p. 16). Following basic rules of website design, it is essential to design and construct a captivating homepage within the virtual learning environment that promotes text-based communication between peers and academic staff. Nielsen and Tahir verify the central importance of the homepage in their deconstruction of effective websites (Nielsen 2001).

Therefore, the question that this paper focuses on and explores is the following: is there a correlation between the use of an effective welcome message and the quality and level of the online discussion between peers and tutors that leads to collaborative learning?

Data selection

66 LUVLE sites have been included in this statistical analysis of the study. The sites are all parts of undergraduate modules within 3 departments from 2 faculties in Lancaster University. The criteria for choosing the specific departments were a) the use of LUVLE in undergraduate modules at a departmental level and b) the number of LUVLE sites in total. We have decided to look into the use and model used on a departmental level first. Also, the statistics of overall use of LUVLE within a department played an important role in selecting the departments for the quantitative analysis of the data. So, in order to produce valid statistical results, it was considered important to evaluate departments' use of those that have active LUVLE for more than two thirds of their total number of undergraduate modules.

Finally, in order to measure the correlation between welcome message and discussion, it was decided to evaluate LUVLE sites that are managed by individual or small groups of members of staff and have groups of students who are enrolled in the same module. Since the VLE is developed in-house, many departments have decided over the years to deviate from the typical module-LUVLE model and follow patterns that were adjacent to already existed models. This, however, restricted the number of departments from the selection process.

Findings

The overall use of LUVLE varies as is seen in the tables below.

Management Faculty: Accounting and Finance Use of LUVLE 100%
Number of sites checked: 21

Status	LUVLE sites
Use of Welcome Message + Discussion	6
Use of Welcome Message only	3
Use of Discussion without a welcome message	5
Neither	7
Inadequate welcome message	12

Arts and Social Sciences Faculty: English Use of LUVLE 60%
Number of sites checked: 24

Status	LUVLE sites
Use of Welcome Message + Discussion	2
Use of Welcome Message only	0
Use of Discussion without a welcome message	10
Neither	13
Inadequate Welcome Message	16

Arts and Social Sciences Faculty: Educational Research Use of LUVLE 71%
Number of sites checked: 21

Status	LUVLE sites
Use of Welcome message + Discussion	2
Use of Welcome Message	2
Use of Discussion without a welcome message	6*
Neither	11
Inadequate Welcome Message	15

In total out of 66 sites for undergraduate modules:

Status	Percent	LUVLE sites
Use of Welcome Message + Discussion	15.15%	10
Use of Welcome Message	7.6%	5
Use of Discussion without a welcome message	31.8%	21
Neither	47%	31
Inadequate Welcome Message	65.15%	43

Nearly half of the examined VLE sites have no welcome message or discussion. Accordingly, 15% of the sites use both the welcome message and the discussion area in a comprehensive way. 7.6% of the sites did not benefit from the use of the welcome message as they generated no discussion. Further evaluation of these 5 modules shows that there was rather poor statistics as to the whole use of the LUVLE sites on more than one level (no discussion, few course materials and resources).

However, a large percentage of sites (31.8%) do have a discussion area that is used either on a frequent basis or occasionally without having an explicit welcome message at the homepage. In Educational Research Department, the members of staff in 6 LUVLE sites have uploaded adequate welcome messages either as part of an announcement or a discussion topic. A first indication that these tutors did not know where the tool-link was in the template is strengthened by the fact that the inadequate message 'Welcome to ABC 100!' in the LUVLE homepage is automatically generated when the site is set up by the Learning Technology Group and the tutors need to delete or change it afterwards. More than 65% of all evaluated LUVLE sites have this welcome message in their homepage.

The majority of the online discussions that lack a welcome message in the evaluated LUVLE sites are mainly related with administrative issues and social question-answer interactions among peers. We identify messages as administrative the ones that state or reply to questions like: 'When is the deadline for the next assignment?'. Accordingly, social question-answer interactions among peers are the ones that refer to personal experiences and/or provide a model of e-mentoring service among peers: 'Who wants to win £50?' 'Where can I find this journal?'.

Finally, the 15 sites that have both an effective welcome message (either in the homepage or as part of an announcement) and main discussions refer mostly to the content of the module or the specific subject area: 'What did you mean by that?', 'What do you think of …'. Research has shown that all three categories contribute for a healthy community of enquiry that leads to collaborative learning (Garrison and Anderson, 2003). Nevertheless, questions that are mainly content specific are contributing to knowledge construction and competence development of both the students and tutors as mentioned above.

Restrictions

The number of the data selected for this study is rather small. Therefore, the statistical significance of the findings cannot exceed the University context. Nevertheless, we infer that the usefulness of the findings can apply on a larger scale, either national, European or international. Apart from the above, from a qualitative point of view, it is difficult to evaluate the meaning and importance of the online discussion without knowing the face-to-face context; whether or not the discussion is linked with other face-to-face activities or is an independent or disassociated element of the online experience (Paz Dennen, 2005). Accordingly, it has been difficult to evaluate the connection of two text-based areas/functions that identify the tutor's communicative/social skills online as well as in the face-to-face environment.

Conclusions

The welcome message is our opportunity to talk about the process of the online environment as well as the content of the course. It is essential to state the VLE's purpose clearly in our early messages as well as what we want from our students when they are using it. Duggleby (2000) suggests that online tutors in a web-based environment 'should start the process of welcome and reassurance before the course even begins' (p. 119) and within a blended environment this is translated as methodical design and development of the tools that lead to a consistent homepage and welcome message.

From a quantitative point of view, there is a relative link between the use of an articulate welcome message and the frequency or extended use of the discussion tool.

The fact that 65% of the LUVLE sites have an automated inadequate welcome message indicates that most tutors may not have the technical skills to edit the message within the configuration (administering) area of the VLE and also that they lack the communicative skills to write an imaginative and friendly welcome message. Consequently, it is down to the technology and the design of the template to make the welcome message area more obvious to the members of staff who have administrative access in the VLE. Furthermore, it is the lecturers' skills and competences that define the feeling of the homepage, its welcome message and the level of interactivity and discussion online.

The 15 welcome messages that were included in this paper had six identifiable areas that are linked with effective communication with the students:

- essential information about course and its assessment
- information about help provided and useful resources
- who is the facilitator and what is her/his role
- netiquette
- time management and access
- what to do next: assignments, discussion

The above areas are currently disseminated to the tutors in face-to-face training and staff development events. The e-learning project team organises workshops where the importance of the welcome message is part of the introduction to LUVLE. During the workshops we present examples of good and bad welcome messages to the participants and ask them to write their own messages as part of an activity. Additionally, we present examples of good welcome messages in universal wide LUVLE sites. So, the use of the welcome message is promoted by the E-learning advisors within the Project team as an integral part of the VLE that helps towards informed use of the environment and effective use of its main discussion.

Suggestions for the future

Another way of reminding the importance and functionality of the welcome message and thus assisting the online communicative skills and competences of the tutors/lecturers in Lancaster University is to make it as explicit as possible on both an interpersonal and more technical way. By saying this we propose the addition of a template of a welcome message in the configuration form in all LUVLE sites in addition to the already face-to-face and interpersonal assistance given by the E-learning advisors in the E-learning project. An example of a template is given in Appendix A. As seen in this example, the template includes all six theme areas that we identified as helpful and essential in uploading a motivating and encouraging welcome message at the VLE's homepage. Another example of using templates for messages is found in San Francisco State University [online].

However we identify advantages and disadvantages in formulating a message that welcomes all registered students to the module VLE. The major advantage of the addition of a welcome message is the fact that all tutors will be prompted to fill in the specifics of the module the according VLE is set for.

On the other hand, there is the possibility of loosing the personalised feeling that a spontaneous and imaginative message has, if the template would be left blank or used in a mechanic, distant and impersonal manner by the administrator of the LUVLE site. Approaching this suggestion from this perspective would actually have the opposite from the proposed results, which are to prompt the interaction between tutors and students by using the online discussion after an informed introduction.

A middle ground would be to ask the tutors whether they want to write their own message or follow the steps of the template. This way, the novice users may want to feel secure by using a form that has been already tried and used and the more experienced tutors may want to conduct their own messages that will potentially establish a more personal relationship between them and their students. However, this suggestion has the potential of being a feasible follow-up action research resulting from this paper.

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Appendix

Welcome message

Welcome to the virtual learning environment of ……

This virtual learning environment has the following sections that can be found in the left hand side column.

……., ……., ……., ……., ……., …….., ……, ……, …….

The purpose of this site is to …….

You are required to access the site frequently/ …times a week and to follow the appropriate netiquette which can be found in……..

Your participation and contribution to the VLE will …. be assessed at the end of the module.

Please make sure you complete your first assignment as soon as possible. Your online assignments can be found in…….. (State the folder or section that you put the assignments)

If you have any technical queries please contact the learningtechnology@lancaster.ac.uk

If you have any other questions and want to contact me personally, please e-mail me at: ……..@lancaster.ac.uk

…… (personalised message at the end)

…… (your name).

REALISATION OF A TUTOR'S INTENTION IN A RULE-REGULATED E-LEARNING SYSTEM

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Introduction

Polish Virtual University has been organising online studies for four years on an Internet educational platform. The educational system developed in PVU is supported by the two pillars – self-study and communication. To facilitate students' learning independence, with the support of subject matter experts, PVU instructional designers create a set of learning materials – an e-book, and structure a full online course package available on our Internet platform. The success of didactic process depends to the largest extent on active participation of a tutor. Tutor's most important responsibilities include monitoring students' activity, support, help, evaluation of students' works, etc. Tutor's active participation promotes students' engagement and thus is the key success factor of the effective communication and worthwhile, fruitful cooperation between tutor and students whose expectations and needs may be satisfactorily fulfilled in this way.

Tutor's competencies

For the tutors' tasks to be properly completed, he or she must display and put in practice a set of competencies. Subject matter knowledge, teaching experience resulting from prior periods of functioning in traditional educational environments and technological skills seem not to create sufficient conditions for effective online teaching. The research conducted in PVU shows that interpersonal competencies – interest shown in students' needs, patience, kindness, friendliness, benevolence and empathy – are much appreciated by the students, often higher than the level of demonstrated subject matter knowledge (Kwiatkowska, 2005). Another set of most desired online competencies is constituted by communication skills. Since online communication, defined more precisely as online contact sustained between students and a tutor, is realised solely by the use of language means, we believe it is crucial to discuss it in terms of sociolinguistics. We define communication competency as direct or unrealised knowledge of rules regulating language usage in different social circumstances within a given social group (Hymes, 1973). Educational virtual environment is exceptional in the sense that it has not developed any distinct and unique model of communication. In consequence tutors are required to identify new communication situations and attempt to employ adequate set of skills themselves, having practically no prescribed patterns at disposal. Very frequently mere relocation of the rules typical for traditional educational and academic environments fails. It must be emphasised that the educational institution bears gross of the responsibility for proper tutor training and making him/her aware of the characteristics of online collaboration and communication. Tutor support system which has evolved in PVU is two-folded. Initial phase of the training consists in distance learning methodology lecturing and a following simulated online course in which future tutors participate acting as students. After tutors commence their activity on the platform as online teachers, their actions are constantly monitored by a team of PVU supervisors whose job is to monitor, support, react in case of queries and problems arising. They also control and evaluate tutors' job.

When asked about most important duties of a tutor online we instantly think of student activating, students' activity monitoring, motivating, encouraging, providing support, etc. With a similar ease and confidence we will enumerate characteristics of a good teacher: responsible, flexible, engaged, supportive, caring, etc. However this may not be equally simple to say how to instruct tutors and what *actions* they should carry out on an Internet platform to become successful online teachers. Actions and acting is what we want to focus on in this article, leaving the discussion on the competencies at the background of the debate. We believe that the most efficient method of competency verification is via

observation of the action carried out by an agent. Didactic competencies – as outlined above – create a net of interdependences, they interchange and sometimes mix to form a unique package of subject matter knowledge combined with an ability of accurate language use and personal qualities such as being open, having sense of humour, ability to interact socially and form interpersonal bonds. Such versatility restrains us from creating a uniform, concise system of tutor competency verification. It appears to be a truly daring task. These findings made us turn to a different standpoint. We carry conviction that online teaching and learning practice should be viewed as a game in the sense of intentional and rule regulated behaviour.

Rules in e-learning

The source of inspiration for e-learning to be viewed from the perspective of the theory of action is John R. Searle's philosophy (1970). Searle, widely known as an author of the Chinese room argument, distinguishes between two kinds of rules: *regulative* and *constitutive*. The former regulate antecendently or independently existent forms of behaviour, e.g. crossing the street while green light is on and stopping at the red light is an example of an antecendent behaviour regulated by a regulative rule. The same applies to interpersonal relationships regulated by etiquette rules, e.g. eating fish with two forks in Poland. On the other hand constitutive rules regulate behaviour and they also create conditions for certain behaviours to be plausible. A good example is a football game – while eating fish with a spoon is still 'eating fish', football played without a ball cannot be considered 'playing football'. Regulative rules regulate a behaviour which existed before the rule was formulated and the behaviour is logically independent from the rule or rules. Constitutive rules constitute and regulate behaviour whose existence logically depends on the rules.

Since we have decided that online teaching is a game, we now have to determine what sorts of rules regulate this game. Are these regulative or constitutive rules? To illustrate the game-like nature of online behaviour, we would like to focus on tutor's role in online forum discussions as they are conducted in the PVU teaching system. We will point out certain rules regulating these discussions.

It is a prime responsibility of a tutor to initiate a discussion at the time defined in a course schedule. To initiate a discussion equals practically publishing first posts on forum in order to present a problem or ask questions in such a way that students feel encouraged and obliged to join and participate. The discussion should develop smoothly moderated volitionally by a tutor and with active and conscious participation of all students. The discussion is supposed to be wrapped up, summarised, solutions should be formulated, conclusions drawn and thus prescribed aims achieved.

We assume that the students' needs are fulfilled and they acquire new skills and knowledge in the course of a purposeful guided discussion, providing it is conducted according to the rules described above. If we were to use the metaphor of a game again, we would possibly call the tutor 'a captain' of the team who leads the team to the victory (didactic goals achievement) consequently and according to a pre-planned strategy.

The best method of identifying a rule seems to be showing an example of its violation. What happens with the discussion on forum if its rules are violated? If the tutor introduces himself or herself to the students and appears first on forum, but does not pose any questions or does not reveal objectives to the students – no real discussion develops. If he or she poses question, but will not show any interest in students' answers, will not comment upon them, will not motivate nor encourage, the result of the forum activity will constitute a set of 'answers to a question' rather than a real discussion! Once more we may compare this to a situation of a ball thrown in the crowd of people walking in a street – the ball will roll down, will probably be kicked a few times by a casual passer-by, maybe a kid will intentionally kick it towards an imagined goal line, but by no means this will be football… This analogy leads us to a conviction that teaching online is not only regulated, but it definitely regulated by constitutive rules. Hence ignoring or violation of these rules results in absence of behaviour which we would call a forum discussion. This observation applies to the broad scope of all online actions and behaviours of both tutors and students.

Formulating the rules remains within the scope of responsibilities of an educational institution. In our case this is PVU defining the time frames of a course and its composing modules. All tasks and types of assignments (essays to be written, group projects, tests etc.) are also designed prior to the course

starting point. It is also known right at the start of a course how many points students may earn for each submitted task. Students know what are the long-term goals of the course and why they have to participate in it. Tutor on the other hand, receives a detailed instruction and a list of tasks to be performed. The tutor's tasks are formulated by the instructional designers and lie at the basis of the support and monitoring system.

Even though the system constrains the tutor to a certain extent, it does not make him/her absolutely dependent on the system – if it was so, the tutor would not need to participate in a course at all. The most grave tutor's tasks comprise forum discussion moderation. Here the tutor acts with the greatest freedom, but also takes all the responsibility for the proper completion of this task. He/she must design, organise, predict and manage all forum posts according to a plan he or she should administer first.

Intentional behaviour

It may seem trivial to say that a teacher must be aware of his or her specific action goals. It is a critical factor for the teaching strategy to prove successful. In a traditional education situation teacher takes the responsibility for the realisation of the didactic plan and is aware of his/her role in the academic system. Teacher usually realises long-term goals in the way he/she believes is best for the students, at the same time being supported by the institution. These long-term goals are defined by the institution and in most cases do not differ much.

Tutor who faces the challenge to act in an online educational environment must reorganise his or her goals and prepare for the new tasks. It is a new didactic situation in which tutor must redefine his/her position. Experience proves that it is often the case for the tutors not to be able to clarify goals of certain individual actions and behaviours, especially while referring to short-term goals. It is absolutely necessary for the tutor to reconsider his/her position in relation to the student – tutor's primary task is not knowledge transfer anymore, but guiding and facilitating student's performance in the workspace of an e-course. The practice of online teaching shows that automatic transition to a new medium is impossible – tutor must make a conscious effort of breaking mental limitations and redefining his/her function.

It seems to be equally important for the tutor to be aware of what the goals are of a forum discussion conducted as awareness of the long-term goal which is knowledge and skill development. The question is: does the tutor consciously realise the objectives of all the tasks he/she completes? Does he/she know why the educational institution wants them to meet students on forum or chat? However trivial, answering these questions seems to be of fundamental importance. If the tutor completes the tasks assigned automatically and does not consciously control the effect of individual actions and, what is worse, does not care about it, then his/her actions do not bear any features of intentional behaviour. According to Searle (1984) human behaviour is marked by the two components: mental and physical. The former refers to an intention one has while performing certain actions. This division may be exemplified by a separation of the two factors. Searle refers to the neurophysiologic experiments performed by Wilder Penfield from Montreal who was able to evoke limb movements in patients whose certain brain areas were artificially stimulated. Patients were surprised to observe their arms or legs moving without their intention and usually said to the doctor: 'It wasn't me. It is you who did it.' This may be perceived as a simplification, but we find in that experiment a close analogy to the situation of a tutor functioning in an online virtual realms.

We observe tutors performing certain actions (e.g. placing posts on forum), but this behaviour is nothing but realisation of the course instructional designers' will. Tutor himself or herself does not intentionally make this 'movement'. While analysing such practices, tutors often claim they do what is expected of them – namely place posts on forum at the start of a given module or send e-mails to students containing certain information. Again coming back to the football metaphor, we may say that tutor is placed on the pitch and being told to kick the ball, he/she does it, but has no knowledge of the objective or rules of the game. It may happen that with a beginner's luck he/she scores points, but this would never be a first league player's method!

We are aware that we may possibly be trapped – it is absolutely necessary for an e-course to be organised and scheduled according to certain rules. Constitutive rules constitute the course itself and regulate its conduct. The tutor on the other hand, except from being precisely instructed and informed

about the tasks which must be completed, should also develop deep awareness of the online teaching-learning process goals.

From theory to practice

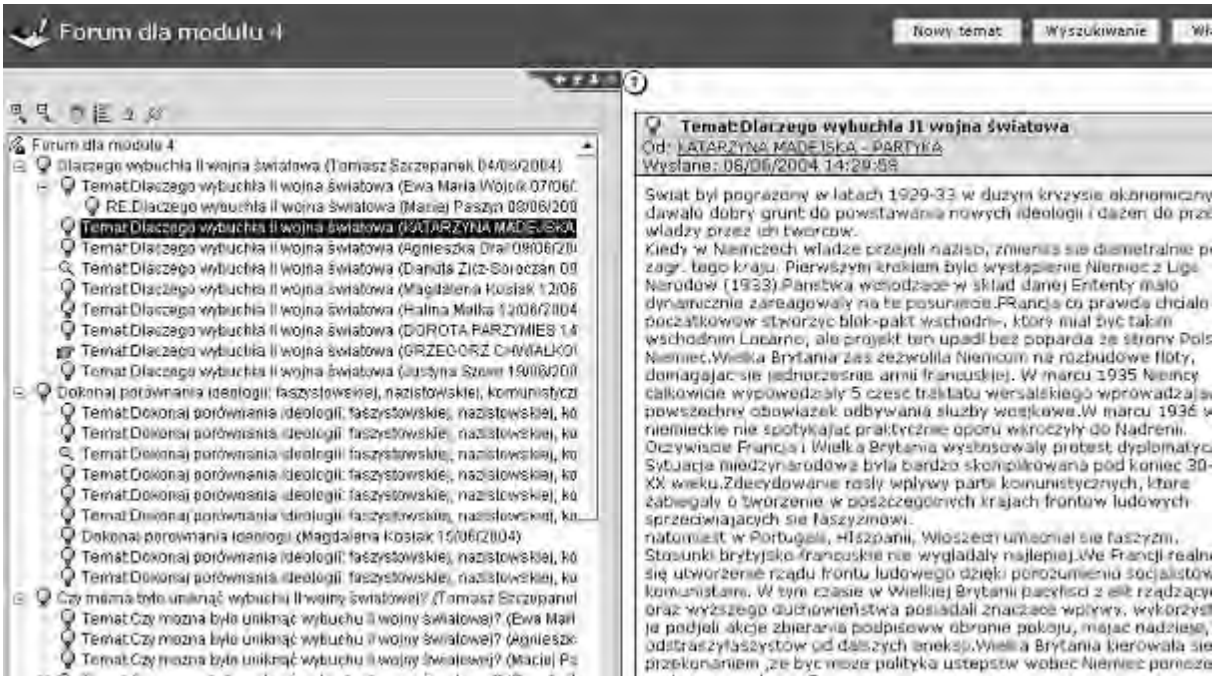

Figure 1.

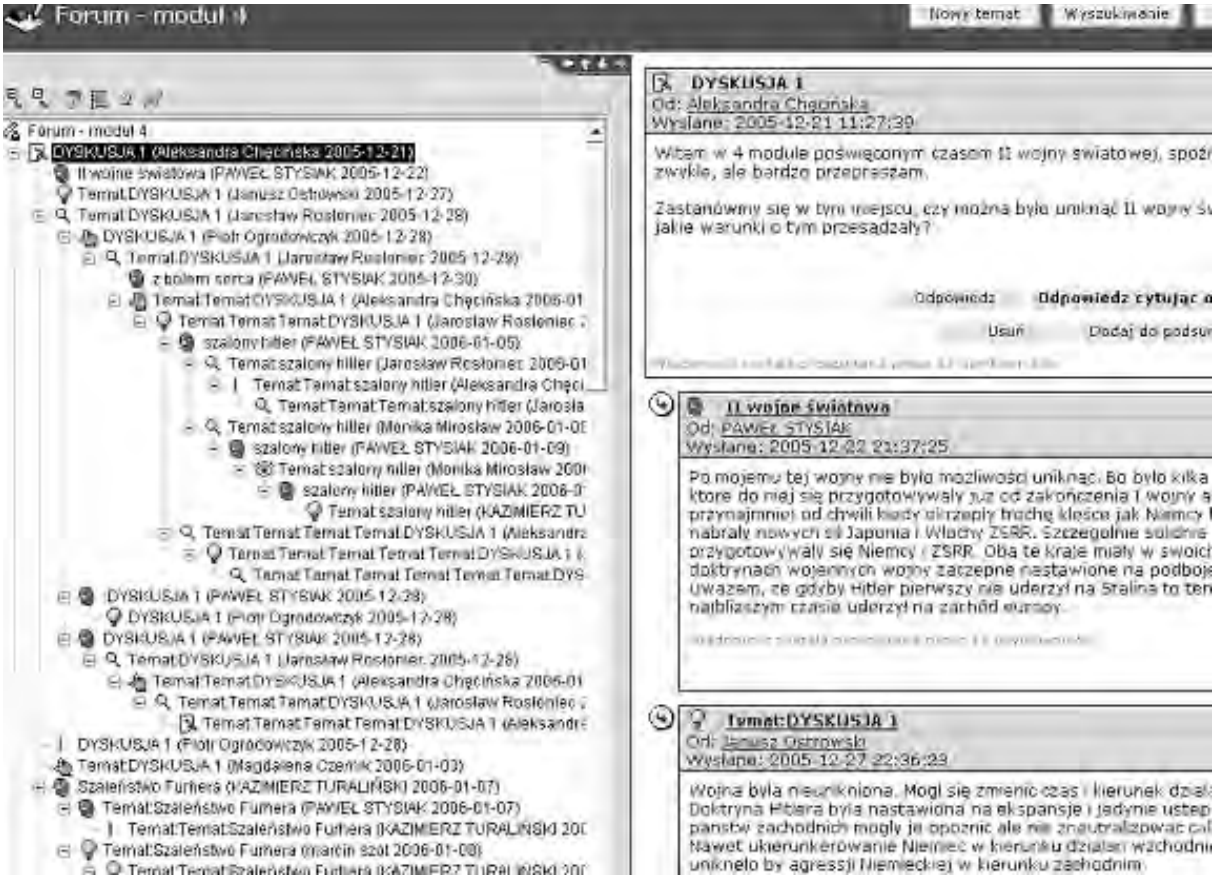

Figure 2.

The two screen prints above present excerpts from two discussion forums of one of Polish Virtual University e-courses – History of the 20th century. The first was organised in summer semester 2003/2004 and the second finished in January 2006. The courses were tutored by different teachers. From the very organisation of the forum we may conclude that the tutors conducted discussions having in mind different objectives. Intention of the first seemed to be making students answer the specific questions posted on the first day of the module 4 week. Students were probably not clearly instructed to comment or refer to each other's posts. Their posts create a collection of answers to one question and some of them bear features of plagiarism. These instances seemed not to bother the tutor who did not participate in the discussion himself and limited contribution to a few individual posts.

The other forum is better organized by the tutor whose idea is to guide students and facilitate their mental activity in the field of politics of the pre-war Europe. The tutor made a conscious effort to create a lively discussion, nesting topics and commenting on students' posts instantly. The discussion itself develops in different directions and numerous threads are concurrently expanding. The number of posts is huge, however they are not all displayed in the screenshot and the discussion ends with a wrapping-up summarising post of the tutor in which she emphasises the most important points and provides students with valuable feedback. One more thing worth highlighting is the choice of icons and differences in topic wording. All participants decided consciously to title their posts and accentuate author's attitude with a distinct icon.

In both cases the tutors used the same material – topics were prepared by the course author and PVU instructional designers. However, only in case of the second discussion it is possible to recognise a situation of a successful communication process taking place when the tutor is able to build up a discourse defined as a *communicative event* in which participants use language means to exchange ideas and opinions (van Dijk, 1998). In case of the first forum, the tutor's behaviour results in a communicative failure. Students are not informed about the tutor's intentions or, more precisely, he does not undertake any intentional actions – he acts unintentionally and unvolitionally. All he does is a mere completion of the institution-defined tutor's tasks – he introduces the questions on forum, but does not initiate any dialogue, does not reveal the goal of the discussion to be achieved. Students do not know what they have to discuss for, so they disengage themselves from the obligation. Consequences of such behaviour – except for a failed or 'non-existent' discussion – may be grave. According to S. Blum-Kulka (1998) similar communication failures may result in the production of negative stereotypes which further influence the groups mutual relationship. There appears a danger that a tutor acquires conviction of his actions becoming futile due to the latency of the students. Students will be viewed as lazy, unwilling or even hostile. Tutor on the other hand may be regarded as passive, disinterested and unresponsive. Such conceptions, if reinforced by subsequent experiences of the same kind, promote negative picture of distance education in general. Students lack face-to-face contact with a teacher (direct proof of the teacher's presence) and the tutor becomes an advocate of the opinion that online teaching and learning is a sheer fiction.

Conclusions

While debating about intentional behaviour online, we must stress the need to take responsibility of every movement and each decision made by a tutor in the course of teaching process as it is performed on the PVU Internet platform. On one hand, the tutor's freedom is restricted by the institution and the rigid rules it dictates, on the other hand, the tutor is required to take conscious steps towards identification and realisation of students expectations which may differ from group to group. Tutors are trained, instructed and then monitored by PVU supervisors, but the teaching job is undoubtfully done by them. These are tutors who have to think and constantly rethink their role in the online educational system, it is them who consciously and frequently intuitively recognise their students' needs, they decide about the best communication method to employ while working with a given group of students, they choose the best techniques of conducting online discussions – still they have to stick to the regulations, platform constrains, course scheduled deadlines and complete all the tasks. It is a challenging and demanding job and there are not many people who are included in the group of, what we call them in PVU, 'online tutor stars'.

The process of acquiring and developing online tutoring skills resembles constant pursuit for the golden mean – finding a delicate balance between tutor's freedom and institution induced formal regulation – this is how we understand the idea of online flexibility.

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CONTENT TEACHABILITY OF DIGITAL LEARNING MATERIALS IN HIGHER ENGINEERING EDUCATION

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Introduction

As early as twenty years ago Shulman[1] criticized that cognitive psychology – predecessor of constructivism – has missed subject matters and perspectives of teacher. He called that "missing paradigm". This is also evident in state-of-the-art socio-constructivist e-learning and pedagogical usability research where the focus is strongly on collective learning processes. In my research-teacher's viewpoint is chosen deliberately to complement the current interface analysis which is mainly learner and user-centered. I will give voice for engineering teachers to analyse and evaluate the actual development and use of their digital learning materials from discipline-specific viewpoint. In the study I am exploring *content teachability*[2] as a phenomenon, concept and as a method, because in spite of the active development[3] of digital learning materials, there may not be much research about the actual use of these[4]. In short, content teachability means efficiency of the network-based teaching material contents from teacher's viewpoint.

The theoretical framework is based on the multidisciplinary MOMENTS – metamodel for future education[5]. Central ideas in the model are the insight of teaching-studying-learning process and the idea of network-based education (NBE), a symbiotic combination of face-to-face and net-based teaching. The viewpoint of teacher's pedagogical thinking[6] is also related to the model. The theoretical framework is based also on the idea of technological pedagogical content knowledge[7] which refers to the teachers' deep understanding and knowing what to teach and how with technologies.

This paper is related to my doctoral dissertation study which is a part of KASVA – graduate school 2003-2006 at Finnish Academy. The study is related to the scientific discourse in engineering pedagogy, educational sciences, media education and partly in usability engineering.

Theoretical framework

Philosophical tradition of teachability

The concept *teachability* has its diverse and even disunited traditions in educational sciences. It is originally a philosophical term which has referred to the awareness and reflectivity of the teachers as well as to the students' responsive ability for pedagogical interaction. Tubbs[8] have analysed teachability as a teacher's self-critical activity within postmodern pedagogy from a speculative viewpoint. He argues that modern subjective freedom is an illusion because there is often uncritical acceptance on that the teacher should be mediated by a process of reflection where the teacher is learning from other viewpoint than his own. This has been especially evident in network-based education because the online teacher's role has often been considered as a reflective co-learner[9].

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[1] Shulman 1986

[2] Karevaara 2005, Ruokamo & Tella 2005, Tubbs 2003, Scardamalia & Bereiter 1984

[3] e.g. Höhne 2003, Maclaren 2004

[4] Lakkala & Paavola 2004

[5] Ruokamo & Tella 2005

[6] Kansanen *et al.* 2000, 23-26

[7] Koehler & Mishra 2005, 2, 11-18, Viiri 2003

[8] Tubbs 2003, 75-77, 75, 80, 90

[9] e.g. Syvänen & Nokelainen 2004, Niederhauser & Stoddart 2001

However, the reflection process Tubbs prefers, is closer to the self-critical activity, which is like teachers' pedagogical thinking presented by Kansanen *et al.* where teachers' personal pedagogical awareness and purposiveness are central. Self-critical activity relates also the teachers' metacognition[10]. Tubbs continues – paraphrasing to Nietzsche and Hegel – that we may distribute ourselves as teachers and learners more tightly than the reflective models currently available suggest. He argues that educational theory too often seeks ingenious suggestions what education should be. In network-based education this can be seen as fragmented criteria lists[11] of what quality network-based education should be. Tubbs summarises that the purpose of speculative critique is to reveal what education already is and that teachability requires only a comprehension what teachers already are. This kind of revealing and comprehension is typical in the widely applied CESI – model by Nonaka & Takeuchi[12] where internal expertise and comprehension – tacit knowledge – is made visible in the collaborative knowledge creation process. In this research this means that engineering teachers' expert knowledge becomes externalised in the development and use of digital learning materials. So far, the expert knowledge construction process of university-teachers has been rather unknown area, especially in the field of network-based education.

Based on these arguments in network-based education teachers should be seen as self-critical experts of their own fields. Hegelian tradition will perhaps give more voice for teachers and a comprehensive framework to plan and implement network-based education than the postmodern tradition solely. This conclusion will lead us to the target of this study, to the phenomenon, concept and method of content teachability.

Technological pedagogical content knowledge and content teachability

The roots of content teachability are referring to the *structure of knowledge*[13] which includes the theories, principles, and concepts of a particular discipline which teachers must master. Shulman[14] has developed further this structure towards to the concept of *pedagogical content knowledge*[15], addressing to questions like how subject matter is transformed from the knowledge of the teacher into the content of instruction. In modern education the concept is even more complex because teaching requires an understanding how technology relates to the pedagogy and content.[16] Mishra *et al.* have therefore extended the concept to *technological pedagogical content knowledge*. They argue that thoughtful, pedagogical uses of technology require the development of a complex, situated form of knowledge. They propose that context neutral approaches are likely to fail because they overemphasize technology skills ('T' in the model). According to them knowing how to use technology is not the same as knowing how to teach with it without developing technological pedagogical content knowledge.

Content teachability can be considered as a pragmatic and visible form of technological pedagogical content knowledge. Content teachability relates more to the actual materials and teachers' use and development of these. Therefore content teachability analysis is partly related to pedagogical usability[17] and usability engineering.

Content teachability and its relations to usability engineering

Content teachability is related to pedagogical usability but the relationship is complex. Intensified, but clarifying explanation is that usability aspects are closer to the students because they are the actual users of the contents. Content teachability is therefore teacher's aspect in same continuum, but in the other end point of usability. Indeed, one might argue that good teachability of the contents is a prerequisite for good *studiability*.

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[10] Scardamalia & Bereiter 1984, 180

[11] e.g. Frydenberg 2002

[12] Nonaka & Takeuchi 1995; CESI-model is widely applied in network-based education

[13] Bruner 1966

[14] Shulman 1986, Viiri 2003; engineering teachers' pedagogical content knowledge

[15] Jauhiainen 2005; students' conceptual understanding in relation to teachers' pedagogical content knowledge

[16] Kukulska-Hulme *et al.* 2004, Hughes, in press, Zhao 2003, Hein & Kairamo 2000

[17] Melis *et al.* 2003

The nature of pedagogical usability[18] is also rather unclear. Criteria for pedagogical usability can be described for example as for example learner control, cooperative learning, goal orientation and added value[19]. These aspects may sound pedagogical and close to teacher's pragmatic work. However, pedagogical usability criteria like these, indeed, are often focusing on the aspects whether the interface and the tasks of the e-learning environments support learning. Pedagogical usability has therefore still its roots deeply in usability engineering which has stable characteristics and own traditions in interface design analysis, e.g. in developing integrated e-learning platforms[20]. Classic usability requirements for the interface design are: easy to learn, efficient to use, easy to remember, few errors and subjectively pleasing[21].

To draw the focus from the interface closer to the pedagogical issues and contents, *adaptability*[22] may serve better. Adaptability in this study will replace pedagogical usability because according Ruokamo & Tella[23] adaptability is not confined to the enhancement of user interfaces but rather is a means of facilitating the teaching-studying-learning process. They argue that adaptability can be seen as a general approach for improving the usability of digital learning materials. (Ruokamo *et al.* 2005, 7-9) Content teachability is thereafter a sub-concept for adaptability. Adaptability is also quite close to the *academic usability*[24] because it deals with aspects such as pedagogical strategies.

To summarise, content teachability is related to usability research but the starting point and framework is primarily pedagogical. Usability aspects are analysed only when necessary.

Research aim and research problems

The purpose of this research is to study content teachability of digital learning material contents in higher engineering education. The research is based on analysing teachers' conceptions about development and use of the contents in authentic educational settings. Research questions are in three themes: 1) pedagogical design, 2) teachability in action and 3) genre of contents. The objective is therefore to:

- Chart what the pedagogical and didactical problems are, which are tried to solve with certain technologies
- Interpret what kind of interventions different techniques and technologies will create, enable and effect
- Describe and analyse how technologies have enhanced the contents and how teachable these contents are
- Analyse how these contents are created and describe the development process
- Understand which tools are relevant and pleasant to use from technical and pedagogical viewpoint and how thesetools suit to different situations
- Analyse the genre of digital learning material contents

Research methodology

Research strategy is qualitative with mixed methods including qualitative and quantitative sources. Research design is phenomenographic case study. Target is the teaching staff at the Helsinki University of Technology (HUT). Sample collection (N=10) is conducted with selection of the "early innovators". The main method in data collection is semi-structured interview. Methods for data analysis include e.g. content analysis.

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[18] Silius & Tervakari 2003, Silander 2004

[19] Syvänen & Nokelainen 2004

[20] e.g. Mioduser *et al*. 2000, Pedersen *et al.* 2002

[21] Nielsen 2000

[22] Hanisch & Straßer 2003

[23] Ruokamo & Tella 2005

[24] Kukulska-Hulme & Shields 2004

In order to get a comprehensive – scientific as well as and pragmatic – understanding of content teachability as a phenomenon, concept and as a method, the nature of the digital learning materials must be studied. Digital learning material contents can be considered as a literacy genre[25] and therefore complementary method in this study is genre analysis of the digital learning materials (N=10). Characteristics of the genre will become visible in the pedagogical use of the materials, but many of the characteristics may still be unknown. The focus in genre analysis is especially in disciplinary structures of the contents because contents cannot be taught successfully if the student has not learned to produce structures belonging to the previous stage[26]. Because the genre of network-based teaching materials is not uniform (e.g. architecture versus mechanical engineering), the focus is also in exploring the discipline-specific characters of the contents and possibilities that the network may offer.

Other additional methods for triangulation to improve validity and reliability are participatory observations (N=2) and comparative analyses for the contents (N=2, Aalborg University, Denmark, MIT OpenCourseWare/USA).

Expected outcomes

The pragmatic importance of the study is in producing information how to develop teachable digital learning material contents and how to use efficiently these contents in higher engineering network-based education. For this purpose, I will develop pedagogical models based on the research results. Pedagogical models are tailored to the needs of engineering teachers but may be applied in other university pedagogy. Models will support in planning, developing and using network-based teaching materials more efficiently in engineering sciences. These models can be introduced, used, tested and developed in several forms of in-service training of engineering teachers.

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COLLABORATIVE AND AUTONOMOUS LEARNING AND ORGANIZATIONAL SYMBOLISM

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Shiho Mochizuki, NPO Institute for Learning Development, Japan

1. Introduction

Constant increase of students and enlargement of class-size in universities requires entirely new mode of instruction to accommodate ever increasing and diversifying students. On the other hand, drastic development of information and communication technology enables us to foresee possibilities of a new style of instruction covering from primary to higher education, or lifelong learning in a coming society. If we follow a traditional framework of teaching, the cost of education per student shoots up, hampers the satisfactory education and even force universities bankrupt. Shift from teaching to collaborative and autonomous learning is indispensable for the future development of higher education in the comprehensive framework of lifelong learning society. In such perspectives, however, autonomous learning is easy to say, but difficult to design and also too complex to accommodating learners' diverse needs. We have proposed a framework of instructional designing in the previous report titled of 'Metaphor, Image, Model and Proposition for Designing Autonomous Learning' (Nishinosono *et al.,* 2005), in which four procedures are suggested as illustrated in Figure 1:

1. starting from educational norms, proceeding to practical syllogism and reaching actions, or voluntarism action theory;
2. application of scientific findings such as psychology, cognitive science and so on;
3. learning from other instructional expertise or educational practitioners, and
4. intuitive and creative ideas and its realization.

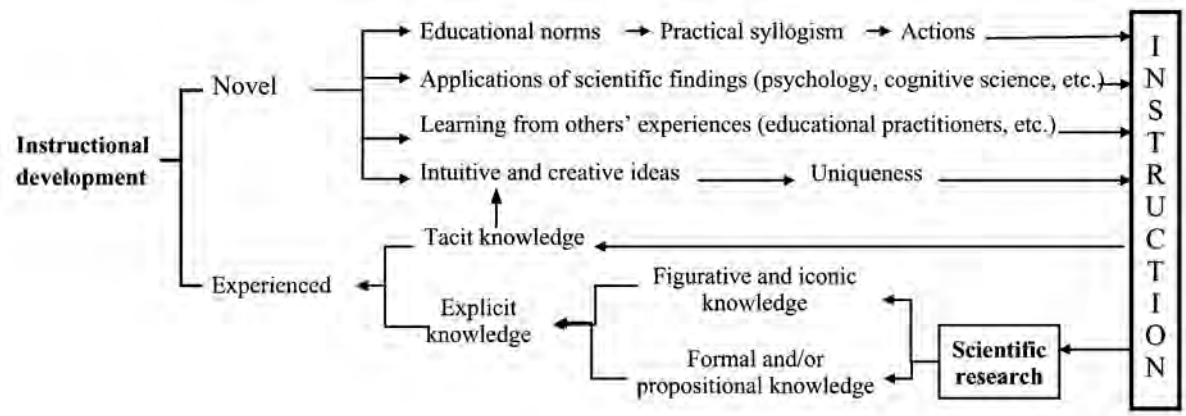

Figure 1. Empirical Approaches for Learning Development

In the practical works in uncertain and rapidly changing circumstances, it is very difficult to start from ethical norms persuasive to diverse youngsters. This approach has been traditionally taken in academic institutes such as schools, university, churches and other formal educational establishment, but does not approve effective for solving problems in the changing and diversifying society. In the second procedure of applying scientific findings to real problems, we cannot wait such findings before solving urgent problems existing just in front of us. At present, behavioral science, cognitive science and social cognitive science are expected effective to develop instruction, but real instructional problems are too complex and difficult to be dealt merely with scientific findings. In the third procedure of traditional apprenticeship systems, personal and intimate contacts with experienced teachers and other professionals were most effective way of transmitting expertise from one generation to another. However, such close contacts are disappearing in schools and faculties due to overloaded works and scarcity of flexible time in dairy workplace.

At the same time, the Internet is providing new communication opportunities among all stakeholders involved in education. Personal intuitive and creative ideas can be circulated among professionals and scrutinized through practical instruction and scientific investigation. This expert knowledge of instruction needs new media for expressing tacit knowledge, describing original ideas and conveying innovative pedagogy among instructional professionals. One possibility of such media is to enlarge our communication media from language oriented descriptions to symbolic expressions including iconic, figurative as well as linguistic notations.

2. From Practices to Generalized Technology

2.1 Learner-centered Instruction

In the conventional procedure of instructional designing, we usually start from a specific theory to practical development of instruction. Programmed instruction follows behaviorism science and inquiry learning does cognitive science and/or social cognitive science. However practical lessons in classrooms are too complicated and diversified to follow one specific theory. Our presumption of instructional designing is to transform lessons from teacher-led ones to student-centered collaborative and autonomous learning. We started our instruction from empirical development in 1999 and repeatedly revised it through systematic analysis by using a variety of symbolic representations for instructional designing: iconic symbols, cartoons, graphics, pictures and so on. Iconic symbols and figurative representations are widely used in the fields of electric engineering, mechanical engineering, chemical engineering, architectural engineering and so on.

We designed a course 'Introduction of Instructional Technology' of which number of students attended in a classroom varied from 90 to 280 during last seven years. We kept the strategy of designing collaborative and autonomous learning, in spite of the students' confusions and embarrassment at the initial stage. Through repeated revisions of instructional materials utilized in the successive lessons, generalized procedures and techniques have been recognized and critically scrutinized by the authors. From this empirical approach in the framework of Figure 2, the following five steps and two hypotheses are proposed for instructional design in ubiquitous learning society.

1. Sharable vision
2. Metaphor and/or analogy
3. Image
4. Model
5. Proposition

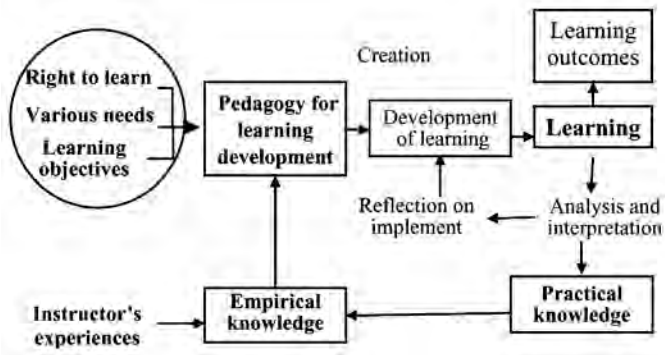

Figure 2. Framework for Learner-centered Instruction

Working hypothesis 1: If we succeed in making learners' internal conditions satisfactory such as meaning, intention, necessity of learning and preparing collaborative atmosphere, they can overcome difficulties of external conditions and work hard autonomously.

Working hypothesis 2: Experiences with instruction are accumulated tacitly as well as explicitly, of which explicit knowledge can be described in a set of iconic and/or figurative representations and formal propositions to be easily communicated among instructional professionals.

From these steps and hypotheses, generalized techniques and rational sequential procedure for designing the collaborative and autonomous learning in ubiquitous ICT environment emerged and gave us confidence of revising the instruction systematically.

2.2 Learning Theme and Assessment Scheme

From our last seven years' experiences, the learning theme is critical for realizing the collaborative and autonomous learning. The instruction was carried out by team learning as well as integration of teamwork and personal work. Learning themes should be sharable and understandable among all participating students and meaningful to them. They should have common knowledge or none of relevant information to start equally. If a part of team members are well familiar with learning theme and others are ignorant, it is very difficult to manage effective learning by active participation.

Learning theme: Each team should propose a plan of ideal school (hopefully in 2020) and develop lesson plan to instruct a basic subject such as arithmetic or national language.

The assessment scheme is another critical factor for realizing collaborative and autonomous learning. Present students are evaluated by teachers or instructors and very passive to learn autonomously. We have to change their perceptions of learning. At the early stage of lesson, the whole assessment scheme is disclosed to participants and explained in detail. Table 1 shows the allocation of score to each item. In the Japanese system, full score is always 100 points and over 60 points is passable.

Table 1: Score allocation to each item

	Score
Attendance in the course	20
Quantity of report(more than 10 pages)	20
Quality of report	30
Teamwork competency (mutual evaluation)	20
Openness of learning outcomes on the Web	5
Instructor's adjustment	-5~+5
Total score	100

Regarding the qualitative evaluation of reports, all students are required to declare one level out of four according to their self-evaluation of which criteria for judgement is given and explained in the course. At the end of course students submit their reports with a declaration of level. Instructors divide the reports into four categories according to students' declaration and adjust the declared level and categorize into one of seven levels. These procedures are shown in Figure 3 and open to students. When we show them clear criteria, students can judge their levels quite reasonably. At the same time, they are required to assure the quality of learning outcomes. The disclosure of assessment scheme is also very effective to enhance autonomous learning.

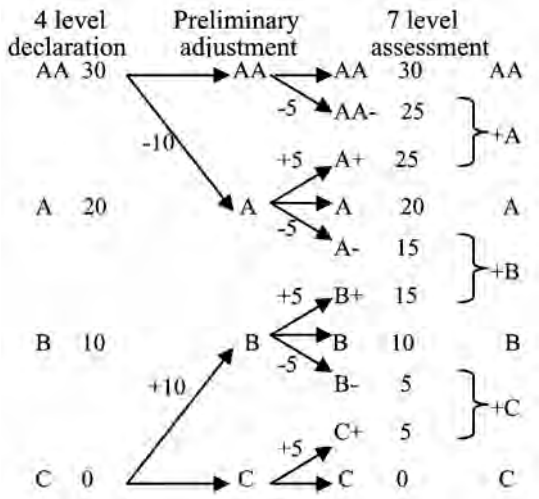

Figure 3. Level Declaration and Assessment

2.3 Pedagogy for Instructional Design of Learning in a Ubiquitous ICT Society

The above-mentioned learning theme and assessment scheme were ambiguous at the initial stage, but gradually clarified by repeating revisions. It is difficult to decide which part of the designing procedure comes first. In spite of such changeable process, we reflect always to learning theme, tangible outcomes and assessment schemes for effective instructional designing. Metaphors, images and models are very effective to express tacit knowledge, share ideas, modify them and communicate each other among those involved in the instructional designing and its execution. The following items are specifically developed for a course 'Introduction of Instructional Technology' and applied for developing instructions for two classes accommodating more than 400 students in total with two instructors and one teaching assistant working collaboratively.

- Sharable vision: the above-mentioned learning theme for common understanding of goal.
- Metaphor and/or analogy: brewery technology for student's personal development and three different types of paragliders: always falling down parachute, slowly descending square-shape paraglider and freely flying modern paragrider for describing the failure and success of team learning.

- Image: graphic representation using PowerPoint.
- Model: a template for generating more concrete learning events; MACETO representing Meaning, Action, Contents, Environment, Tools and Outcomes.
- Proposition: judgmental propositions expressing instructor's experiences and procedure of clarifying tacit knowledge to the formal explicit knowledge.

This technology has been developed along repeated revisions of instructional practices.

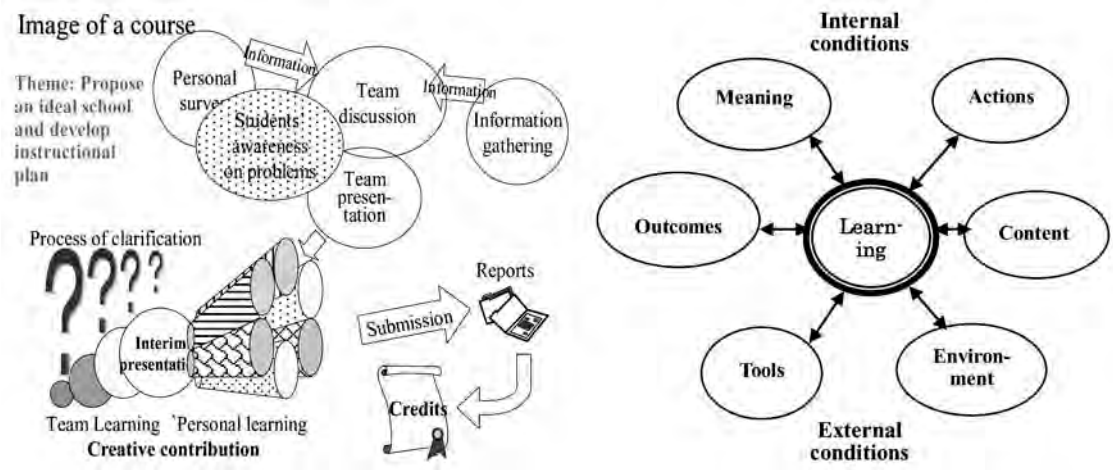

Figure 4. Image of a Course and MACETO Model for Instructional designing

3. Organizational Symbolism as Theoretical Framework

Problems in education are getting more and more complex and interrelated. Recent problems are not solved by unilateral application of research findings and educators' personal efforts. Teamwork is dispensable to tackle such complex problems, overcome individualistic and isolated professionals in the present school and enhance collaboration at the workplace. Systematic approaches should encourage teachers and all stakeholders in education to collaborate and stimulate educational activities to integrate different worldviews. They require more comprehensive and multi-dimensional reflections from the various expertise viewpoints. Experiences, tacit knowledge, intuitive ideas and creative discussion with colleagues are very effective way for finding appropriate solutions to the complex problems. One teacher cannot provide final solutions to these complex and changing circumstances and make students easy to work confidently.

Our research started from an empirical implementation of instruction for the large number of undergraduate students having diverse background and heterogeneous competences. These instructions were carried out twice a year for seven years since 1999. The research was a process of trial and error at the beginning and proceeded gradually to systematic analysis, interpretations and rational revisions. During these repeated improvements, we needed a theoretical framework for effective development and implementations. At the same time, we needed to investigate this discipline for a teaching subject in the graduate course. In-service teacher education requires us to explore theoretical framework suitable to their daily works and easy to apply to complicated instructions. The theory of symbolism seems to be appropriate to our requirement. The symbol here includes any sign, picture, figure, graphics, illustration, aural language as well as written language. The organizational symbolism covers a very wide range from behaviorism to hermeneutics and to phenomenology. Objectivity and subjectivity in this theory are not dichotomy, but two extreme ends on one axis. It provides a framework to interpret the culture of any organization such as class, school, institution, community and so on. The theory and techniques in qualitative analysis are now developing very fast. They provide tools to analyze and interpret instructional processes as well as learning outcomes qualitatively. These theories are very promising for solving the complex problems that reflect the diverse backgrounds of instructors and students. Thus we started our instructional development from tackling with dairy instruction, proceeded to systematic revisions, and finally to a theoretical framework to make teamwork collaborative and efficient.

Conclusion

The instructional design for collaborative and autonomous learning equipped with ubiquitous ICT is entirely different from the conventional instruction, in which we start from specification of instructional objectives, proceed to its development and evaluate the outcomes at the end of instruction. On the other hand, instructional design for collaborative and autonomous learning starts from learners' 'Right to Learn', their needs and learning objectives. Every learner should have a clear foresight on his/her goal, competences of making a plan of learning and collaborative communities with colleagues. The assessment scheme should be disclosed for them to make a plan of autonomous learning more effective.

Pedagogy for instructional development in ubiquitous ICT society requires a new instructional technology for eliciting tacit knowledge from educational expertise and expressing them as explicit knowledge for circulating among professionals through the World Wide Web. From this viewpoint, the following five steps have been applied and proved effective for instructional design in ubiquitous learning settings; (1) Sharable vision, (2) Metaphor and/or analogy, (3) Image, (4) Model and (5) Proposition.

Two following hypothesis have emerged from our experiences and seem indispensable for developing collaborative and autonomous learning.

Working hypothesis 1: If we succeed in making learners' internal conditions satisfactory such as meaning, intention, necessity of learning and preparing collaborative atmosphere, they can overcome difficulties of external conditions and work hard autonomously.

Working hypothesis 2: Experiences with instruction are accumulated tacitly as well as explicitly, of which explicit knowledge can be described in a set of iconic and/or figurative representations and formal propositions to be easily communicated among instructional professionals.

From our experiences, we conclude that the organizational symbolism can be a theoretical framework suitable to develop a universal collaborative and autonomous learning in ubiquitous ICT society.

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COMMUNITIES OF PRACTICES: LEVERAGING THE TACIT KNOWLEDGE BY CROSS-POLLINATION

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Summary

This paper presents a very innovative way of using the Communities of Practice (CoP) concept to create a macro community, where knowledge and value of the knowledge does not only serve the community members, but the wider community. The concept is based on the community of practice theory, as defined by E. Wenger, and the cross pollination of ideas, concepts across the communities by using the peripheral members as the main vehicle. This concept enables more lively and knowledge rich communities.

What are Communities of Practices?

The concept of Communities of Practices has been promoted by Etienne Wenger in the early 1990's. According to Wenger, Communities of Practice are everywhere and we all belong to a number of them, whether it is in at work, around school, around local associations, around local/regional interest or in our hobbies. Some communities are more formal than other, and have a name and a governance structure.

Members of Communities of Practice are connected by their passion or their common interest either formally or informally – from formal meetings or workshops to informal chats. They have learnt how to work together, what and how to produce and how to operate.

Typically, Communities of Practice are formed around the following axis:

- the purpose of the community: why or what do they collaborate for. This purpose is not defined in stone at the start of the community, and will evolve over time. The revisions of the purpose will be renegotiated on a continuous way over time.
- the functioning or the governance model: how the community functions and how its members get recognized within the community. Typically, the community will choose its own value, whether it is meritocracy (the ones who contribute the more, or is more respected by other, or manages to define consensus), or it could also be the influence or the external recognition of some its member.
- the output of the community: what the community manages to produce over time, whether it is knowledge or informal links or documents or contribution towards its purpose, or ancillary purposes.

What is interesting here is that communities are self-forming, self-managed, self-organized, but they operate using a common operation mode, and all members are bound around the purpose, operating under a given (informally agreed) model, and produce outcomes that are valued by the members of the community.

The outcomes from Communities of Practice are multi-fold. Probably the main outcome is the community itself, the implicit connections, the bounding and the shared mission, objective and the common learning. The other outcomes are really dependant on the kind of communities and the purpose of these communities. I will focus mainly on communities that produce tacit knowledge around a product, a vision or a passion. These communities could be corporate, or communities formed around a concept or a platform, such as open source software communities.

The production from these communities is tacit knowledge and learning around specific topics. The quality of the knowledge produced is usually of very high standard and quality, because of the way Communities of Practice are organized.

Communities of Practice create value and learning through the knowledge they develop at their core and through interaction at their boundaries. The maximum potential and value of their outcome is when the core and the boundaries are active in complementary ways.

Organization of Communities of Practice

A community of practice is different from any business or functional unit within a corporation. The community defines itself, and the members develop the "what this community is really about". This purpose also may evolve over time, but in the same time is the understanding of the purpose of the community by all members. The expectation is that all members participate and collaborate to the community, but each member can contribute in different ways and to different degrees. The core members are expected to facilitate moderate and give authoritative viewpoints on given topics. The peripheral members usually participate and collaborate less that the core members, but they form the permeable periphery of the community, in which outsiders, new comers and lurkers can participate by bringing new subjects and ideas, different perspectives and input from outside the community.

Another key characteristic of CoP is that these are defined by the knowledge that is created by the community and the tasks to arrive at this outcome. The agenda is driven by the knowledge and the value this knowledge to the member of the community and not to by external schedule.

The community of practice is more that just relationships between members. It provides an identity for the community and its members, a community exists because it produces a shared practice as members engage in a collective process of learning.

Issues with Communities of Practice

In the context of building communities outside a corporate environment, there are several potential issues with the Communities of Practice. Some are listed here, and need to be taken into consideration before creating a community of communities.

- Languages: the language used by a community to create the knowledge and the learning may not allow this knowledge to be used and leveraged outside this community. This may not be an issue for the members, but this may not encourage other members to participate and contribute.
- Culture: in a corporate environment, the culture, vision and mission are, to a certain extent, common. It can therefore be assumed, that the members of the communities from these structure have at least a set of value and way of working that facilitates the interactions within Communities of Practice. In the case of open communities, the cultural difference may be an issue and members need to learn how to collaborate together.
- Size: the size may also be an issue, as even if the knowledge produced is valued by the community's members, the vitality of a community is dependant on the size of its core (as this is the creator of the knowledge). The number of peripheral participants can also be small, bringing therefore fewer new information or viewpoints. This lack of fresh input can also impact the vitality of the community and constrain the value and knowledge created by the community.
- Influence: this is mainly linked to the members and the influence of the core team, and the knowledge and its value produced by the community. The more influential a community or its core members, the more likely peripheral participants want to participate, the better its knowledge is disseminated outside the community.

Enabling the forming and the cross-fertilization of Communities of Practices

Typically, Communities of Practices are self forming and tend to appear in a random way. If the forming of these communities could be somewhat catalysed and enabled in a way that it can support a dissemination program, but also create the essence of a master community of practice around a wider and multi-disciplinary and multi-domain platform, the value of the outcome of this mega-community could be extraordinary.

This vision is to create the infrastructure that will, on one hand enable the forming of communities and on the second hand facilitate the peripheral members to participate in many communities. Even if members are more likely to identify themselves as members of a selected number of communities.

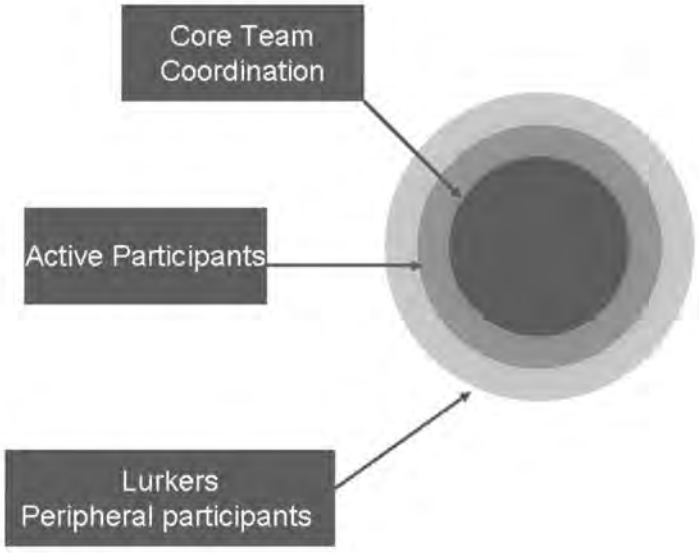
The enablement of Communities of Practice is mainly done by offering the technical infrastructure and the tools to allow the forming of the community. Typically, tools that allow treads, forums, blogs, wikis and knowledge repository management will help to establish a home for the community and for the founders to facilitate its governance and the functioning. These tools could easily be replaced by another infrastructure if chosen so by the community itself.

Providing a way for communities to register and share the purpose, the governance rules and the core teams and moderators to the world is the next steps. By doing this, communities can make their work and the knowledge they are providing accessible to other communities that have a similar interest. This will expose the tacit knowledge, topics and latest thoughts of the community.

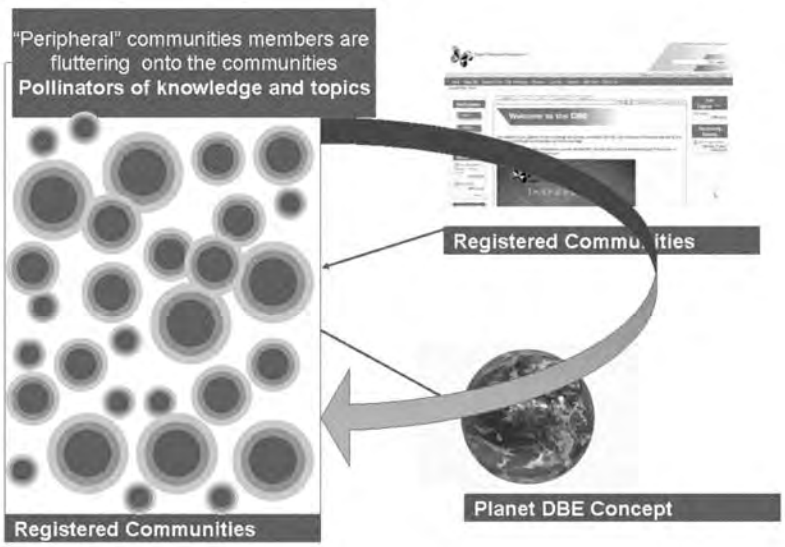
As the communities are known, it is also possible to syndicate the knowledge created into a planet that will aggregate the knowledge from several communities and allowing one access point to all this knowledge. It is also possible to syndicate the life of these communities, by retrieving and making available the next events, latest hot topics or posts, number of members, and other information related to the life of the community. This will show the vitality of the community.

Exposing the community governance, rules and core members, the work of the community and its vitality, will attract peripheral members to this community, as they will have an interest in a given topic or discussion, but also will feel confident that these community members can be trusted, and that this community is active and prolific. If we extend this concept to several hundreds of communities, several thousands of people interested, we are creating an environment that will encourage the fluttering of participants from one community to another, enabling then the cross-pollination of knowledge from one community to another and also bringing a sustained flow of new information, of new ideas and new peripheral members to each community. As the permeable periphery is feeding the core team with this fresh input of outside information, the outcome of the community itself is getting richer. And this is the start of a circle where value attracts new members that enable the creation of more value…

If this is the representation of a community



Here is what is created by the implementation of this concept



Practical example

This has been used as one of the main tools for the dissemination and proliferation program for a project called the Digital Business Ecosystem (DBE). In a nutshell, the Digital Ecosystem aims at contributing the Lisbon objectives, providing to small and micro enterprises [SMMEs] ICT applications and services which improve their efficiency, business integration and synergies within EU territories, but also enabling their integration of local value chains within the global market.

These applications and services are tailored on SMMEs local needs and are formed by the dynamic integration of several components, which are provided by different organisations scattered around Europe. In this way Europe industries will maintain and enlarge its knowledge and capacity to develop and to deploy ICT applications and services.

The digital ecosystem initiative has two target groups:

- SMMEs (of any business sector) which need customised ICT applications and services for improving their efficiency through process and organisation integration and for extending their business beyond local barriers;
- ICT-related organisations: system integrators, service providers, software component developers (with emphasis on open source communities and open systems developers) This goal is reached through the implementation of new paradigms which exploit the advantages of the EU economical structure (based on SMEs and on diversity and local identity), through the implementation of a network of digital ecosystems; which activate a virtuous circle.

This project presents a lot of challenges, as it is a pan-european project, is multi-disciplinary and covers several domains (from science, business, software, micro and macro economy). More information can be found on http://www.digital-ecosystem.org

COLLABORATIVE LEARNING THROUGH NETWORKING: IMPROVING PEDAGOGIC PROCESSES THROUGH COLLABORATIVE LEARNING IN LITERATURE

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Abstract

The Israeli Ministry of Education Culture and Sport attaches great importance to developing collaborative learning between pupils of different countries. Among the reasons for this is the development of pupils' ability to exchange cultural knowledge in the era of globalization as well as to communicate in English. Israel also wishes to develop learning models in conjunction with other countries, what may be applied in other educational projects between Israel and its Middle Eastern neighbours so as to enable dialogue between pupils in the region.

A model for collaborative learning in the field of literature was developed in order to implement the present project. The rationale behind the project is based on the belief that the study of literature can effectively open a window of opportunity for pupils to study other countries' cultures and identities as well as contribute to pupils' own identity construction and to their understanding the identity of others. ICT serves as a learning platform which transcends national boundaries and presents pupils with the opportunity to engage in the collaborative learning of cultural and identity similarities and differences, to strengthen their national identities, and at the same time to appreciate the characteristics of others' identities and cultures.

In the present project, learning is conducted through the medium of English in order to improve the pupils' grasp of the international language of communication. The idea is to study, in Israel and in partner countries, two works of literature: one Israeli literary work that has been translated into the partner country's language and one literary work depicting the partner country's culture that has been translated into Hebrew. The choice of literary works is based on their relative contribution to the understanding of the two partner countries' cultures. This ensures a meaningful dialogue between the pupils and provides a platform for serious discussion about both countries' cultures and literary heritages.

In order to promote the learning model, the Israeli Pedagogical Network for Collaborative Learning (IPNCL) was established in order to provide a suitable environment for collaborative learning. The program was initiated three years ago as an experiment in twelve schools from five other countries. At present, 25 Israeli high schools participate in the program, partnering schools from 13 other countries. In this paper we will present the theoretical background at the basis of the program, its structure and its goals, as well as the method of implementation. Finally, we will summarize the project and ask how to turn the collaborative learning technique used in the project into an integral part of the curriculum in the high school leading to school leaving or the matriculation examinations.

Introduction

The Internet is the outcome of the dramatic development of a communications network during the 1960s and 1970s. What began as a network that mainly served the American military authorities, later began to serve academic and other institutions and as time passed, became more dynamic, and evolved into a medium for international communication that have transformed the world into a global village (Merkle & Richardson, 2000).

The purpose of the present paper is to highlight the elements underlying the project which are: collaborative learning, the Internet as a venue for learning and social encounters, and the necessary changes in teaching in light of technological advances, the mass dissemination of information and globalization.

Collaborative Learning

Collaborative learning is a collection of ideas and techniques aimed at expanding and enriching the learning experience through learning encounters between pupils. Cognitive and creative skills develop when pupils meet their peers, and these include: brainstorming, the quest for explanations, raising collaborative questions, discussions and problem solving (Tan, Gallo, Jacobs & Lee, 1998). Collaborative learning began to gain momentum during the 1970s, and has continued to develop up to present times. There are various approaches to collaborative learning, but the following two ideas are shared by most of the approaches:

- Individual accountability: each individual feels responsible for his or her own learning as well as that of the members of his or her group
- Positive interdependence: the feeling of each group member that the group's success or failure is shared. Individual success is the group's success, and vice versa

The goal of collaborative learning is to turn each individual into a person who stands on his or her own while contributing to the success of the group. However, the success of the group is not measured on the basis of a group outcome but rather according to the individual development of each group member.

Technological development in the field of computers provides numerous opportunities for collaborative learning that become increasingly more readily available. In this situation the pupils are more active, the teacher more passive, and there are many more connecting points where pupils can relate to one another. Learning is more focused and more effective for the pupils utilizing advanced technology in collaborative learning (Ackan, Lee & Jacobs, 2001; Braine, 1998). Beauvois (1998), who researched the subject of using computers to teach French as a second language, referred to computer based communication as "slow conversation". He noted that using computers to encourage conversations between pupils and as a language-study tool has yielded positive results in the linguistic and cognitive spheres. Simpson (2002) suggested that new methods for learning and teaching are possible using computer-mediated communications (CMC). A comparison between this type of learning and regular learning shows that CMC promotes improved pupil participation. In addition, the role of the teacher changes from an authority that possesses all the knowledge to a guide and a facilitator of learning.

Warschauer (2000a), in a summary of an ethnographic study conducted in Hawaii, stated that in order for collaborative learning using the computer to be effective, it must be:

- Focused on the pupil, where the pupil participates in the planning and implementation
- Based on authentic communication using rhetorical means adapted to the learning in which it takes place
- Related to fostering a genuine change in the pupils' world
- Suitable for enabling pupils to investigate and express their identity

Au (1993) noted the importance of teaching literacy to affirm the cultural identities of students of diverse backgrounds as well as to help students of diverse backgrounds to understand their own experiences as well as the experiences of others. Social context is particularly important for teachers to consider, both in terms of understanding how literacy lessons can be more beneficial for students of different backgrounds. Furthermore, Au & Raphael (2000) mentioned that literacy education needs to include the emphasis on multiculturalism evident in students' societies. Cultural literacy entails the understanding of ethnic, religious, and language differences existing in the given society.

Changes Required in Teaching in Light of Technological Advances

Warschauer (2000b) studied the connection between changes in the international economy and the future of teaching English. He noted that the extensive and rapid changes that have resulted from globalization and technological developments demand that educators ask themselves what impact these developments will have on education. In the new world order, two opposing forces can be identified: one force that pulls in the direction of globalization, with the other pulling towards local identity. Warschauer claimed that information technology influences the way in which people communicate, search for and share information. Therefore the reason for studying English does not only focus on the ability to read articles, but also emphasizes the necessity of being part of a communications network.

Naturally these skills would be required, at least in part, even in a non-electronic world, but have a more important role in a world that provides vast quantities of information through technology.

The New London Group (1996) noted that from a pedagogic perspective, one of the tools required for preparing for the aforementioned changes is a multi-faceted approach to reading and writing skills. This approach recognizes the fact that educational approaches that limit themselves to the physical page, to official guidelines and standard forms of language, are not enough. The new approach proposes that pupils learn to communicate using a variety of means. Learning that conforms to these characteristics is based on projects that focus on the pupils' background, needs and interests. Pupils are encouraged to engage in electronic communication and collaboration, in order to increase their opportunities for reading and writing in authentic situations. Collaboration between pupils from different countries provides pupils with opportunities to cope with questions relating to identity and culture that are crucial in the new global environment.

The contribution of distance-learning projects is demonstrated in a learning project conducted for French and American pupils, described by Kern (1996). The main idea behind the learning project was the presentation of the pupils' historical and family background through discussions, and the way pupils relate to history in general. Kern indicated that the importance of such projects is also the study of language that takes place in an interesting and effective way, as well as the creation of cultural awareness. Kern's research indicates that teachers play a significant role in such projects, by increasing pupils' motivation and preventing them from engaging in superficial communication. It seems that the chance for such projects to be perceived by the pupils as important depends, first and foremost, on teachers.

Main Phases and Goals of the Project

The basic learning model used in the project is based on joint learning of two literary works written in each of the partner countries. The choice of the works is made jointly by the teachers on both sides, who make sure that the chosen works conform to the curriculum. The works have a common theme to serve as a basis for joint work, and are related to the existing cultural context, opening a window to the culture of each country.

During the course of learning, pupils in each country build a website that presents various aspects of the original work. The pupils in each country then study the translated work both with the aid of the website and by communicating with their peers via the Internet. In the course of the study, enrichment activities which are intended to offer a more in-depth look at the partners' culture are offered to the pupils. The enrichment activities include lessons taught by guest experts and visiting museums. Discussions between pupils from the two countries constitute a significant part of the learning process. The program is structured in such a way that correct implementation will ensure that the discussions between the pupils deal with significant aspects of the literary works and cultures. The main goals of the project are to enrich the cultural world of the pupils, to develop communication skills in English, familiarity with the Internet, the breaking of classroom boundaries and the adapting of learning in the age of globalization.

Implementation of the Program

Initially, seven secondary schools from Israel participated in the program, working with schools from five other countries (China, Greece, Italy, Japan and Mexico). Now in its third year the project is implemented in schools through cooperation between the English and literature teachers and the schools' telecommunications administrators. In each school there is a program coordinator, and the learning is conducted in English or literature classes. There is great importance in coordinating expectations between the partners before the project begins, deciding which the literary works are to be studied, and the establishment of a timetable for operating the program. The program coordinator in each school maintains continuous and regular contact with his counterpart.

Schools are accepted to the program only if regular contact has been established and have committed to maintain continuous contact during the school year. Accordingly, only after an acceptable annual work

plan has been submitted do we permit the program to be operated. It appears that insistence on these pre-conditions is bearing fruit. At the end of this year's first trimester, communication problems have arisen in only three out of 23 pairs of schools. In the rest of the schools, the program is progressing according to the work plans: pupils are in the process of studying the chosen literary works, are engaged in the building of websites and participate in enrichment activities, with the schools preparing for the stage of communication between the pupils. In 50% of the schools, preliminary communication has already begun between the pupils, even before substantive discussions on the content of the works being studied have begun.

The main problems encountered in guiding the schools are as follows: a misunderstanding of the nature of the project, problems in understanding the language of communication, lack of commitment, telecommunications problems, and a lack of experience in collaborative learning over the Internet. Support is offered to the participating schools as problems arise and from time to time cultural mediation is provided when the lack of communication lies in cultural misunderstandings.

Discussion and Summary

The Israeli Pedagogical Network for Collaborative Learning (IPNCL) appears to be developing into an integral part of learning in the high schools participating in the program. High school studies in Israel, as in many other countries, are focused on preparations for the school leaving or matriculation examinations, thus the question which is now being addressed is how participation in the program can ensure the recognition of the school authorities to pupils participating in the program. Therefore the question is how collaborative learning can be assessed, evaluated as part and parcel of the studies towards a school leaving or matriculation certificate.

As stated above, the program is usually implemented in literature classes led by the literature teacher, with the assistance of the school's telecommunications administrator, or in English classes led by the English teacher, with the assistance of the literature teacher and the school's telecommunications administrator. At a declarative level, Israeli curricula encourage learning of this type. For example, the following instruction appears in the Israeli curriculum for English studies:

"The new format of the matriculation examinations allows for testing all four domains in the written examination: social interaction, access to information, presentation and appreciation of literature, culture and language. […]" (Ministry of Education Culture and Sport, 2003, p. 9)

The matter does not end at the declarative level. The English and literature curricula have sections where the program can be integrated as part of official studies. Part of the requirements for the English matriculation examination is for the pupils to carry out a project. The grade attained in the project is then integrated into the total English and literature matriculation grade. In advanced level literature studies, part of the final matriculation grade is given to students who participate in a unique school-based program. The chief inspectors of English and literature have given their approval to operate the collaborative learning model in the aforementioned frameworks, which constitute some 20% of the study time in each subject.

The experience obtained while conducting the program indicates that statements on a declarative level and the findings of a curricular framework are not sufficient. Assessment and evaluation methods are still not uniformly available for this type of learning. Work is now being conducted in order to meet the requirements of the subjects where the abovementioned learning is employed (the project "English and literature studies", so that on one hand the program's participants will meet the formal subject requirements, and on the other hand they will be assessed and evaluated on the basis of meaningful implementation of the collaborative learning model. Establishing clear assessment and evaluation criteria, as part of high school matriculation studies, will most definitely upgrade the quality of learning. This step will lead to a situation where collaborative and distance learning become an integral part of the high school curriculum.

Another essential aspect vital for the success of collaborative learning, is to collaboratively create and agree on the annual work plan. This has been pointed out by many researchers. For example, Petraglia (1997) and Schlessman (2005) noted that that a key characteristic of collaborative learning is shared decision-making regarding the project to be undertaken by the collaborating parties.

Accordingly, all teachers participating in the collaborative learning program, such as English teachers, literature teachers, telecommunications administrators as well as a number of pupils, will attend a conference before the beginning of the school year in order to ensure that all participating parties understand the work plans, and are committed to implement the collaborative program.

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EVALUATION IN CSCL: TRACKING AND ANALYSING THE LEARNING COMMUNITY

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Introduction

One of the most significant consequences of the introduction of ICT in education consists in the opportunity given by technology to "record" and "maintain a history" of the events occurring during the learning process, with consequent possibilities of reflecting on the process itself, evaluating it and possibly improving it. The project "DPULS – Design patterns for recording and analysing usage of learning systems", carried out within Kaleidoscope, the European Network of Excellence (IST – 6FP), aimed at gathering experience concerning recurrent "tracking problems" in e-learning systems. By "tracking problems" the consortium meant all those problems one faces while recording and analysing events in a technology-enhanced learning environment with the aim of gaining a better understanding and evaluating a learning situation. The DPULS consortium was composed of 8 European partners, each one addressing a different e-learning system, ranging from systems for individual learning, to Computer Supported Collaborative Learning systems (CSCL) and to Learning Management Systems (LMS).

In particular, the present paper focuses on the experience gained in the field of CSCL (Dillenbourg 1999; Palloff & Pratt, 1999; Kanuka & Anderson 1999; Vanderbilt 1991; Scardamalia & Bereiter 1994) which is rooted in the socio-constructivist theoretical framework. According to this approach, students, while interacting and sharing their points of view about a subject, gain a better understanding of it. For this reason, in CSCL courses learners are typically engaged in a task, be it the solution of a problem or the production of an artifact (a document, a concept map, a schema, an hypertext), which stimulates them to discuss, negotiate meanings and possibly reach an agreement, so to reify a single product that is the expression of the groups' achievements. As a consequence, differently from other e-learning contexts, where the technology and the delivery of learning material play an important role, in CSCL it is the community and its characteristics, together with the group dynamics that emerge during the course, that really determine the learning process, its evolution in time and, of course, its results.

From this perspective, any attempt to evaluate the learning experience should take into account the analysis of the learning dynamics that take place within the community itself. This paper is based on a framework proposed by Manca *et al.* (in print), which is a general model for tracking and analysing CSCL processes. The adopted model is rather articulated because it addresses different aims (evaluation, assessment and validation) and different contexts (instructional design, research, teaching practice). The aim of the paper is to propose some practical applications of the framework to the evaluation of CSCL environments. In particular, the authors suggest relevant aspects of the community structure and evolution that the framework allows to investigate: ways to identify participants' roles and how they change in time; ways to evaluate aspects of tutors work, such as timeliness and responsiveness; ways to monitor actors' participation to the process; ways to detect group dynamics, such as conflicts or collaboration, etc. For each of these aspects of a learning community, the authors identify the most relevant dimensions, indicators and data to be considered.

The learning community, its structure and the actors involved

Giving an exhaustive definition of what is an online learning community goes beyond the scope of this paper. However, in order to discuss our approach to the analysis of virtual communities' features and dynamics, we need to set the scene starting from the concept of "community" and then discussing the value added by the two words "virtual" (that we use here as a synonym of "online") and "learning". We will then proceed to discuss those features of virtual learning communities, that can be analysed through the proposed approach.

Shaffer and Anundsen (1993) define a community as a dynamic whole that emerges when a group of people share common practices, are interdependent, make decisions jointly, identify themselves with something larger then the sum of their individual relationships and make a long-term commitment to well-being (their own, one another's, and the group's). Today, thanks to the global availability of Information and Communication Technology (ICT), involvement in a community can happen independently of geographic location, and this is why we can talk about virtual communities. The glue that supports online communities is provided by sense of identity and shared values, which in turn requires and promotes a conscious commitment to a group.

But what about the word "learning"? When does a "virtual community" become a "virtual learning community"? Of course, learning often takes place in any community, be it virtual or not. Actually, communities have a great potential for learning that is well documented by the literature on socio-constructivism (Kaye, 1991; Kanuka & Anderson, 1999; Lave & Wenger, 1991). Indeed, there are situations where a community is purposefully created in order to take advantage of its potential for learning. This is the case, for example, of many formal educational contexts, where the community is not a spontaneous aggregation of people, but rather it is a group formed by someone who has detected a common learning need among the members. In online courses, instructional designers and tutors usually cooperate to set up a learning community with features that are deemed desirable to facilitate learning. The community may be split in smaller groups, decisions are made as for the composition of these groups and for the learning strategies that will be enacted in order to carry out well defined learning tasks. To support the community (and its sub-groups) throughout its lifecycle, it may be helpful to take into consideration the five stages of growth identified by Tuckman (1965). These include a first couple of phases, called "forming" and "storming", where some specific familiarisation activity must be carried out so that participants get to know each other and the group develops a sense of trust that is a precondition for knowledge sharing. In order to develop a real sense of community, during the subsequent "norming" and "performing" phases, members will have to negotiate common meanings, to share objectives and ideas, to develop mutual interdependencies. Finally, the "adjourning" phase, in virtual learning communities, usually entails some conclusive meta-reflection activity that aims to foster awareness of learning achievements and evaluate the whole process, both from the students and tutors points of view.

The actors involved in the lifecycle of a CSCL community include: course designers (if the community is created for a specific course or learning initiative), tutors, experts and, of course, trainees. Course designers identify the learning objectives of the course and design the overall learning environment: they plan and schedule the course activities; select aim and content of each of them, define the learning strategies, decide how the community should be organised; configure accordingly the CMC environment, etc. The role of the tutors is to facilitate learning during the course by providing information about the activities that learners should carry out (what to do, how, when), stimulating participation in the discussion, helping to solve technical and logistical problems, settling conflicts, reminding students about deadlines, etc. Often tutors are also in charge of learners' assessment, which is based on regularity and quality of participation. Experts of the domain or of other related content areas provide help in the preparation of the learning materials and during the course are available to answer students' questions and to provide significant information and sources about the contents of the course.

The learning community is thus characterized by its size (the number of people involved), the general features of the learners (background, technical skills, age, gender, etc.), the roles members play, and the social structures employed in the various learning phases, that are usually coupled with the learning strategies adopted. Several social structures used in virtual learning communities have been derived by group structures in face-to-face environments. Many of these are described by (Kagan, 1990) and include the Jigsaw, the STAD (Student Teams Achievement Divisions), the NHT (Numbered heads together), etc.

During the learning process, interactions take place and relationships among members develop. As we will see in the next chapter, the tracking and analysis of such interactions may inform the evaluation of a learning initiative that makes use of a Virtual Learning Community, because it helps to analyse the features of the learning community that has been created and its internal dynamics.

Using a general framework to analyse aspects of the learning process

As mentioned above, Manca *et al.* (in press) proposed a general framework to investigate learning processes in a CSCL environment. According to them, the analysis of the learning process may have three main aims: to evaluate the quality of the process, to monitor students' performance in real time, to assess individual learning performances. Agents who may benefit of such analysis are: course designers, tutors/instructors and researchers involved in collaborative learning experiences. The proposed approach is based on a five-dimensional model that includes a participative, an interactive, a social, a cognitive and a teaching dimension.

In particular, according to the framework, "participating" to an online collaborative experience means "doing" something (entering a platform, accessing a forum, etc.) that demonstrates that one is there, independently from any other action s/he does (Manca *et al.*, in press). The interactive dimension refers to the extent to which participants take into consideration each others' contributions. Finally, the social, the cognitive and the teaching dimensions, which have been derived by the model of the "Community of Inquiry" by Garrison and Anderson (2003), refer respectively to: the ability of participants to project themselves emotionally and socially as real people in a community (social presence), their ability to construct and confirm meaning through sustained reflection and discourse (cognitive presence), and their ability of designing, facilitating and directing the cognitive and social processes for the achievements of the learning outcomes (teaching presence) (Garrison and Anderson, 2003).

Each dimension can be analysed through a set of indicators that are worked out in the framework on the basis of data obtained by tracking course participants' behaviour within the learning environment. While typically the investigation of the participative dimension is based on quantitative data (number of sent messages, number of read messages, number of sessions, etc.), the investigation concerning the interactive dimension may be carried out using both quantitative (number of replies, number of messages read before postings, etc.) and qualitative data (detection of citations, references, etc.). As far as the analysis of the last three dimensions (social, cognitive and teaching) is concerned, they usually rely on the content analysis of messages exchanged by participants during the course and are based on the detection of "typical expressions" that may be referred to the three dimensions.

The presented framework is rather articulated and complex, because it is thought as a flexible tool, possibly adaptable to different situations and usable for different purposes. One example of such process of adaptation consists of using the general framework for the detection and understanding of specific aspects of a learning community: depending on which aspect is the focus of the evaluation, one may choose to use only one or two dimensions of the framework or even to select some indicators rather than others. In the following, some examples are discussed.

The emergence of roles is one of the most important aspects to be analysed while trying to understand the dynamics in the evolution of a learning community. Content analysis of messages exchanged among participants will reveal whether some members of the community (tutors or students) have assumed specific roles. For example, some indicators of the teaching dimension may help identify those participants that are leading the community from the cognitive point of view. We could call these people the "cognitive leaders" and should be prepared to acknowledge that they may not be the tutors. In particular, indicators addressing "Direct instruction" expressions (such as presenting contents, proposing activities, diagnosing misconceptions, confirming understanding through assessment and explanatory feedback), or "Facilitation" expressions (e.g. identifying areas of agreement/disagreement to achieve consensus, encouraging, acknowledging or reinforcing participant contribution, providing feedback, setting the climate for learning), will pick out those members who mostly take the responsibility of the task and try to direct the process. Similarly, an analysis of the social dimension may support the identification of the "emotional leaders", who typically use expressions of emotions and intimacy, present details of personal life ("Affection" indicator), use vocatives, inclusive pronouns, phatics, salutations, etc. ("Cohesiveness" indicator) (Manca *et al.,* in press).

The use of the participative dimension may help in the detection of "lurkers", those members who usually do not contribute actively to the discussion, but only read messages exchanged by others: an analysis of indicators, such as the "passive" and "active participation", which consider respectively the number of read messages and the number of the sent messages, may be point to the lurkers within the community. It is worth noting that, since these indicators have a quantitative nature, it is quite easy to

automatically extract and elaborate the data as most of the CMC systems used in CSCL environments maintain a history of the events occurred during the learning process. As a consequence, this kind of analysis can be carried out during the learning event and its results may be used by tutors for monitoring purposes.

Although the participative dimension mostly provides quantitative information and therefore does not allow to capture the complexity of the learning process, there are other interesting aspects of a learning community that can be analysed on the basis of such dimension. The evolution of some attitudes of participants over time, for example, can be monitored thanks to the participative dimension. People who act as "newcomers" tend to send few messages at the beginning, and increase as time goes by, as they become more comfortable within the community and the environment. The phenomenon of "drop-outs" may be monitored thanks to the participative dimension as well. Even the tutor behaviour, his/her responsiveness, timeliness and tutoring style may be analysed by using the indicators for this dimension. For example, by considering the tutor/student ratio in one or more activities, it is possible to understand the amount of support provided by tutors and its evolution in time, therefore understanding what activities required more tutor intervention and whether students became more autonomous while the course progressed. Alternatively, the different tutoring styles could also be compared, using indicators of the participative dimension combined with indicators of the teaching dimension.

Furthermore, in CSCL particular attention is often devoted to the group dynamics that may emerge within the community during the course, as for example the rise of conflicts. An analysis of interactions focussing on the social and cognitive dimensions, may help identifying these kinds of situation. From this perspective, useful indicators include: references or citations of each other's messages (interactive dimension), the presence of vocatives, phatics (social dimension), expressions of strong disagreement (cognitive dimension).

Collaboration and competition, which can be considered two opposite, but useful elements of the development process of critical thinking, may be evaluated using the interactive and the cognitive dimensions. The analysis of the four main indicators of the cognitive presence (i.e. "Revelation", "Exploration", "Integration" and "Resolution") (Garrison and Anderson., 2003), together with a qualitative analysis of interactions (detection of each other's citations, references, etc.), may provide an idea of the overall process.

To conclude, it should also be noted that there are some limitations in the use of the framework, mostly depending on the characteristics of the learning community. Let us consider for example its size: when the target population is composed of 20-25 people, both quantitative and qualitative approaches are possible, because the total number of messages exchanged by participants is not very high. In these cases, it is possible to have a complete picture of the learning community, based on all the five dimensions of the framework. On the contrary, larger target populations (the authors' experience includes courses with more than 150 people subdivided into small subgroups), the content analysis of messages can be extremely time consuming. The analysis of the learning dynamics in such contexts is usually restricted to the participative dimension and – in some cases – to some quantitative indicators of the interactive dimension (i.e. number of messages read before postings, the number of replies to other students' messages, etc.).

Apart from the number of people involved in the process, there are other factors that may affect the choice of the dimensions and the indicators to be used. The social structure, for example, and the learning strategy associated to it, should influence the way the framework is used. For example, if the community is structured for a peer review process, the indicators of the cognitive presence suggested in the original framework may turn out not to be fully adequate and may need to be integrated with more specific ones. On the contrary, in the case of a JIGSAW structure, the adoption of the interactive dimension would help in having a deeper understanding of the process and in evaluating the effectiveness of the proposed learning strategy.

Conclusions

Within the DPULS project partners from different countries were asked to gather their know-how as far as the tracking and the analysis of e-learning systems. In particular the authors explored the CSCL field: starting from a general framework which identifies dimensions, indicators and data useful for evaluating the learning experience (Manca *et al.*, in press), the authors provide examples of applications of such framework with a particular focus on how to detect and analyse features of a learning community.

It is interesting to stress that some of the indicators and data identified in the framework were recognized as useful also by partners of the project who addressed very different contexts. In particular, the quantitative indicators of the participative dimension resulted to be exportable and applicable also to some Learning Management Systems, where typically the focus is not on the community (but rather on the delivery of materials) and where the number of courses, students and teachers may be very high.

This indicates that the framework is rather flexible and may be applied to different contexts in order to analyse the interactions occurred within the members of a community and possibly investigate the dynamics emerged during the process. The five, heterogeneous dimensions seem to cover a wide spectrum of phenomena and allow to select from time to time the most useful indicators and even to adapt them according to the focus of the evaluation. From this point of view, the paper intends to provide stimuli for further research in the field and for further application and adaptation of the framework.

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E-LEARNING TOOLKIT: BUILDING SPACES FOR COLLABORATION AND EXPERIMENTATION WITHIN THE E-LEARNING ACADEMY

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Introduction

The E-Learning Academy (ELA) is a project developed by the Croatian Academic and Research Network – CARNet. The main goal of the ELA is to establish organized education for e-learning through three educational programs based on the latest achievements in the field of e-learning, which are adapted to the Croatian academic and wider environment, and with the possibility of further regional development. The Academy Certificates have been developed in collaboration with the Office of Learning Technology, Distance Education at the University of British Columbia, Vancouver, Canada, and the program comprises 3 related Certificates: Certificate in Management of E-Learning; Certificate in E-Learning Tutoring; and Certificate in E-learning Course Design.

85 participants from 26 different cities in Croatia have participated in the ELA. To date, 21 participants have graduated from the Management Certificate, and the remaining 64 are studying in the Tutoring and Course Design Certificate, or just starting the Croatian version of the program. The participants who are taking the Course Design Certificate come from a diverse background, ranging from heads of human resources and technical people who are going to assist trainers, professors and teachers in the creation of multimedia and e-learning materials, to corporate trainers, professors and teachers who are, themselves, interested in implementing e-learning technologies [1]. The first offering of the ELA was in English, but in autumn 2005 all three program started with the delivery in Croatian language, too.

The focus of this paper is on a particular set of resources, tools and activities within ELA's Certificate in Course Design called the E-Learning Toolkit. The development and implementation of the E-Learning Toolkit is an interesting example of how networked-based collaborative spaces like wikis support the development of educational materials, particularly when the development teams are working across great distances and with multiple authors and designers. This approach is also important because the students, for whom the content and activities have been created, are given access to the same set of tools as are the instructors and designers, and they have the ability to play an active role with their peers but also to refine and extend the existing content within the course materials. Finally, the E-Learning Toolkit structure can easily expand according to the needs of the participant-community: instructors, students, administrators from CARNet and, indeed, people from the general public, can make use of this evolving space.

Rationale for the E-Learning Toolkit

The Course Design semester comprises 4 modules that range from 4 to 6 weeks in length, for a total of 16 weeks of instruction. During that time, participants are introduced to an instructional design cycle and are asked to complete 3 related assignments that take them through planning, design and implementation of an e-learning project. Beginning in Module 5, participants also have access to the E-Learning Toolkit, a set of resources that are not organized in a particular sequence, but are instead structured to allow participants to choose a particular tool based upon their own interests, learning needs and project requirements. The students have access to the E-Learning Toolkit for approximately 3 months, and during that time, they have opportunities to explore the range of tools and examples found there, begin to experiment and assess the potential suitability of the different learning technologies found in the E-Learning Toolkit for their course projects, and then apply the tools to their projects using the resources and installed services that have been provided by CARNet to the ELA participants.

Figure 1 shows the overall structure of the Course Design semester. The content of the modules, the primary development activities and the E-Learning Toolkit are all organized around a common instructional design model students follow during their project work. While the modules are taken in sequence and the project assignments are linked together and build upon one another, the material and activities in the E-Learning Toolkit are in no particular sequence.

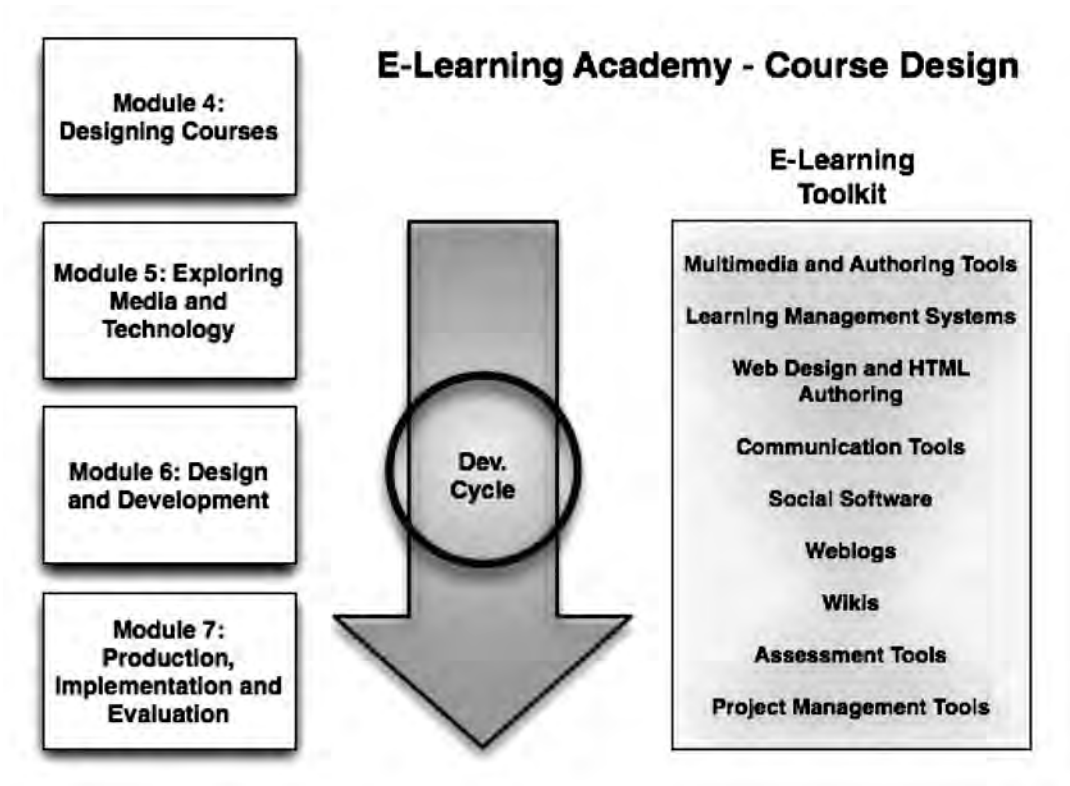

Figure 1. The structure of the Course Design semester

E-Learning Toolkit Structure

The E-Learning toolkit is located at the following address: http://elacd.carnet.hr/wiki/index.php/E-learning_Toolkit. The E-Learning Toolkit is structured within a wiki environment (MediaWiki), and at present, it is open to the public. We selected a wiki environment in part to support the collaborative development of the materials between authors in Canada and Croatia, but also to create a highly flexible environment where instructors and participants could easily add content and resources. Finally, based upon experiences at the University of British Columbia [2], where social software use amongst faculty and students has increased dramatically, we wanted ELA participants to gain experiences working with a simple-to-use self-publishing space to demonstrate potential tools that they might implement in their own classrooms. Participants in the Course Design Certificate first explore the E-Learning Toolkit during an activity in which they are developing a plan for the design of an e-learning project. Part of that plan involves assessing different learning technologies that they might use to support student learning objectives and instructional goals they have identified in planning their project. The resources available in the E-Learning Toolkit range from mainstream tools such as Learning Management Systems and HTML authoring environments to emerging tools such as wikis, weblogs and tools particularly designed to help educators with assessment, communication and, even project management.

We plan on increasing the range of tools within the Toolkit every time we offer the ELA courses as well as further refine existing pages to bring in new examples of best-practice as well as new resources and tutorials.

Each page in the toolkit uses a similar structure.

Description

For each of the tools, a brief description is offered to provide participants with an understanding of the nature and typical application of the tool.

Background

Background information is provided on the characteristics of the tool in terms of its suitability for presentation of content, how it supports development of specific skills, and the type and nature of interaction that is possible to create through its use. Participants can also find links to additional readings as well as an analysis of the e-learning technology in relation to the pedagogy, design and implementation issues raised in the Course Design modules.

Design Questions/Issues

This section contains a set of questions and issues that need to be considered when using the tool. Some of these questions are related to the Bates and Poole SECTIONS Framework [3] or the Instructional Design Cycle [4] that participants are using in the Course Design Modules.

Examples

This section contains examples that showcase how educators have employed the tool. This is a place to present best practices and innovation, but also to provide critical assessment of how well a particular tool supports student learning. In this section, we are making a conscious effort to include examples of best practices from Croatia and the region.

Activity

For each tool, participants are offered an exploratory and a participatory path. These activities are intended to increase their familiarity with the E-Learning Tools as well as to encourage them to pick up the tools and use them in their project work. Some of the participatory paths are only available to students in the ELA program because of the need for CARNet to provide hosting and authentication.

Resources

Each tool page also has a range of tutorials, templates, client software, etc. Recognizing that it was beyond the scope of the Course Design curriculum to teach participants about all of these different tools, we worked, instead, to provide a vetted collection of resources to help participants to develop their skills using a broad range of tools.

A special page within the E-Learning Toolkit provides instructions to participants on how to gain access to a range of services that CARNet has set up for the ELA participants. For instance, ELA participants can choose to experiment with LMS platforms such as WebCT, Moodle and Claroline. They also have access to web server space provided by CARNet, so they can author their work in html if they choose. They have access to a concept mapping tool called CmapTool, which allows users to publish and share internet-based concept maps, as well as social software spaces like MediaWiki and WordPress. The ELA, being a program that aims to teach people how to make effective use of learning technologies, has to provide opportunities for students to use those technologies, and the E-Learning Toolkit serves both as an information resource and sandbox environment for participants to experiment and gain confidence. The services found in the E-Learning Toolkit are extremely important for the ELA participants, as many of them do not have access to a lot of technical support and e-learning infrastructure in their local context.

Supporting the E-Learning Toolkit: Building Capacity and Infrastructure

We selected mostly Open Source tools that could be hosted on CARNet server like MediaWiki (wiki), WordPress (weblog), Moodle and Claroline (LMS), CmapTool (concept mapping tool), Loudblog (podcast) and provided web space for student's web pages. The criteria for the selection included

availability cost (i.e., no direct cost for the software), simple administration and management and ease of use considering different technical skill level of our users.

Apart from server administration and installation of the tools, technical support was focused on providing guidelines and help to students. We created simple guidelines for using each tool. Every tool included a demo element, such as demo course or demo concept map where students could try out existing elements, or they could choose to create their own material from the scratch.

We did not create tutorials or manuals because we wanted our users to discover the tool through hands-on experience. For that reason only a short description of the first steps in using the tool was available, and the technical support person was available during working day via e-mail for any question regarding registration or any technical problem. Technical support service was used seldom, due to the available guidelines and resources, as well as the fact that the course tutors were main sources of reference for users in case they searched for help in most situations. The Resources section for each tool does include links to possible tutorials and information to help people to learn to use the tool.

The question of access level arose very early in the development phase because we created a set of procedures for account management and usage of the tools and available space. Originally, we restricted the access for registered users only (ELA students and content authors). We had limiting factors such as tuition fees and the potential for spamming. Although CARNet is a non-profit institution, ELA is organized as a fee-based educational program. However, in the end, we only restricted access to those services that would require technical or account support from CARNet like the web space, LMS space, etc. We have left the WikiMedia space open for users even though we realized that an open structure increased the possibility of spamming. To date spamming has remained a low level issue, with almost no unwanted content published within the wiki environment. Although we are ready to implement restriction measures if necessary, at the same time we realized that by restricting access we would be limiting a number of possible authors and restricting the service to a small number of users.

Furthermore, CARNet's mission is to help Croatia to transform into society of knowledge [5], and as a non-profit institution we saw more benefits in opening access to the Toolkit service rather then closing it into safe restricted area. We are encouraging group authoring that includes experts from various fields (academic, technical people, schools, others) in Croatia and abroad.

Supporting Collaboration Approach through Wiki Environment

In developing the content within the E-Learning Toolkit, we engaged different authors across several institutions, ranging from the University of British Columbia in Canada, to CARNet in Croatia, and its associates from different institutions, including the University in Mostar in Bosnia and Herzegovina. This distributed approach was made possible by the ease of use of the wiki environment, as well as our prior experience in distributed program production. It also encouraged us to expand our initial plans and invite ELA participants and other CARNet users to contribute to building content around existing services within the Toolkit. The wiki environment shaped development, allowed for easy collaboration with production teams, and even opened up spaces that ELA students began to author, setting the stage for the creation of community of practice in the next phase [6].

Initially, we started with the group authoring using wiki environment in order to produce more content in less time. More importantly, we used this collaborative approach to engage best expertise from various fields (multimedia experts, social software experts) for different technologies and tools. We engaged Croatian experts where possible (LMS, Multimedia), and UBC expertise where best used (social software, communication tools).

Some interesting activities from both the Course Design certificate and the Tutoring certificate ended up being structured inside of the wiki environment, rather than in the course WebCT shells because the wiki space was much more conducive to collaborative writing than were the discussion forums and project spaces within WebCT. For instance, at one point, participants from within the Course Design started a page to translate e-learning terminology into the Croatian language (http://elacd.carnet.hr/wiki/index.php/ELA_Words). The growth of this page was entirely driven by the participants in the group, and they are the ones who defined the overall structure and approach to this

material. Participants in the Tutoring Certificate used the wiki environment to work on an activity focused on the benefits of collaboration and also tapped into some of the E-Learning Toolkit resources relating to Communication and Assessment Tools. We fully intend to position more activities from all three of the ELA Certificates within the E-Learning Toolkit, and to continue to add resources there to support the participants within the program and beyond.

Expanding the Reach of the E-Learning Toolkit

The initial phase for the E-Learning Toolkit involved creating a collaborative space in the Course Design Certificate for 20 people per generation. However, the E-Learning Toolkit has already grown beyond that initial phase, as students from both Certificates, as well as members of the larger CARNet community are using the resource.

In the second phase we plan to test our service within the larger community that CARNet supports through its various programs and projects. This pilot will include promotion of the E-Learning Toolkit service, education workshops and experimentation with the access issues and authoring levels.

The testing phase will enable us to make the right decisions for the third phase, a completely public service directed toward CARNet users, which are now 100.000 in the academic community (teaching staff and students) and 30.000 in the school community (only teachers). The purpose of this augmented service will be to build resources around mostly Open Source technology in education and provide resources in Croatian with Croatian examples. Even more, we believe that by inviting people to create content around tools and already existing content, we will support the creation of community of practice through social engagement and legitimate peripheral participation [6, 7]. The community will be a bridge between Croatian educators from different educational systems (academic, school, public, private) who will create and share knowledge and bring additional users to CARNet's services. We believe that this purpose is well aligned with CARNet's mission to play a leading role in helping Croatia become a society of knowledge.

We will support the content creation in both English and Croatian. The initial resources have been created in English, because it allowed for Canadian-Croatian cooperation. We are translating the resources in Croatian because it will create more opportunities to engage Croatian authors and users. Nevertheless, we want to continue to support English materials as well in order to assure cooperation between Croatian, European and world communities.

In order to support transfer into third phase, a public service, we will introduce evaluation instruments, including evaluation of user satisfaction, measuring specific tool usage and documentation of activities and actions.

Conclusions

The E-Learning Toolkit is playing an important role as a component that provides content, activities and resources within the Course Design Certificate of CARNet's E-Learning Academy, and we are excited to see how quickly it has begun to serve needs beyond the course and, indeed, beyond the ELA program. Considering that the ELA participants come from every educational sector within Croatia, our hope is that the tools and services structured within the E-Learning Toolkit become available to teachers and students across Croatia. In that sense the Toolkit is a space for experimentation with different technologies and even more for collaboration inside community of educators. We envision our main effort in the future will be to support the development of the community of practice, by encouraging social engagement, sharing of knowledge and experience between experts and novices within a creative learning environment. The growth of the community and development of its individual experts will support Croatia's efforts towards creating a society of knowledge.

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THE COLLABORATIVE VIRTUAL PROJECT TO ACQUIRE GENERIC ICT COMPETENCES

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1. Introduction

Network society is a society built up around the information network from the information technology. In this sense, Internet is not just a technology but a way of communication that sets up our society's organizational pattern. It is the heart of a new socio-technical paradigm that constitutes the material base of our lives and of our way of interacting with others, as well as of working and communicating. (Castells, 2001b)

One of the basic challenges of current education is to prepare people to be capable of fully participate in an information society where knowledge is a critical source of social and economic development (Cornella, 1999). In this society, the productive collaboration is a key element of the interactive organization network whole which is opened to the unceasing change.

The paradigm emerging in this new century is that one of a network learning based on global interactivity, collaborative learning and access to activities and educative resources all along one's life (Harasim, 2000).

Virtual learning does not only open new cooperation proposals that will permit to enrich current pedagogical proposals, but also facilitates that these cooperation processes can be carried out fulfilling individual space and time needs. It also gives answer to a new form of knowledge, a more autonomous one where students become the centre and they have a leading role. New opening electronic learning spaces demand imminent innovations in the pedagogic approach of the training actions that we have so far. According to McClintock (2000) "new technologies, specifically telematic systems, are interesting ways of introducing alternative pedagogies and favouring changes within the educational structures".

European Higher Education Space highlights the importance of collaborative work from two different points of view: on one side, it is considered as a methodology that encourages the student to carry out active and participative work processes; on the other side, it is considered as one of the most valued competences in professional environments.

Bearing this objective in mind, a group of UOC teachers from Computers & Multimedia studies considered the need to enrich current learning environments with the possibility that students work virtually as a team, setting in motion some strategies that provide and enhance the acquisition of generic ICT competences. At the same time, gathering reflections on these generic ICT competences to be acquired by students and strategies to be taken, would be useful information to be included in the European Elene-TT[1] project UOC is currently participating in.

1.1 The context: UOC

UOC was created in 1995 in order to facilitate virtual distance learning at university level, using new technologies that allow us to break time and space barriers. UOC offers a learning system based on the Internet. The student, through the Virtual Campus, has access to a dynamic experience from any place and becomes the centre of a personalized learning process.

UOC students do not attend presence classes at university, but carry out a fully online learning process. There are only two appointments that UOC students can attend in person voluntarily, that is, the opening session at the beginning of the semester and the one at the very end, as well as the exam or validation test at the end of the semester.

[1] Elene-TT e-Learning network for Teacher Training (2005-07) www.elene-tt.net

On Figure 1, one can see that students are in the centre of the learning process and that they interact with the surrounding integrated elements of UOC pedagogical model.

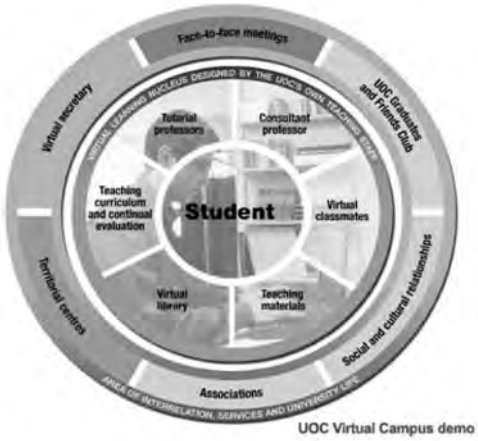

Figure 1. UOC pedagogic model

1.2 The context: subject on digital literacy

Since UOC was created 10 years ago, it has experienced the internet growth and its several phases of popularization which have been included in the "Multimedia & Communication" subject. This subject, specific of this University and transversal to all UOC degrees, enables students to be able to take the other degree subjects digitally, effectively and efficiently in the net learning environment.

This year, a new degree on Engineering on Telecommunications has been introduced at UOC. Due to this new degree, a new subject has also been created which takes into account the redefinition of the study plans in the Bologna process and it adjusts itself to EEES[2]. This new subject, named "Work Competences in Virtual Environments" fulfils the students' need and has has actually developed from the competence objectives which are a logic evolution of the former subject (Multimedia & Communication). This new subject has been inspired by the Bologna process on High Education, fitting perfectly well in the new education paradigm focused on the student.

The subject "Work Competences in Virtual Environments" within the studies of "Engineering on Telecommunications" is a 4.5-credit compulsory subject recommended to be taken in the first semester, its aim being to put into practice work and study learning strategies in virtual environments from the acquisition of skills expressed in terms of basic ICT competences, framed in a cooperative work setting which goes further from the individual task.

The competence objectives of the subject are the following:

- to acquire a virtual communication style in a learning community;
- to foster the critical thinking on the impact of the Information Technologies and the Communication in the Information & Knowledge Society;
- to integrate planning and organization as study and cooperative work skills in UOC virtual environment;
- to learn to develop and manage an online group project;
- to acquire team work skills in virtual environments;
- to acquire skills to search and select information online;
- to acquire skills to analyse, process and interpret digital information;
- to acquire skills to elaborate and structure digital information;
- to acquire skills to present digital information.

2. Work competences in virtual environments

What activities do students carry out?

One of the subject objectives, which is contemplated in the subject syllabus, is to integrate group work in the subject content learning process, fostering the problem resolution in an asynchronous cooperative way and acquiring the basic competences to work and study online through the elaboration of a team virtual project. Before starting the group work process, a document is provided to the students to help

[2] EEES: European High Education Space (in Spanish)

and orientate them. This document is a first orientation approach on the attitudes that facilitate work team in virtual environments. Besides, the document explains, broadly, the different stages of cooperative work.

The project work methodology (see Figure 2) enables students to acquire ICT skills and competences. The figure shows how a virtual project is developed step by step. Some of the key elements are the student's planning and re-planning, as well as the student's and teacher's evaluation (feedback).The global activity that students carry out is a group virtual project which they keep elaborating in stages through the fulfilment of collaborative activities carried out in a fully asynchronous way.

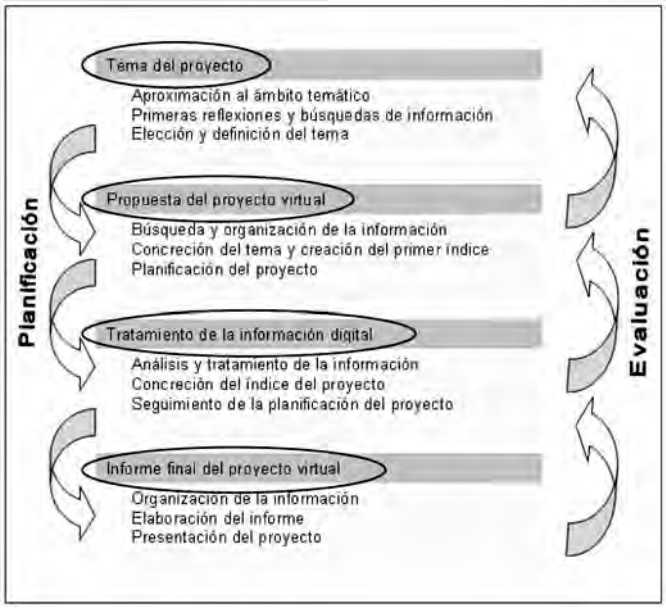

Figure 2. Work methodology per projects

2.1 Project topic

In this first stage, students carry out two activities:

a) They participate in a *virtual discussion* on the ICT impact on current society with two main objectives: that students introduce themselves in the project topic and that they get to know each other, facilitating this way the creation of groups. The ideal number of people per group is 3 or 4, being 5 the maximum recommended.

b) After the interaction and the discussion in the virtual debate, and bearing in mind the subject syllabus, students are ready to start making proposals for the topics they are more interested in. They express, individually, their personal availability, study interests and a *topic*. By availability it is understood the planned hours per week devoted to the subject, connection time at the Campus, other subjects they are taking, command on computer skills…

2.2 Virtual project proposal

In this stage, students are meant to carry out activities in groups:

a) Workgroup creation and first group agreements

This is a key moment, especially in virtual environments, as it is the previous stage before starting the actual work. Students enter into relations with each other and they must agree on some key agreements that should be properly set, such as the group organization, work plan, system, interaction frequency, communication among them, decision taking. It is demonstrated that certain activities can help out consolidating the group. We would like to highlight some of them:

- Decide a name for the group: it is an informal activity which aims to start the relationship and social interaction among the students while deciding a name that they can feel identified with.
- First agreements: they must elaborate a set of agreements that become their group rules and their organizational parameters. These agreements can be reviewed all along the working process in order to validate their performance or correct deviations.

This activity, linked to the beginning of the group work, is very important in order to initiate the strategies of virtual communication which will be consolidated in the following activities.

b) *Selecting and specifying the topic. Internet search*

In this stage of the project, groups establish by consensus a topic area and they start a discussion in order to specify more concretely the topic. Students do searches on the net on the chosen topic using resources such as searchers, webs, virtual communities. They then use this information to help them specify the topic and develop their project.

c) *Group work planning*

Groups elaborate a task list to help them carry out the final project. They elaborate a chart where they include tasks to be done and their timing according to the personal planning of each of the group members. Groups organize themselves and tasks are assigned to each member. Some groups decide not only to assign work to be done but also responsibilities and roles (i.e. secretary, general coordinator…).

d) *Index of the virtual Project*

Searches done to help students elaborate the index of their virtual project.

e) *Group self assessment*

At the end of this stage, groups assess themselves analysing the work done, the advantages and obstacles that came up while working together. They then make proposals to improve their work which will help them to elaborate the final project.

2.3 Processing and elaborating the project

Students agree on some information organizational strategies at the very beginning of the process, some of these have already been agreed on and included in the initial agreements, some other come up during the process.

At this stage, groups start elaborating a text document based on the Internet information search (which started in the previous stage) on one of the proposed topic areas. This activity involves three tasks:

a) *Advanced searches.* Groups present a search chart or webgraphy. At this stage, searches should be much more specific and they should include different aspects of the chosen topic. In the previous stage, searches were more generic, whereas in this one they should sharpen up in order to obtain key aspects to point up the chosen topic area. Students should bear in mind that the aim of this work project is to become a sort of expert on the chosen topic.

   The search chart or webgraphy should be focused on the project content, indicating the link between the consulted webs and the different project headings.

b) *Final index and first version of the project.* Groups start elaborating the almost definitive index and a summary of the most relevant content found on their searches. In the previous stage, groups handed in a provisional draft index, whereas in this stage the index should be almost definitive and it should include the first paragraphs of each item in the final project. That is what makes this stage different from the previous one and from the final one. It is necessary that the document is properly written and that is worth a university level; that is, it should achieve an impact in respect to the formal aspects that computer tools can facilitate.

c) *Work group analysis.* Revising calendar and planning. This activity aims to reflect on the cooperative work done to that point.

2.4 Final report

The last activity involves two tasks:

a) *Final report* on the virtual project carried out all along the taking of the subject. Groups elaborate a final report in a text document through the development and writing of the contents. They also carry out a self assessment on the established planning and work design.

b) *Self assessment and group reflection.* Once work is finished, students make an individual self assessment and a group assessment (on the group's dynamics) which helps them reflect on what they have learnt and on the skills acquired all along the process. That certainly helps the closing of the group tasks. Each member of the group has to fill in a questionnaire to individually assess work done all along the semester.

3. Conclusions

What competences do students acquire during the process?

By analysing teachers' teaching dynamics and taking into account students' assessment, we can conclude that competences acquired by students are acquired in a progressive way and that they help them understand the subject. Students learn without even realising. Competences acquired are the following:

- ability to plan and organize group work;
- ability to communicate virtually;
- ability to search and process digital information;
- ability to manage and organise group virtual information;
- ability to elaborate and present a digital project;
- ability to work in virtual teams.

All along the process, students acquire a set of digital competences that fit in the Bologna process by putting into practice new skills and abilities that go further than just the sheer accumulation of knowledge. Students, through the development of cooperative activities, implement also skills related to conflict resolution, negotiation, individual and group work planning, arguing, reasoning and reaching consensus.

Besides, the realization and achievement of a virtual project implies the acquisition of skills and abilities linked to digital information search, processing and presentation.

Apart from the acquisition of generic ICT competences, students acquire a series of competences which set off as a result of group learning and team working. Team work capacity facilitates interaction processes both social and cooperative; also it involves abilities such as the capacity to learn, to take decisions, to organize ones' time for virtual studies, to get a proper virtual communication style, to analyse, to summarize and manage information.

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STUDENTS' ACTIVITY ON A DISCUSSION FORUM – ATTITUDES AND LEARNING OUTCOMES

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Abstract

The study focuses on a group of distance students and their attitudes towards knowledge construction in distance education. Their usage of a web based Learning Management System (LMS) is studied and the relation between the students' activity on a discussion forum and their learning outcomes is described and discussed. The study was carried out by interviewing a group of distance students and their teachers and also by studying the students' behaviour on a LMS. The students' attitudes towards their own learning process showed lack of confidence in their capability of contributing to knowledge construction in a student group. The concluding part of this paper indicates that the students' attitudes towards knowledge construction and learning processes affected the way they behaved on the discussion forum. The study also shows that the students' activity on a discussion forum is related to their learning outcome.

Introduction

Information technology has made it possible to distribute, share and store information independent of time and place. This has lead to new alternatives for education and learning; a flexible distance education [1, 2]. In this paper the term "distance education" is used to describe education on distance utilized by a computer based Learning Management System (LMS) distributed by the Internet. A LMS makes it possible to communicate with teachers and fellow students on distance. There are several LMSs used today as "virtual classrooms" or web based tools for communication and learning in distance education. They provide tools for course production, course administration and communication. One essential tool for communication is an asynchronous discussion forum, independent of time and place, which can be used for group discussions. This tool is especially important for collaboration issues [3].

The dialogue has always been a way to learn and share experiences and knowledge and with a LMS the important dialogue can be handled in distance education. A LMS enables students and teachers to meet virtually and discuss issues concerning their studies. An increased use of discussion forums has been noticed in higher education [4]. Social interaction, for example discussions, has a great impact on the learning process [4, 5, 6]. Bill Pelz [7:37] states that *"Interactivity is the heart and soul of effective asynchronous learning".* It has been proven, in educational research that a student who is actively involved has a greater learning potential compared to a passive listener [8].

Dysthe [9] argues that it is essential to try to understand the learning process from the student's perspective. In order to do that it is necessary to understand how knowledge is constructed and how learning processes can be handled. Dysthe's [9] standpoint stresses the importance of showing interest in students' learning processes and inspires to study the communication between participants on a discussion forum and the usage of the tools supporting the communication.

In this paper a study of the learning process and knowledge construction by usage of a LMS in a distance course is described and discussed. Focus is on students' behaviour, i.e. activity on a discussion forum. The following questions will be answered:

- Do the students' attitudes towards knowledge construction have any impact on their behaviour on the LMS?
- Does distance students' behaviour on the LMS indicate anything about their learning outcomes at the end of the course?

The learning process in distance education

If we accept learning as a social process, communication and collaboration are essential for learning situations [2, 10, 11, 12]. The dialogue is important for communication and collaboration and consequently also in any learning process [8]. Knowledge can be constructed through collaboration. This is especially effective for strengthening critical thinking, problem solving or to understand different perspectives of a certain phenomenon. In these situations students need the opportunity to discuss and exchange ideas with others and this will help them to develop their own thoughts. [2, 3, 11, 12, 13] The level of interaction between participants is vital for a successful web based distance course [3], the more interaction the more learning situations. The existence of a discussion forum in a distance course is important for distance students' active learning process and the level of collaboration intrinsic in the course is significant for the usage of a discussion forum [11].

Dysthe [9] has proven that an asynchronous discussion forum supports learning because it offers an opportunity to study and use the discussion forum whenever it suits the students best. As a consequence this can lead to more extensive discussion contributions compared to oral discussions, due to the fact that students have time to reflect on an issue before they express their own opinion. Some negative aspects of being independent of time and place can also be observed. A successful distance student needs the ability to organize and allocate time for the studies. In this aspect self-learning and the need of self discipline are essential student characteristics to be considered in distance education. Students who are not able to handle these aspects may not accomplish good learning outcomes [3, 6, 14].

According to Soong *et al.* [11] one of the critical factors that needs to be considered when using a LMS is the mindset about learning. This factor deals with what teachers and students perceive learning to be (construction or absorption) and has a great impact on how they act in teaching and learning situations [9]. Distance teachers can influence the students' communication behaviour in different ways depending on their view on the learning process. Dysthe [9] has established some fundamentals for a well functioning discussion on distance. One important aspect is the creation of need for communication through intellectual challenges. The author argues further that the design of the task is important for stimulating the students to feel the need for communication. By designing tasks that force or stimulate students to work together the teacher can encourage and support collaboration [2, 6, 11, 12, 13]. Students may need different kinds of help and support to carry out and complete a distance course and therefore the need for intervention of the teacher varies for different student groups. By monitoring the system, a tutor can use this information to encourage and give students adequate support and feedback [9, 14].

Students' learning achievements in a distance course are to a great extent dependent on their activity on the LMS [6, 14]. Active students are more successful in their studies compared to less active students. A positive association between students' participation in discussion forums and learning outcomes have been proven in recent studies [8, 15]. These studies confirm that activity on the discussion forum improved the students' perceived learning.

The distance course

The course in question was a web based distance course Introduction to Academic Studies offered by Mälardalen University in Sweden. It was a part time course, comprising ten Swedish credit points which lasted from November 2004 to April 2005. The course was part of a one year college program for students interested in university studies but not fully qualified for studies on an academic level. The objective of the course was to encourage and prepare the students for future academic studies. The course was interdisciplinary and aimed to introduce and provide basic knowledge about scientific and critical thinking. A LMS called WebCT was used in the course.

The course was divided into two main parts of ten weeks each. The first focused on social and behavioural science and the second on natural science. An integrated component based on humanities was carried out parallel with the two parts described above. This integrated component aimed to support and encourage students to practise and develop the oral and writing skills required for academic studies.

The teachers provided the students with a study guide which described the content of the course and the tasks week by week. For every weekly task the students were required to make their own original postings to the discussion forum and to respond on other's messages.

Eleven students began the course but two dropped out after a few days. The nine students left were all female students. None of them had any previous experience of university studies, but some of the students had studied on distance on a lower educational level. After part one another student left the course and therefore her activity and participation is not considered in this study. Eight students carried through the whole course. Three students completed the course, passed all the examination modules and obtained a pass grade.

The Learning Management System – WebCT

The Learning Management System (LMS) used in the course was WebCT (Web Course Tool). In the course Introduction to Academic Studies the main communication tool was a forum for discussions. The forum was used by all teachers and students through the whole course. None of the participants indicated any difficulties using the discussion forum.

The discussions were held in an asynchronous mode which made the participants independent of time. In order to avoid confusion among the students threaded discussions were used in WebCT. The threads allow the reader to follow the various contributions to a discussion and respond to specific messages. The students were obliged to take an active part in the different discussions and their participation was part of the course examination. A thread in this context is equivalent to each student's original postings to the discussion forum. Each time a student posted a new original message a new thread was created in contrast to the responses which prolonged the thread.

In this paper the term *original posting* is used to describe a new thread in the discussion forum. The expression *follow-up posting* stands for a response on a message.

The study

The study was preliminarily a qualitative analysis of student participation in the course *Introduction to Academic Studies* and was carried out by interviews with participating teachers and students and observations of the students' behaviour and contributions on a discussion forum in WebCT. In addition statistical information about the students' behaviour on the discussion forum has been retrieved from WebCT. An initial questionnaire was carried out, aimed to explore the students' attitudes towards their own learning process. The answers indicated that the students did not expect much support from each other. The interviews also showed lack of the students' confidence in their own capability to contribute to knowledge construction in a group of students. The importance of self-discipline and self-efficiency was mentioned several times among the students and teachers in the interviews. Statistical information about the discussion forum participants' behaviour on WebCT shows that teachers and students made 1328 postings (original and follow-up postings) in total to the discussion forum during the entire course. The number of the students' original posts and follow-up posts were summarized and put together in figures showing each student's achievements and activity in the discussion forum.

As measurement, concerning the students' learning outcomes the sum of credit points (maximum 10) taken of each student is used. The table below shows the result for each student.

Table 1: Number of credit points for each student

Students	1	2	3	4	5	6	7	9
Credit points	2	10	4	10	0	10	0	4

Students' usage of WebCT

An analysis of the content of the various messages in the discussion forum show a mixture of social small talk and task related comments. In an interview one of the teachers expressed her critical view of the way the students used the discussion forum. She meant that the purpose of the discussions was not fulfilled since the discussions had too much character of a social dialogue among friends. Sometimes she could notice a discussion which was clearly leading to knowledge construction, but this did not occur very frequently and it was only related to a few students.

In a qualitative analysis of the content of the messages students 2, 4, and 6 show a larger amount of task related messages in comparison to the other students. Students 5 and 7 have the smallest number of task related messages.

Original postings

As can be seen from Figure 1, three students, 2, 4 and 6, show an outstanding number of original postings compared to the other students, both in part one and two of the course. This means that they started between 49 to 63 new threads in total. The other students, 1, 3, 5, 7, and 9, had four to 22 original posts and show a more active participation in part one compared to part two.

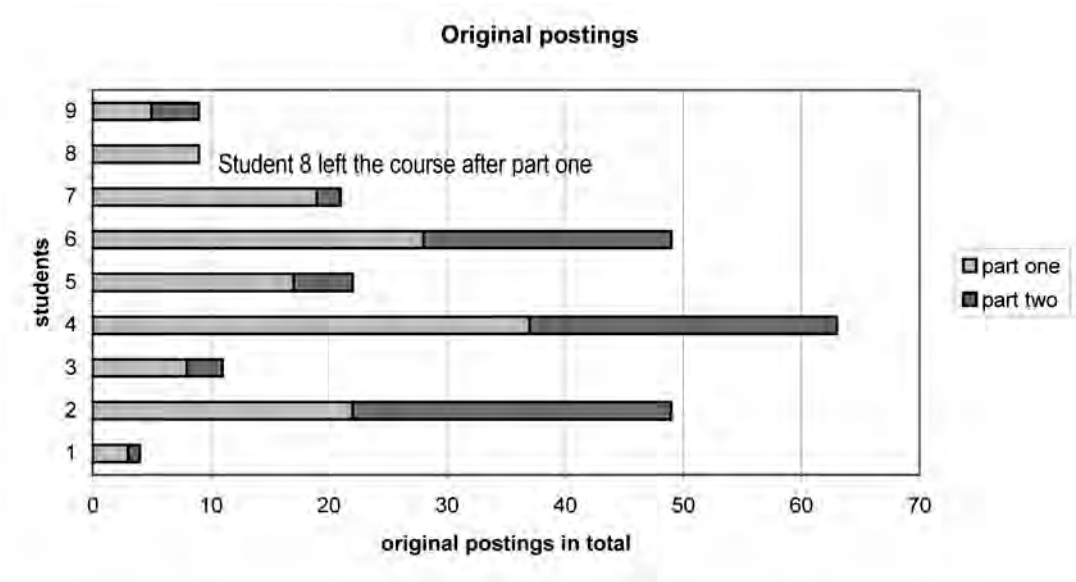

Figure 1. Number of original postings

Follow-up postings

In Figure 2, students 2, 4, and 6 are among the most active students, but the most active is student 7. The same tendency as in Figure 1 can be perceived – the students participated more actively in part one in comparison with part two.

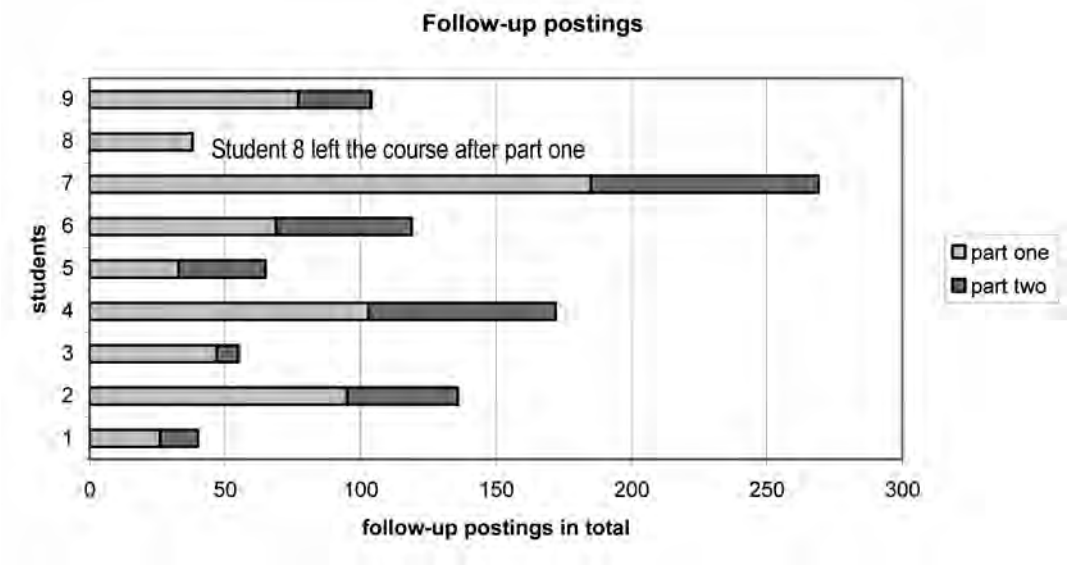

Figure 2. Number of follow-up postings

Discussion

Figure 1 clearly shows that students 2, 4 and 6 were more active than the other students regarding original postings. According to Webb *et al.* [8] and Wang & Newlin [14] some predictions about the students learning outcomes can be made by studying distance students activity in discussion forums on a LMS. To start a new thread, i.e. make an original posting on a subject can be related to students' mindset about learning but also to what Volery & Lord [3] found about self-learning and self discipline. This also coincides with the interviewees thoughts about self discipline. Posting an original message is more demanding than to respond on fellow students' messages. The tendency for the three active students' behaviour was quite obvious in part one of the course and became even more distinct in part two. They showed an outstanding number of original postings compared to the other students. According to the findings of Clark, [6], Webb *et al.* [8], Wang & Newlin [14] and Wu & Hiltz [15] the extent of activeness of the students is related to their learning outcomes.

Soong *et al.* [11] underpin the importance of students' attitudes towards the course and show that students' own learning capability i.e. mindset about learning appears to be a vital component according to the question of students' active role in discussion forums. The initial questionnaire and the interviews indicated the students' attitudes towards knowledge construction and learning processes. Many of the students expressed their scepticism about their own capability to contribute to knowledge construction in a group of students. The students' lack of previous experience from academic studies could be an explanation to this view. These doubts could have been relevant for the outcome of the students' activity on the discussion forum. Students who did not value their own contribution to a discussion forum as a part of a learning process may not have been motivated to participate in a discussion. The teacher had observed that some discussions lead to knowledge construction, but these were only related to a few students. This coincides with the findings of Soong *et al.* [11] that the students' mindset about learning is a critical factor worth considering in distance education.

Conclusions and further studies

Due to the limited quantity of students it is not possible to draw any firm conclusions simply based on the empirical material in this study. Nevertheless, supported by previous research, the assumption is that students' attitudes towards knowledge construction and learning processes affect the way they behave on a discussion forum. It can also be established that the study points in the same direction as previous research results regarding prediction of students' learning outcomes, namely that students' behaviour on a discussion forum indicates their learning outcomes at the end of a course.

The conclusions indicates that monitoring the students activities on the LMS can be relevant for the distance teacher when evaluating, planning and developing the teaching methods and the kind of support needed in a web based distance course. Regarding these aspects the distance teacher's role in distance education needs further investigations.

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E-LEARNING STRATEGIES IN AUSTRIA – AN INTERMEDIATE SURVEY OF FIVE YEARS OF DEVELOPMENT

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Introduction

Our main objective in education has become more relevant than ever in today's knowledge-based society: rather than focusing our attention on merely reproducing knowledge, we are concentrating on its application as well as critically reflecting upon how this knowledge is constructed. It is a matter of finding solutions to new challenges. First-rate education and training not only secure existing jobs and create new ones, they also provide young people with a foundation for personal development, for a meaningful life and a successful career.

The trends in Europe are therefore to integrate IT-application and e-learning in the whole learning process, dealing with electronic "content" (electronic supported learning materials) and using IT-applications outside school and lessons for personal and professional life.

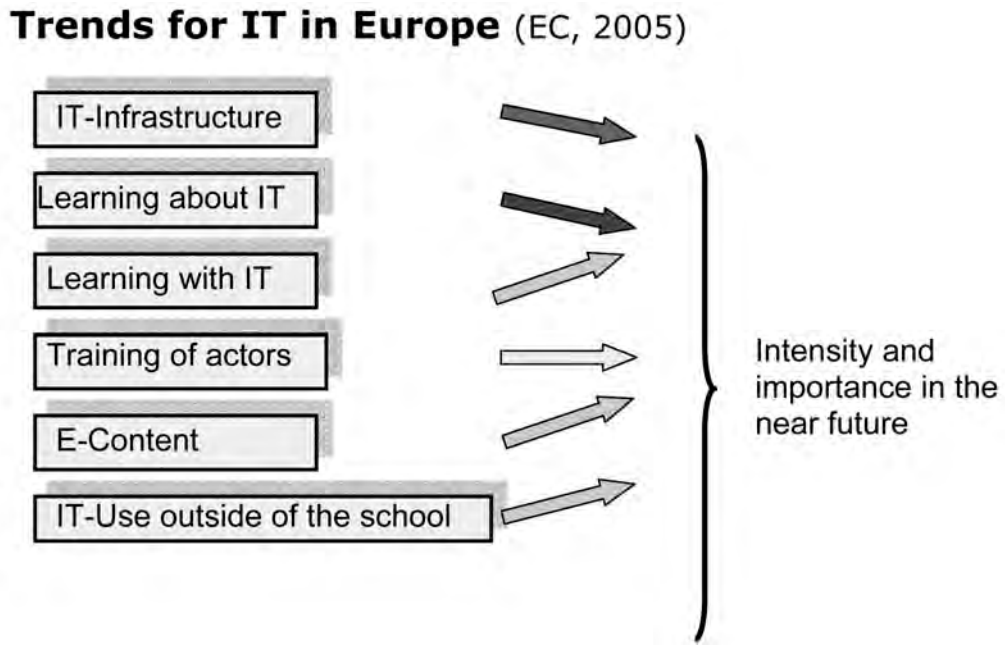

Figure 1. Trends of IT-integration in Europe (R. Apflauer, bm:bwk)

Evidences for wide range of access in OECD countries

Frequent internet access, frequent use of e-learning for life and employment and positive attitudes towards IT-applications are common issue for young people in industrial countries. The OECD published data from PISA 2003 (=Programme of International Students Assessment) background questionnaire on students familiarity with ICT. 33 countries took up this option in PISA 2003. The responses were summarized as follows (OECD, Are Students ready for a technology rich world?, Paris, 2006):

- Almost all 15-year-old students in OECD countries have experience of using computers, but the length of time for which students have been using computers differs greatly across countries.
- Access to computers at home and at school has increased since 2000 and most students now have access to computers in both. However, students without computer access at home are likely to come from low socio-economic backgrounds, especially in those countries where overall access to home computers is comparatively low. The number of computers per student in schools has increased since PISA 2000, but it remains highly unequal across countries.

- Social inequalities across countries in terms of access to resources for home study are wider for computers than for books.
- Even though access to computers is more universal at school than at home, 15-year-old students use their computers at home most frequently. Nearly three-quarters are using computers at home several times each week.
- Students use computers for a wide range of functions, not just to play games. Various common uses, such as Internet research, have educational potential, but students use specific educational software less frequently.
- The vast majority of students are able to tackle basic ICT tasks and students are generally confident about their Internet abilities. While fewer can perform high-level tasks unaided, most think they could do so with some help.
- Overall, female students use computers less frequently, and are less confident in ICT, than their male counterparts. However, this varies by type of use. Females are now about as confident as are males that they can perform basic computer functions, but males remain much more confident in high-level tasks such as programming, suggesting that the male bias in advanced computer studies may persist.

In most of the European countries computer and internet use is part of the lifestyle and quite common for young people. It will be possible to bridge the digital gap. The education system must act quickly to integrate all these developments in a very comprehensive way.

The Lisbon process was an important motivation for European countries to fulfil ambitious targets and plan a lot of activities to integrate information technologies in education. After five years of work the driving forces are shallow, the public attendance is decreasing, all is getting more usual. We must set a second impulse to move on young minds again.

"eFit – Phase 2"

The Austrian school administration took the initiative in 2000 by consolidating and specifically funding the implementation of new media in education and culture. With financial backing our "eFit Initiative" quickly developed and has become a success story. Under the "umbrella" of eFit Austria, we have activated the enormous potential of those involved in the fields of education and culture and have helped to launch innovative ideas and projects along the road. Consequently we have been able to reach numerous eFit targets; one outstanding example is a comprehensive 100% Internet connectivity at our schools.

In 2005 eFit Austria entered its second phase and, funded by the "Education Innovation Money" eFit will be continued until 2006. eFit Austria2 aims to strengthen the sustainability of the eFit projects so far and to ensure that the necessary technical, infrastructural and didactic/teaching pre-conditions are in place so that both the new media and the changes in learning culture are embedded in the Austrian education system. There are six principles of innovation:

New Understanding of Education: The new media support an understanding of education that sets top priority for training and life-long further education. Accessibility, motivation and interaction will be made significantly easier – also for the working population and older employees. The new media also enable education institutions to become accessible to all who are interested.

New Learning and Teaching Culture: By implementing electronic media, appropriately qualified teachers can use accessible, online teaching/learning material to prepare for their classes more effectively and to teach all target groups more productively. Teaching staff will acquire not only pedagogical skills but also the necessary media competence. New media allow the learning process to become functional and increasingly more empirical with project-oriented and/or task-related components. Learning – whether individually or in virtual teams – is becoming more and more associated with developing solutions and making use of new forms of communication. Here experts claim that this change in media in teaching has a positive effect on the whole learning process.

New Quality in Education: The new media promote quality in education. Education standards, based on subject matter, indicators and benchmarks, all give a clear indication of the quality in education. Quality in education is also assessed by the extent to which it is conveyed in a solution-oriented way.

New Education Infrastructure: Basis and prerequisite for the widely-effective implementation of the new media is a high-quality, reliable and user-friendly infrastructure. In future, eContent, offering digitized teaching/learning information and programmes, will be made available: user-suitable, barrier-free, structured, formatted and personalized. Centres of Competence have been set up at central locations where IT-supported services are either already available or can be developed, for all tasks required of educational institutions and where advisory services are provided. In cooperation with universities and Fachhochschulen, investments will also be made in research. Broadband networks are to be expanded.

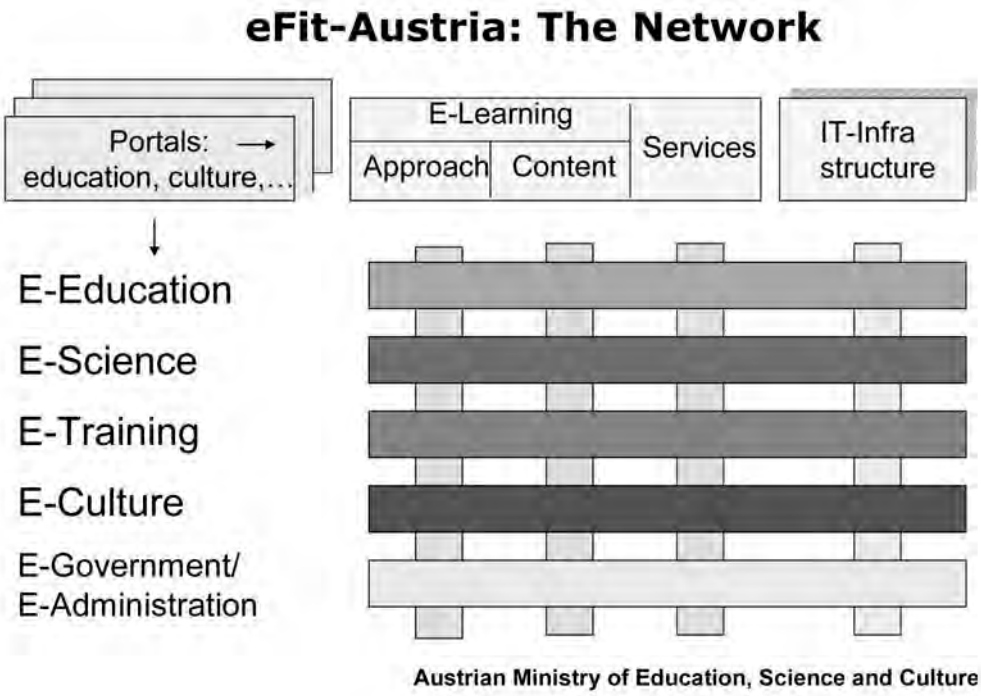

Figure 2. Matrix structure of eFit2 (R. Apflauer, bm:bwk)

New Partnerships in Education: The new media are the driving force behind the international exchange of ideas and projects. Partnerships between schools and teaching staff within the European area (also within the framework of EU programmes) are leaving their mark on our day-to-day education of the future, as is the exchange of best practice teaching/learning methods.

New Understanding of Culture: The new media aim to provide the population with low threshold access to all that the Austrian cultural facilities have to offer and, in doing so, they will contribute to a broad-ranged confrontation with art and cultural issues.

The new paradigm is to bring main stream education topics like quality programmes and change processes at school or education standards in different subjects in coordination with e-learning topics. One example is the connection of basic skill testing like the ECDL (European Computer Driving Licence – with 530.000 single tests in 4 years a success-story in small Austria) and education standards or the application of "reusable" learning objects as testing tasks of education standards (see project description below).

Selected projects of eFit-2

eEducation and eLearning

eFit Austria, with over 150 projects, has succeeded in providing a strong impetus to a new teaching and learning culture. More than 25,000 pupils and 4,000 teachers made use of eLearning implements. The very fact that 80% of these projects under eFit Austria1 are being continued shows their sustainability.

Objectives to be achieved in area of eEducation by 2006:

- Across-the-board agreement with regard to application software, teaching and learning software and software for school administration
- Concrete support and funding but also with clear structures and defined areas of responsibility within the eContent Initiative (department, education server, publishers and authors)
- Comprehensive e-learning clusters (collaboration of schools and school partnerships) comprising at least 20 school locations in each federal province
- Preparation of eLearning pilot school classes before integration into the formal school system
- Revision of IT qualifications in the BMHS/BS (TVE – Technical Vocational Education) sector
- Review of mid-level administration with regard to IT education standards, IT support at schools and also guidelines for the provision of an eLearning environment
- Conduct of projects with subnotebook-PCs/PDA/individual learning tools
- Increase in research projects
- Innovative impulses for teacher in-service training
- Critical confrontation with the new media (critical media reception)

In this context, there are important projects to be completed by 2006:

eLearning clusters (eLC)/eLearning in everyday school life (eLSA): The focal point of this school development project for lower and upper forms that have eContent and platform utilization (partly in notebook classes) concentrates on the development of learning methods, on teaching/learning culture and education standards. By 2006 a didactic model should be in place for all locations together with installed networks for schools and their users. About 120 schools of all types are involved. The idea of clustering means co-operation under themselves and with companies and university institutes.

eContent Initiative: Within the scope of the whole project, teaching/learning software and eLearning material are being developed specifically for teaching and are being offered via provider structures such as education servers in the federal provinces but also via independent subject servers and school servers (eContent clusters). Here it is important to involve all authors from publishing houses, school locations and education server editors etc and to develop teaching materials for a wide range of subjects. By the end of 2006, it will be possible to carry out approximately a third of classroom instruction in all subjects at secondary school level using eLearning materials.

Media-Manual.at: This website provides information on the topic of "active media work in schools" in the form of lectures and workshops, with pupils and teachers as target groups. Parallel to this, more than 12,000 pupils and 500 teachers received support as part of the Media Literacy Award. This project was awarded the Comenius Medal in 2004.

eLearning Strategies at Teacher Training Institutes: The objective is a common platform for eLearning seminars, new seminar concepts and a greater exchange of experiences. It involves also special in-service training features, which has been progressing systematically, involves setting up networks for INTEL I and INTEL II graduates. It aims to optimize the implementation of SbX contents. Strongly encouraging teachers to visit each other's schools will promote the exchange of experiences. IMST3 – with the core areas eLearning and eTeaching – Teaching and Learning with New Media, financed by the MNI fund (mathematics, natural sciences, informatics) is to be integrated at the planned, national centres for subject-related didactics.

Education Portal and eServices

Within the framework of eFit Austria, projects were carried out that drew a great deal of interest: based on a scientifically sound, worldwide platform evaluation, the bm:bwk recommended nine cost-free learning platforms (LMS and CMS). In the meantime, not only schools but also Fachhochschulen, universities and private industry are following these recommendations. The Schoolbook Extra (SbX) project, with approved electronic teaching and learning materials, has become a successful exemplary content project. The ministry education portal (www.bildung.at) offers a one-stop-shop for all

eLearning activities within the framework of eFit Austria and it will undergo further development to become an eContent clearing house offering an interesting range of qualitative, web-based, educational contents for Austria's teachers and pupils. eFit Austria2 will promote significant developments in innovative IT services for education in Austria.

Important objectives in this sector:

- setting up an education portal as an access point for all available services relevant to education
- providing electronic, quality-assured teaching and learning materials for all levels of education
- setting up a platform for all education initiatives
- forming a development forum and compiling a content catalogue for eLearning educational offers
- integrating the implementation of Learning Management platforms
- taking European and international standards into account

A special feature – education standards and learning objects

The experience gained in Europe will be taken into consideration when developing models of essential skills and education standards in all IT subjects as well as models for schools themselves (eLearning quality schools). The description of education standards in Austria will be subject-oriented and consists of three parts:

- a competence model for students in more dimensions (in Austria three dimensions are applied: content of subject, action-oriented performance of subject, complexity of subject);
- the formal description of the subject-oriented standards;
- concrete tasks and items to demonstrate, how every standard formulation can be connected with examples of different tasks (like in international achievement assessments).

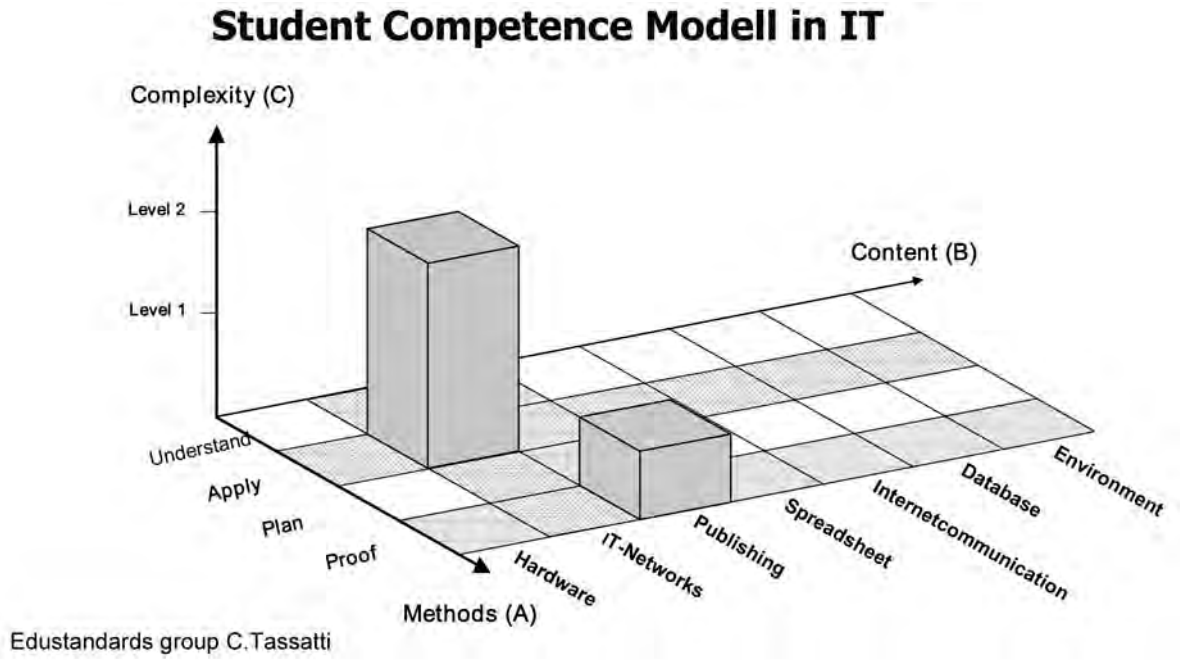

Figure 3. Competence model of education standards in informatics (C. Tassatti, HAK Neumarkt)

The tasks and item-groups which show the concrete requirements cannot only consist of paper written tasks, but also be performed as electronic learning object. The reusability is quite clear – it is a constitutional feature of tasks to be reused by the whole student population and context orientation is also fixed. The interactivity will be a new feature, supporting dynamic skills of the students. So, reusable learning objects show an advanced application of item groups of education standard testing. The tests can be set up as online tests with the advantage of online tools (supported formulation of items, easy to change, immediate evaluation, connected with other subsystems).

The second feature of a reusable learning object is the connection with the curriculum reform process.

Curricula, even vocational curricula change every three to five years. Flexibility and modularisation of the curriculum is therefore an important issue. The curricula can be built up in three or four steps (course system, learning unit, learning module, learning object) with reusable learning objects as smallest unit.

Some example of this conception can be found at

www.londonmet.ac.uk/ltri/learningobjects
www.e-teaching-austria.at
www.wirtschaftsmuseum.at/wirtschaft
www.physicsnet.at
www.mathe-online.at
www.mehalev.org.il/mop/flash_inED
http://webphysics.davidson.edu/Applets
http://showroom.bitmedia.cc
www.lehrer-online.de
www.educeth.ch
Different approaches to learning objects can be found.

An often used metaphoric picture for reusable learning objects is a LEGO-brick, where larger units can be built. For content-production there are some discussed standards like SCORM (=sharable content object reference manual – description of the technical framework for web based learning), IMS (=IMS learning consortium is concerned with standards for learning servers, content and enterprise integration) or LOM (=learning object metadata – will specify the syntax of learning objects-metadata: these "standards" are technical and complete different from definition of education standards.

After a phase of trial and errors with first e-learning approaches in the Nineties of the last century, a phase of clear strategies to roll out e-learning programmes for all university institutes, Fachhochschulen and schools in the late 90's, we have now a phase of consolidation and evaluation of the project structure and the project results. eLearning had become a usual aid for learning processes (or even not) for students and adult people but not meaningful or euphoric, rather tool-oriented and practical. The surplus for academic learning or application in professional fields has to be investigated. The positive changes in all learning processes, stimulated by e-learning environments, are proved and thus irreversible. We should find rational strategies to convince "mainstream education workers" and to find mainstream solutions for all learners.

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FROM "INFORMATICS" TO "E-LEARNING" – 20 YEARS OF INTEGRATING NEW MEDIA AND ICT IN EDUCATION IN AUSTRIA

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Erika Hummer, eLSA, Birgitta Loucky-Reisner, School Portraits, Austria

ICT in education

20 years ago – fall 1985 – ICT started being used in Austrian's classrooms.[1] Being named "informatics", it was and is used for teaching computer sciences. It is a subject for students in secondary schools – required for students aged 14-18.

Since the publication of the action plan of the European Commission "Learning in the Information Society"[2] in 1996 which postulated the usage of computers for even younger children, education with computers is being realised also in primary schools.[3]

Since 1985 technical infrastructure is being fostered at Austrian schools. 2003 about € 35,2M were invested in IT-infrastructure, meanwhile Austria is of exemplary development in Europe. This infrastructure is not being used in computer sciences only, but in all areas and for all students. E.g. the ECDL is being offered for students in all areas, not only for those with an IT-focus.

Furthermore, E-learning is being used more and more throughout all areas, subjects and classes.

Austrian E-learning cluster (for all students older than 14 years)[4] and eLSA (for students aged 10-14)[5] are offering special programmes for students and schools throughout all Austria since 2002. Those programmes show a visible change in teaching methods towards self-dependent, lifelong learning methods. Furthermore they are impulses for school development.

This is one of the goals of eLSA project.

-Project

eLSA means: e-Learning im Schulalltag – E-learning in the daily school business

In 2002 eLSA started as a pilot project with nine schools, each located in one of the nine Austrian provinces. Teachers try to implement E-teaching and E-learning in the everyday teaching situation by offering the students E-learning sequences in very different and creative variations. As a common communication and working platform they were using "BlackBoard®". The initial phase was systematically evaluated (University of Innsbruck) and there were several case studies during the first three years of the pilot project.

In autumn 2005 eLSA II started with 15 new schools. We hope to increase the number of participating schools up to 60 (or more) with the end of this year.

[1] Reiter, Anton: 20 Jahre Schulinformatik in Österreich und IKT-Einsatz im Unterricht, CDA Perg, 2005

[2] http://europa.eu.int/scadplus/leg/en/cha/c11032.htm

[3] http://www.fgi.at/if/artikel/if1998h2Reiter.html

[4] http://www.e-teaching-austria.at/eLC/index.htm

[5] http://elsa.schule.at/

Schoolportraits

Austria took part in the ERNIST (European Research Network for ICT in Schools of Tomorrow) Project: "Schoolportraits" which described and analysed how schools worked on the implementation of ICT in their schools and how this affected pupils, teachers and the school organisation and management. Results were published on a special website and in printed form.[6]
Schoolportraits Austria is based on this approach extended by some items.

Goals of the project:

On the level of individual schools

- Promotion of the sustainability of innovative use of ICT
- Quality assurance of the use of ICT in school education
- Participation in the project can be used as marketing instrument

On regional and national level

- Gaining practical experience for future certifications – suggestions for Guidelines for future certifications
- Establishing certification as method to endorse sustainability and quality assurance of the innovative use of ICT in schools

Participating Schools: the participating schools took part in the project eLSA:

- Gymnasium der Diözese Eisenstadt
- Bundesrealgymnasium Bundesoberstufenrealgymnasium Landeck
- BRG Kepler Graz

Activities within the project:

Self assessment: the self assessments have both a descriptive and an appreciative element. The self assessment was supported by means of a structured list of questions

The questions were strucured in the following way

- General description of the school
- Changes for pupils/students
- Changes for teachers
- Organisational change
- Changes in the co-operation with others
- Reflection and ambitions
- Appreciation
- Lessons for others

Of particular importance was the topic of documentation to ensure that statements and conclusions are reproductable for others.

School visit

General Agenda

- Talks with the school management and the E-learning co-ordinator
- Attendance of 2 to 3 lessons including interviews with pupils

[6] http://eunbrux09.eun.org/ww/en/pub/insight/school_innovation/best_practice.htm

- Discussion with a group of teachers respectively the entire teaching staff (BRG Kepler)
- Talks with the participating schools inspectors

Based on the self assessments, an individual list of questions for each school was developed. In each school between 50 and 70 topics were discussed, which were the results of the self assessment of the schools.

Final report for each school

Results of self assessments and school visits:

- Pupils play a decisive role as change agents. Their enthusiasm motivates teachers to practice E-learning and they appreciate the advantages of E-learning. Pupils are accustomed to the use of ICT in learning.
- The use of ICT initiates a concentration on didactics – both on level of the individual teachers as well as on the level of the entire staff.
- Additional amount of work: The use of ICT in lessons demands very careful and time consuming prearrangements. The production of media adequate materials as well as preparing exercises on different levels result a higher workload. The question weather growing experience and the reusability of materials will reduce this higher workload in the future cannot be answered at present.
- High acceptance of the use of ICT in a school seems to be correlated with a high degree of cooperation: cooperation within the staff of the school as well as cooperation with other schools and institutions.
- Further education of teachers: E-learning beginners need the common courses and training as well as individual on-the-job support. Main topic of beginners training is the technological aspect. For advanced teachers different methodical approaches and didactics gain in importance.
- In the future the maintenance of equipment and funding of new equipment will be an increasing challenge for school management.

Students and computers

As a teacher of computer sciences, one can see that it is getting easier every year to teach ICT competences. Children are getting more educated already at home, more and more kindergartens are using computers already in their work.

We can see that children do not have any hesitations in using computers; the younger the children are having their first contacts, the easier it is for them to learn basic competences and tools.

Older students sometimes are very much influenced by traditional forms of education and do have problems with these new forms of self-dependent learning. They usually use new media only for research and do have some resentment. Explorative and collaborative learning has to be explicatively trained – in contrast to younger children.

Unfortunately, in Austria there is no regulated ICT introduction phase in secondary I classes (for students aged 10 to 14 years). Therefore it is sometimes difficult to teach in inhomogeneous classes with E-learning methods, since very different levels are to be expected.

Parents often have the wish and expectation that their children learn ICT skills at schools, somehow as a new cultural skill in our knowledge society. Society is expecting this learning at a very early age in order to prevent knowledge gaps and a two-classes society.

For instance it might be very important to offer special programmes for disabled and slow learners and their requirements by offering ICT programmes. E-learning cannot only ease the learning process, but also enhance their quality of life.

Teachers and computers

The gap – concerning ICT competences – between students and their teachers is steadily increasing. This gap can be only very slowly closed and quite a lot of caution is necessary. This is not only true for "older" teachers, but also for fairly young teachers, since they did not learn those competences in their own education.

In Austria, a special program for teachers is being offered (eFit)[7] for those teachers. This program includes methods of teachings, didactics, but also tools and software training.

But more and more teachers seam to be tired of seminars and trainings. Furthermore it can be seen that only a small group of teachers seem to accept those trainings at all, therefore we see mainly the same persons in different seminars, therefore we cannot see totally positive effects of those programmes.

E-coaching

In 2005/06 a new way was started: E-coaching and E-buddies.[8] They help teacher-colleagues at their workplace in concrete difficult situations and offer solutions and trainings on site. Those buddies are paid by the Federal Ministry of Education for a small fee. E-buddies are supporting the trainee for several weeks (app. 7 hours) and taking the trainees' requirements into consideration. It is possible that trainee and buddy are planning an E-learning sequence and discussing trainee's experiences.

E-tutors are supporting five colleagues app. 20 hours, mainly from their own schools.

E-trainers (mentors) are supporting 12-16 other teachers (20 hours) for implementing blended learning and more sophisticated sequences.

In Austria (as in other European countries) it is being discussed, whether it might be useful to have a special certificate for those training other colleagues and how this could be implemented.

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[7] http://www.efit.at/

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BLENDED LEARNING IN SECONDARY SCHOOLS THE AUSTRIAN *E*-LEARNING CLUSTER AS A MODEL OF CHANGE TOWARDS INNOVATION AND FLEXIBILTY IN TEACHING

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Blended Learning on the Upper Secondary Level – Challenges and Perspectives

The integration of ICT in the regular school system is regarded to be of very high relevance in many European countries, although a general trend and common strategies are sometimes difficult to observe. The activities range from national eLearning plans to single solutions on provincial, municipal or school level. Nevertheless, there is a common sense visible with regard to the importance of ICT literacy as an essential feature of active citizenship and the necessity to provide pupils and students with the skills that are required on a flexible labour market. Teachers in vocational education and training feel the pressure for innovation and the need for adaptation more intensively as parents and future employers often expect them to react on the current development more rapidly. Moreover, pupils enter the upper secondary schools with much higher ICT skills and a very unconcerned approach to using technology and instruments of virtual communication in their everyday life. Therefore teachers feel the need to change and to further training and professional development much earlier compared to times when computers were considered to be an exceptional instrument in teaching and a tool for experts, mainly teachers of maths and natural sciences.

Thus a successful strategy for the implementation of blended learning models will always focus on the teachers and their needs in the first place. They need support to bear their share in the transformation process from teaching to learning, from giving lectures to an audience of more or less attentive pupils compared to coaching independent learners in their autonomous acquisition of knowledge at their own speed in a virtual learning environment. Many teachers are also scared of a vision to be replaced by computers, with the result that a discussion and definition of blended learning is very essential at the beginning of a process of change. In comparison to university-based courses for students on a distance, secondary schools are dominated by face-to-face teaching with the result that a focus on didactics and methodology of blended learning in the classroom is of high importance. Therefore we define blended learning as a mix of methods in the classroom setting.

Even technology still appears to be an obstacle for some teachers. Either they are afraid that they might be expected to be technicians or they have the experience that technology quite often simply does not work and is therefore considered to be a time-consuming barrier in the learning process. Moreover, some teachers fear that the intensive use of technology can prevent direct communication between pupils. Undoubtedly, these arguments and misgivings also contain a grain of truth, with the result that it is very important to confirm teachers in their opinion that they should focus on pedagogical and not on technological issues. Outsourcing maintenance and services for hardware and software to specialists can relieve teachers from their sense of responsibility. Strictly speaking, technology simply has to work!

The implementation of eLearning in classrooms will only be successful if teachers participate in training activities that provide them with the necessary skills and tools that allow them to use the wide range of opportunities information technology can offer. Structured plans and curricula in teacher training can give them security and will make the benefits of the new way of teaching and learning apparent. Educational authorities play an important role in this context as they have to provide financial investment for these training activities. However, it must be emphasised that the design of courses for the further training of teachers should integrate the actual needs of the target group. Therefore tailor-made courses for single schools reflecting the needs of the staff or *e*-buddy courses could be more effective compared to big training schemes (also see below).

The integration of blended learning in a school must be based on a common decision by the head of school, the teaching staff, pupils and parents. Only if the initiative is part of the school programme it is likely to have success to be established firmly and to develop further.

The Austrian eLearning Cluster Project

Austria is meeting the goals of the eEurope action plan with the government initiative called "eFit-Austria", which is designed to foster the implementation of modern communication and information technologies in education, science and culture.

"eFit Austria" (http://www.efit.at/english) was established as a platform for IT initiatives and projects which deal with new and innovative methods in teaching, learning and research in education, science and culture. The conception of "eLearning Cluster Schools" in Austria is part of this programme and tries to push and promote the development towards innovation in the school system by a special programme for model schools that are implementing eLearning sequences in their notebook computer classes. 60 Upper Secondary Schools and Colleges in the nine federal provinces participate in this programme and its main objectives are as follows:

- The implementation of practical models of eLearning, networking and co-operation with regard to the development of learning material in subject groups. Educational content is provided in electronic format and structured in learning packages according to the SCORM standard to be integrated in electronic learning platforms or learning management systems (LMS). Students have direct access to it in school networks via their laptop computers or from home at a distance via the Internet.
- The development of teacher training courses to enhance the teachers' skills and qualifications.
- The exchange of examples of best practice in particular concerning the practical work with virtual learning environments.
- Networking and co-operation by opening the systems: educational material is being offered on the web without any access restrictions.
- Integration of eLearning in the annual school programmes and school profiles as a an essential contribution to school development.

The national framework of this project is defined, supervised and financed by the Austrian Federal Ministry of Education (http://www.bmbwk.gv.at, http://www.e-teaching-austria.at) and the European Social Fund (2002 – 2006) and managed by cluster-board managers on provincial level.

The eLearning Cluster schools are regarded to be pioneer schools that spread results, experience and findings to further schools and colleges in their region in the subsequent stage of dissemination.

Both authors of this paper are members of the eLearning cluster in the Austrian province Upper Austria, where six schools and colleges participate.

Virtual Learning Environment

In 2002 at the beginning of the project the discussion was somehow dominated by the question which virtual learning environment or learning management system should be used. From today's perspective it can be stated that the whole discussion was overestimated, because it soon turned out that it is necessary to make a quick decision for a platform that is not too complex not to mention complicated, but even more importantly very user-friendly and clearly arranged on its surface.

In addition, it should rather not be a proprietary system as this can quite often lead to problems in the transfer of learning material and the integration of structured learning packages and learning objects according to the SCORM standard.

The eLearning Cluster Upper Austria follows the current trend and uses the content management system MOODLE (http://moodle.org) not only because it is an open source product, but it offers a variety of applications for the beginner via the average user to the expert. However, it should be pointed out again that we have made the practical experience that very long discussions about the advantages and disadvantages of different products are often an obstacle for the motivation to introduce innovative methods in learning and teaching.

Teacher Training

As it has already been pointed out above, the further training of teachers appears to be the key to success in a project that aims at the introduction of eLearning in a school or college. The focus should be on pragmatic solutions, which include the actual needs of the target group. Teachers should already have basic IT skills before they enrol in courses that will lead to the qualification of an "*e*teacher".

Basically, a "train the trainer concept" was realised in the eLearning Cluster Upper Austria, which means that experienced teachers with skills in the practical integration of IT in teaching adopted a trainer's role for those who felt the need for training. The following steps have turned out to be successful:

- The most essential aspect in developing teacher training courses is the focus on methodology and didactics. "The Principles of Effective Instruction" by Hermann Astleitner (http://www.qis.at/material/astleitner_unterrichtsqualit%C3%A4t.pdf) formed the basis for the pedagogical discussion and the subsequent design of teacher training courses in the eLearning Cluster Upper Austria.
- To begin with, teachers need tools which allow them to structure their materials, which most of them already have in electronic format, or to integrate small learning objects in packages for students. The "Reload Editor" (http://www.reload.ac.uk) has turned out to be a very effective tool in this respect and teachers appreciate it very much as it only requires a very short time to be able to use it effectively. Two hours of training are really sufficient to enable teachers to design their first learning packages in a hands-on workshop.
  Dealing with audio and video programmes could be a next step teachers may want to take as some of them want to transform their already existing files into electronic format.
- At the next stage teachers should be trained in the use of the platform which is used at their school. Their sole participation in a course is not enough, but more importantly they need a help-desk that can support them in case of questions and troubles later on during their work with pupils. In our project is has turned out to be very effective to install a so-called *e*-buddy system: in the beginning every teacher gets an experienced colleague who can provide support and help.
- Sooner or later many teachers feel the need of developing their own material and courses. It is very essential to facilitate the co-operation of teachers in this respect. Working together in subject groups will foster the exchange of experience and materials and prevent teachers from "inventing the wheel again and again". The co-operation of different schools in a cluster favours this exchange and open approach to sharing examples of good practice.

European Perspectives and Co-operation

International orientation appears to be of utmost importance although it is sometimes difficult to find appropriate partners for secondary schools and colleges to work together in the field of eLearning at the level of initial education and training in the age-group of 10-20. Occasionally we were given the impression that the scope of definition of eLearning is biggest on the school level. Therefore in recent years the eLearning Cluster Upper Austria has tried to integrate experience from the university level and from adult education and we have really felt the need of putting emphasis on methodological and didactical issues to a much larger extent.

In 2004 a LEONARDO Mobility Project for Trainers with the title "eVOC – eLearning in Vocational Education and Training" (Austrian LEONARDO Mobility Award 2005) was realised with the partner CNED (Centro Naval de Ensino a Distancia – Distance Education Centre of the Portuguese Navy, Lisbon – PT) and the universities of Aveiro, Minho and the Portuguese Telecom. In 2005/06 a second LEONARDO Mobility Project for Trainers ("eTT – Train the Trainer in eLearning") was established with the Distance Education Centre of the Kaunas University of Technology, Lithuania and currently the eLearning Cluster Upper Austria has submitted a third application for a LEONARDO mobility project for trainers with the title ("TeLUS – Technology Enhanced Learning in the Upper Secondary") with SELB – Southern Education and Library Board in Armagh – Northern Ireland, UK. Further information on these projects can be obtained from: http://projekte.kirchdorf.eduhi.at/leonardo.

In conclusion it can be said that the Cluster project received confirmation concerning the pathway it has taken. On the other hand, the experience gained in methodology, didactics and course design could be integrated in the efforts to develop the project further. Thus the exchange and know-how input on the European level is an essential part of the project work and appears to be an absolute necessity to avoid professional blinkers. Therefore the Cluster management is always open to further co-operations on the international level – also see the contacts below.

The Focus on the Learner – Benefits and Critical View

Continuous quality assessment is important to get feedback on the initiatives undertaken. The fourth year in the Austrian eLearning Cluster has a strong focus on the pupils in the colleges. Their evaluation of the activities undertaken is of the greatest importance for the further development and spreading the initiative. The first results are available, meetings of students were organised to ignite a discussion about benefits as well as critical aspects and disadvantages of blended learning. A study based on a questionnaire among students in different subjects shows the following results:

Motivation

Students liked working with the computer very much, they really prefer working with computers in the lessons and they would like to have this way of teaching more often. On the other hand, their interest in the subject did not increase to the same extent. Teachers who participated in this study, prefer the use of ICT in teaching and they believe that the students appreciate this way of teaching, but they think that students will not become more interested in the subject of the lesson because ICT is being used.

Achievements

Students as well as teachers are satisfied with the results achieved. They think that the students have made progress in IT as well as in their subjects. There are only a few less who believe that they learned faster and more efficiently by using computers.

Attitude towards Work

On the one hand students worked very independently, but on the other hand they also supported each other. It was mutual support and not so much support on one side only. There were only a few single workers. Teachers assisted half of the students and their advice and support was quite often passed on to other students.

Evaluation of Learning Material

Materials were considered to be clear and understandable, but they were not regarded to be easy.

Working Time

Students felt that they had enough time working on the exercises. Faster students could do additional exercises and some occasionally found time enough to do things that did not really belong to the lessons.

Assessments and Marks

Most of the students could agree to the way of getting marks and were of the opinion that the grading was fair.

Gender Related Analysis

In general it can be said that there is no substantial difference between males and females with regard to their attitude towards the use of ICT in teaching and learning.

It is rather the *girls* who think that

- they liked working with the computer
- the topic of the lesson has become more interesting for them because of the work with the computer
- they are satisfied with the results
- they know how to deal with the computer and the programmes much better now
- they helped others
- they received support from friends
- they are satisfied with the method and the results of the assessment

It is rather the *boys* who think that

- they had learned more in the subject by using a computer
- they can use the acquired IT-skills later in life
- they had enough time
- they could work on additional exercises
- they had time enough to do things that did not really belong to the lessons

Further questionnaires and studies will be carried out to evaluate the activities in the eLearning Cluster project, but it is already clearly visible that students like the integration of ICT or blended learning very much as it allows them to learn at their own speed and to use the enormous variety of additional information they can find on the web. Moreover, students appreciate their independence, the clear structure of blended learning lessons and the materials provided.

However, blended learning seems to put experienced learners into an advantageous position, whereas less self-confident pupils need more intensive coaching by teachers.

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GUIDELINES FOR THE DESIGN AND EVALUATION OF E-LEARNING SYSTEMS

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Abstract

Guidelines for educational software are not very common. Nevertheless, their usage can increase the quality of educational software and support the evaluation process. The following paper describes a system of guidelines for e-learning courses at the Vienna University of Technology. These guidelines were applied successfully in two projects. Our experience indicates that guidelines can form a sound basis for the design and evaluation of e-learning systems but have to be adapted to single cases.

1. Introduction

In Human-Computer Interaction and User Interface Design guidelines are fairly common. In contrast to that, guidelines are seldom used in e-learning. This might be due to several reasons. Every educational software is based on theoretical assumptions about the process of learning, whether explicitly or implicitly (Baumgartner 1995). It is well-known that there are many different learning theories. It seems plausible to assume that every one of these learning theories implies a different set of guidelines although some of the less general guidelines might be similar for several learning theories. In addition, there is some empirical evidence that the effectiveness of educational software always depends on the context in which it is used (Moonen 2002), for example on the classroom organization, the attitudes of the teacher, or the previous knowledge of learners. Guidelines have to be adapted to these environmental variables. Very complex forms of hypertextual organisation of contents should, for example, not be used in introductory lectures for undergraduate students, whereas more advanced students can profit from such a form of knowledge representation (Spiro *et al.* 1992).

Despite all these problems, guidelines for e-learning system can be applied in a meaningful way. It has, for example, been argued, that the predominant learning theory today is constructivism (see e.g. Ardito *et al*. 2004). Guidelines based to a certain extent on constructivist theory will, therefore, be relevant for the development of a significant amount of e-learning systems. In addition, the careful formulation and use of guidelines could overcome the problem of context. Guidelines what offer several options might be flexible enough to be applied to several contexts. Only the experts who teach a course or act as tutors can decide whether a given guideline is applicable in a certain context or not. This implies that the developers of an e-learning system should be in contact with the teachers to decide which option of a guideline is applicable. Such an approach would also lead to more participation of teachers and students in the design process. On the other hand, such a procedure runs contrary to common expectations about guidelines. Usually, guidelines are seen as fairly strict catalogues of do's and don't's. More flexible guidelines might be seen as more time-consuming and therefore less effective from the point of view of the developers.

Some efforts have been made to develop systems of guidelines for e-learning systems. One very well-known example is the system of guidelines formulated by Clark and Mayer (2003). Clark and Mayer point out that their guidelines are based on empirical research, not on opinion. They describe extensively the research which substantiates their guidelines. This information makes it easier to see the scope and the limits of single guidelines. Clark and Mayer cover several areas with their guidelines. They describe guidelines concerning the use of words and graphics, the use of audio, the problems of the use of interesting and motivating material, the use of examples, cooperation, learner control, and several others. Theirs is one of the most comprehensive systems of guidelines for e-learning. Hannafin (1997) also developed an interesting framework of guidelines which is based in psychology and pedagogy. In contrast to that, the guidelines devised by Ardito *et al.* (2004) are strongly influenced by research in usability. The authors themselves remark that their system has to be extended to relate their work to

pedagogy and psychology. Their main categories are Presentation (especially the use of graphics and visual information about the system), Hypermediality, Application Proactivity (which mainly refers to support given by the system to the user) and User's Activity. These are only examples for guidelines for e-learning systems.

The following text describes the developement of a specific set of guidelines. It was formulated in the course of the MobiLearn project. Its aim was to inform the design process of an e-learning system which can be used for teaching media informatics at Austrian universities. Later on, these guidelines were also used to develop and evaluate another e-learning system – the Ecodesign learning program. The text will describe the guidelines, general problems concerning guidelines and the experiences we gathered with using these guidelines for the developement of specific systems. Despite all the problems with guidelines, we found that they helped to increase the quality of the systems and that they formed a good starting point for the evaluation process.

2. The MobiLearn and the Ecodesign Project

The aim of the MobiLearn project (http://www.mobilearn.at/) was to develop an e-learning system to teach Media Informatics at Austrian universities. Media Informatics comprises courses on all aspects of the creation of multimedia systems. Four Austrian universities cooperated to develop several different learning modules. The project was funded by the Austrian Ministry for Education, Science and Culture. One important aim of the project was to exchange written material between the four universities on a more systematic level than before. All material for a lecture (lecture notes, transparencies, background material) is put on the WWW and can be used by all participants of the project for their own courses. Another important aim of the project was the support of mobile learning, especially learning with PDAs. It must be mentioned, however, that it turned out to be very difficult to develop material for laptops as well as for PDAs. The difference in screen size is so large that it made a complete redesign of the material necessary. Cooperative learning played a significant role in the MobiLearn project. Students are able to interact with each other and with their teachers either synchronously or asynchronously.

The guidelines described below were originally developed for the MobiLearn project. They still reflect to a large extent the goals of this project and the structure of the material presented. Basically, the material consisted of text, graphics and interactive examples illustrating the information presented in the text. In additon, cooperation between all participants is made possible. It seems to be plausible that e-learning programs structured quite differently (e.g. e-learning programs for little children) will need different guidelines. On the other hand, there is a certain similarity to the guidelines described in the literature. We, therefore, assume that, especially at universities, there is a large amount of e-learning programs for which these guidelines will be valid.

The Ecodesign project (Pohl *et al.* 2005) is supposed to teach sustainable product design to adult learners. The Ecodesign courses were originally offered by the Vienna University of Technology as face-to-face lectures. One of the problems of these courses was that participants not coming from Vienna had difficulties to attend. Therefore, we developed the concept of an online course with a restricted amount of face-to-face teaching. The participants have to work on seven different examples (e.g. the development of a sustainable electrical water kettle). They get access to relevant material through the e-learning system. Electronic communication (chat, forum) is also supported by the system. The design of the Ecodesign e-learning system was based on the guidelines from the MobiLearn project. An ongoing evaluation showed that these guidelines were an important starting point but had to be refined for the Ecodesign project. The target group of the course is adult learners who work in the area of product design. This is a target group with specific needs. The participants of the Ecodesign courses (which are offered every year) have very little time and some of them have little computer literacy as well. The Ecodesign e-learning system had to be adapted to the needs of these users. The modification of the guidelines resulting from our experience in the Ecodesign project will be described below.

3. Guidelines

3.1 General Remarks

In many situations it is necessary that the creation of e-learning systems is based on the more theoretical knowledge originating from educational science and psychology to ensure that learners can use these systems effectively. An advantage of this approach is that the experience of previous researchers which influenced the theoretical considerations does not get lost. It is important to relate this knowledge to the practice of educational software development. To achieve this, the knowledge from educational science and psychology has to be somehow translated, so that it can be applied to e-learnings systems in a meaningful way. Guidelines are one possibility how this process of translation can be done. Very often, teams developing e-learning systems are interdisciplinary ones, and guidelines can support the communication between the different groups. In this way, guidelines can become a useful tool for the development of e-learning systems even if they are, in some respects, not a perfect solution. So far, intuition played an important role for the development of educational software but this "caused a lot of instability and variability" (Lowyck 2002, p. 200). A more systematic body of knowledge about how e-learning works is, therefore, necessary. Guidelines can be a method of preserving the experience of developers of e-learning software. Clark and Mayer (2003, p. 1), for example, point out that their system of guidelines is based on a cognitive theory of how people learn and on scientifically valid research studies.

Beier and Vaughan (2003) point out that many interface design guidelines tend to be either too general or too specific. General guidelines are usually more comprehensive and flexible. One of the problems with general guidelines is that it is often difficult to apply them in practice. System designers tend to complain that general guidelines give them too little guidance for their work. More specific guidelines are very precise and can be applied easily but they can often only be adopted in a restricted number of cases. Beier and Vaughan suggest a layered approach with different levels of generality. Their model is very sophisticated and detailed. In many cases, a more simple combination of general and specific guidelines will probably be sufficient.

It is often difficult to distinguish between user interface guidelines and pedagogical guidelines. A good user interface and an easy-to-use system help learners to concentrate on the content and not on the system. Quintana *et al.* (2002) point out that learners differ from other users insofar as they are no experts in their domain. A good usability of educational software is, therefore, essential for effective learning. The guidelines developed for the MobiLearn project concentrate on pedagogical aspects of e-learning but also include interface guidelines where it seems appropriate.

3.2 Description of the Guidelines

The Guidelines developed for the MobiLearn and the Ecodesign project cover five different aspects: structure, interactivity, multimedia/visualization, mobile learning and cooperative learning.

Structure

The MobiLearn learning modules are structured in a hypertextual manner. This makes it possible to understand the interrelationships between various concepts in the material. The guidelines in this section refer to the way the nodes look like and how links should be designed. In general, nodes should not be larger than a computer screen and scroll fields should be avoided. Otherwise, it will be very difficult for students to organize their studies because scroll fields make it very difficult for them to assess how much they have to learn. It must be mentioned, however, that this guideline is very controversial. Smaller nodes make it necessary to jump more which might be annoying at times. The design of links is very important (Fisher 1992). They should be clear and give the learners a fairly precise idea what to expect. They should have meaningful names and lead to relevant material. In additon, graphical overview maps (sitemaps) should be used to give students a sense of the structure of the document (Jonassen 1996).

It is an open question whether hypertext is beneficial for learning (see e.g. Schulmeister 1997). Our experience in the Ecodesign project indicates that it also depends on the situation whether the use of hypertext makes sense. If the learners' task is to memorize a given material they prefer a linear

organization of the text. Any cross-reference link distracts them in this task. If they have to search for information in a large information base (as, e.g. the WWW) a hypertextual organization seems to be more appropriate. We would, therefore, suggest to use a hypertextual organization only in specific situations.

Interactivity

Interactivity is again and again mentioned as one of the advantages of educational software. It must be mentioned, however, that in the literature, the word 'interactivity' is used in many different ways. We define interactivity as the ability of the computer to react to the input coming from the student. Good examples for this are simulations where students can change variables of the system to find out how the system works under varying conditions. In this way, students get an idea of the complexity of the phenomena they are supposed to study. Problems can arise when simulations are either too complex so that students need much time to get acquainted with the system or too simple that they get bored quickly (Murray *et al.* 2003).

Interactivity also means that the computer can give feedback to the student. The use of examples which offer feedback is especially valuable (Clark & Mayer 2003). Examples support meaningful learning because they motivate learners to reflect the material instead of memorizing it.

Multimedia/Visualization

Multimedia is supposed to be another of the advantages of educational software. It depends very much on how Multimedia is designed whether this advantage can be exploited. William Winn (1993) has developed a rather comprehensive set of guidelines for visual material. These guidelines treat the use of pictures and diagrams, the layout of the screen, attention and perception and other important topics. Research of the last 30 years has shown that visualizations can be used effectively in educational material (books or software) if certain guidelines are observed. Pictures and diagrams should be relevant for the text they accompany and they should be explained in the text. Pictures and texts together should convey a coherent message. Irrelevant pictures should be avoided because they can have detrimental effects in some cases.

The use of video and animation is one of the great advantages of educational software. Experience from the Ecodesign project indicates, however, that these media should be used with care. Learners complained that the use of video was very time-consuming because of the time downloading this material from the internet took. In this situation, videos have to be extremely relevant for the course to make this effort worthwhile. Explaining the videos and their importance in the text also seems to be advisable. Animations were often described as "childish" and not taken seriously. They should be used with care and designed professionally.

Mobile Learning

Mobile learning is tested in several European countries right now. There is some experience already concerning laptops (Schaumburg & Issing 2002) but not enough experience concerning PDAs and cell phones. One advantage seems to be that students possess a personal learning tool which contains all the material which they need for a certain course. The use of PDAs for field experiments, for example in archeology, also seems to be very useful (Sharples *et al.* 2002). In general, mobile learning has to be planned carefully. The use of mobile technology in traditional face-to-face learning can be disruptive (Sharples 2003) because such equipment can distract from the presentation of a teacher. Appropriate pedagogical strategies have to be developed to avoid such situations.

Luchini *et al.* (2004) point out that an overwhelming problem with handheld tools is the small size of the screen. They developed guidelines for the design of educational software for such tools. They suggest, for example, to decompose tasks into smaller sub-tasks to make it easier to present them on one screen and dual-purpose interface elements which allow functionality (e.g. navigation) and scaffolding. Thus, the number of elements on the screen can be reduced.

Cooperative Learning

Cooperative learning without any accompanying measures is usually not very efficient. Experience shows that cooperative learning has to be organized by teachers (Allen *et al.* 1996). Electronic communication has to be well integrated into the course. Mailing lists or computer conferences usually need a tutor or teacher as a facilitator. Video conferences only allow a restricted interactivity between students and teachers. In general, cooperative learning can be very interesting for students and teachers but it requires very much effort especially from the teachers.

Electronic communication led to controversial opinions among the participants of the Ecodesign course. Email was well-known to the participants and its use was not problematic. The discussion forum was accepted by more or less everybody although it was not used widely. Chats organized by a tutor were held regularly. They were criticized by a majority of the course participants. The reason for this was that chats were too chaotic and that it was not possible to discuss questions in great detail. Some of the participants mentioned that they felt uncomfortable with chats because they had never used it before. Apparently, it is necessary to take the characteristics of the target group into account. Lifelong learning means that many learners who use e-learning systems will possess little computer literacy. Systems have to be adapted for these learners.

4. Conclusion

The use of guidelines for educational software poses some difficult problems. Nevertheless, there are some good arguments for the use of guidelines, especially, that guidelines can ensure that the development process of educational software is grounded in theory and takes the experience of previous research in that area into consideration. Guidelines can be used for the design process as well as for evaluation purposes. During the design process, they form a set of goals. During the evaluation process, researches can check whether these goals have been achieved.

Guidelines for educational software should not be used like cookbook recipes because many factors can influence their effectiveness. The usage of the guidelines developed for the MobiLearn project in the Ecodesign project indicates that it is probably necessary to adapt guidelines for every single case. The target group of an e-learning system and other contextual variables always play an important role. Nevertheless, the use of guidelines for the Ecodesign process enabled us to develop a clear and usable system which is adapted to the needs of learners with little or no computer literacy. We assume that in many cases the use of guidelines can lead to valuable results in design and evaluation. They can be very helpful for the evaluation process and the increase of the quality of educational software.

Acknowledgements

The MobiLearn project was financed by the Austrian Ministry for Education, Science and Culture (Initiative “Neue Medien in der Lehre an Universitäten und Fachhochschulen”). The project “eLearning Kurs zu umweltgerechter Produktgestaltung/ECODESIGN” was financed by the European Social Fund (esf) and the Austrian Ministry for Education, Science and Culture.

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APPLICATION OF 3D ENVIRONMENTS IN SCHOOL EDUCATION

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1. Introduction

Virtual Reality is expected having a special influence on the user's attitudes and eventually behaviour (cp. Biocca, 1995). Theoretically this can be explained by the increased presence, that such virtual interactive environments allow (cp. Short *et al.,* 1976). Newer findings differentiate between a number of more specific variables as immersion, but also spatial presence, involvement, and realness (Schubert *et al.,* 2003). However research in the educational use of such phenomena is rather limited, there is a relatively small amount of scientific publications dealing with Virtual Reality and education. Topics of specific interest had been the electronic classroom (1986), VR & Simulation (1995); virtual learning communities (since 1998);, virtual universities (1999); competence training for education personnel (2000). Additionally reviews of current educational software reveal that there is minimal use of VE technology to provide learning experiences in personal and social development or social problems. Moreover technology is used to train usage of large technical devices as planes, trains and industrial facilities in a simulation-type scenario.

On the other hand there is little opportunity for students in schools and colleges (in the age 14-19) to explore real problems in a truly interactive computer environment, for example to develop social awareness through exploration of events and consequences. Also young people are consumers of games on home computers that involve them in exciting problem solving activities in a virtual reality. Though many games do have some basis in reality only few – if any – have roots in key themes of the European schools curricula and relevance to the European Community's transversal policies. The CRIMCITY project, that this paper does focus on, aims to bridge the gap between the currently available educational software and the more dynamic games software market and to combine the potentials of 3D virtual environments with pedagogical techniques. It is important to note that especially younger people are used to playing computer games and are open to new ways of learning. Engagement is one of the important features creating learning effectiveness. Already Ahdell & Andresen (2001) could identify six key factors influencing user engagement: interactivity, flexibility, competition, reality, drama effects and usability.

Principally the purpose of this paper is to explore the technological potentials of 3D virtual environments from a pedagogical perspective and to outline scenarios for integration into school education. Along with that, the case of the CRIMCITY project will be presented and discussed. It will allow to study the benefits and effectiveness of learning through the use of VE and related technology, and to incorporate the strengths offered by the media. This research will provide an opportunity to examine pedagogical methodologies and practices as well as students and teacher's role in school education from different perspectives, and consider the potential for them to benefit from lifelong e-learning initiatives, based on experiences from research and development projects at national, European and international level.

2. Media Use from an Education Theory Perspective

2.1 eLearning

Internet-based instruction – usually summarized under the generic term eLearning – is present in all mouth and enjoys large popularity particularly in rather education-far contexts. This teaching and studying form is widely new at school and at university – which brings a number of special requirements with itself. The competence for development and use of eLearning is undisputedly an important feature of future educational practitioners. Surprisingly such is more of a media-scientific and educational nature, but less primarily of a technical one. Important aspects are media organisation,

estimation of media effects, cooperative media usage and particularly self control of the user's behaviour. Whether and in which way internet-based instruction, respectively eLearning fits into school education and which challenges line up for teachers like learners, is widely discussed in current educational research and beyond in society. The authors argue that the introduction of the Internet is connected with a paradigmatic shift that is combined with concrete challenges for teaching and learning. This change is at first related to the hypertextual and relational mode of presentation as empirical findings show, taking into account the use of information and communication technologies (so-called "ICT") in education. Subsequently educational development tasks on individual and organizational level arise due to the introduction of such eLearning scenarios.

Meanwhile various ways of supporting teaching-learning processes by Internet-based technologies are available. Those fit different design principles and different aims. It seems that especially the continuous education sector with its operational context and special conditions of a short-term, decentralized information access may profit (cf. Köhler *et al.,* 2005; Kreikenbom, 2002). Nevertheless traditional learning at school may be supported by the new educational technologies too. The following list presents possible instruction models for the use of the Internet:

- offline use with externally stored information (also computer based training "CBT");
- retrieval of instruction relevant information from the Internet;
- retrieval of independent information offers on the WWW as part of newsgroups, mailing lists or portals (with/without a content management system "CMS");
- usage of the Internet as communication channel (also web based training "WBT");
- creation of virtual studying communities for cooperative discussion, problem-processing and assessment (particularly by the use of learning management systems "LMS", also named virtual learning environment – VLE, but also by the use of specific "community software");
- creation of mobile electronic learning groups.

Concerning the didactic management of such technologies a serious need for new developments exists. The following example may illustrate that need, where the temptation to leave a online discussion forum used for an eLearning lesson at the university is considerably increased compared to the context of a face-to face seminar: "I think in the concrete lessons case it is really hard to have control over who will attend it, who takes actively part and who is interested in what because the immediate contact isn't here – reactions can only be shown in written form, what I find a pity …" (Participants message in an LMS forum of the eLearning seminar "Multimedia Based Learning", held on 5-8-2003 at Potsdam University by the 1st author).

2.2 The Paradigmatic Shift Caused by eLearning Technologies

The use of eLearning technologies as a lessons' medium leads to new requirements for instructors too, not only learners are exposed to these changes. In a similar way school practitioners, including teaching profession students, need to take over a double role: as a teacher and as a continuous self-educating learner. This is not principally a new expectation – but due to the increased velocity of technological change and update on content information those are exposed to new requirements. As described above such is rather less of a technical nature and refers to educational and didactic issues instead.

3. The Crimcity approach

In the project CRIMCITY (cp. CRIMCITY project homepage) a focus has been set to "street crime" as an example for examining European school curricula and implications for the design of VR-based-simulations. Requirements for and design studies of an educational tool are developed to be used in schools and colleges that will use VR technology to address the theme of street crime. This tool consists of a 3D interactive simulation, in form of a game, where children will reflect and deal with a number of street crime situations. To do so the combination of the engaging factors of 3D games, the benefits of role-playing for enhanced learning and to produce an educational package that gives a novel and original approach to address street crime in the classroom is needed. It will provide greater awareness and understanding of the potential of VE to be applied to other subject areas of the curriculum.

More specifically the main objectives of the project are:

- To develop an educational tool to be used in schools and colleges that will use VE technology to address the theme of street crime. This tool consists of a 3D interactive simulation in form of a game, where children will reflect and deal with a number of street crime situations.
- To model a number of city environments that will recreate parts of the different cities where the project partners are based, (Manchester/UK, Kaunas/LT, Potsdam/DE, Innsbruck/AU, Starachowice/PL). In these environments a number of street crime situations will be represented where the user, in this case the student, will be able to take on a number of key roles such as the victim and the criminal.
- To develop a network of teachers and schools and colleges in the partner countries that will promote the use of VE as an educational tool.
- To create a website which will support and disseminate the aims of this project, raise awareness of the potential for using VE in schools and colleges for teaching awareness of street safety.

The principal results to be used at school that are developed by the project are the following:

- A software package, which will be an interactive simulation to address issues relating to street crime and the safety of children and young people on the streets. The resulting product will also be a valuable tool to support community empowerment.
- Teacher training (workshops & packages) and training of community groups and agents such as planning authorities.
- A web presence to disseminate current and future information relating to the use of VEs to address issues of street safety, social responsibility and issues of active citizenship.
- Models for the future development of VEs as a tool to progress learning and teaching strategies.
- Pedagogical and didactical framework and concepts for the use of Virtual Environments in schools and colleges and with students, young adults and learners within the community.
- The development of a practical solution to the inclusion of citizenship into the curriculum for the age group 14-19 years for general education, vocational training and lifelong learning.
- Development of VE learning activities that are applicable and transferable to a wide range of curriculum subjects including Geography, Design and Technology, studies of the built environment and social sciences.

Principally the main didactical approaches underlying the project are to combine Virtual Environments and role-playing techniques to develop a simulated VE game to encourage activity-based learning to create a more powerful and fun way of enhancing citizenship learning through ICT, in particular the area of street crime. This approach had been chosen because recent studies have shown that storytelling and role-playing games provide many learning opportunities and an overall motivational context in which to learn. Herewith this project will allow a study to clearly identify the benefits and effectiveness of learning through computer games and VEs. Also gender and race specific issues related to crime and street safety will be observed and taken into account as they would have direct impact on the project participant. To do so the post-14 curricula and teaching practices in schools, colleges and elsewhere relating to the theme of citizenship had been investigated in order to take into account national differences in perspective and experience (cp. Köhler & Börner 2005).

4. Summary: Further Requirements at the Introduction of Internet Based Teachings

The scenarios described above also lead to new requirements on the teacher-pupil-roles. The often very different teaching-behaviour of the teachers is reason for that because ICT leads mostly to a non-authoritarian, tutor-like approach. However, these often do not dare to differ from a rigid teaching curriculum. Moreover it turns out, that older qualified students value new ways of ICT usage, if such is not only experimental. The inclusion of these qualified pupils into the training of their classmates by assisting the teacher is possible (cf. Stauche 2001) without affecting the authority of the teacher.

Independently of these difficulties a number of current educational aims can be achieved by the introduction of Internet based teaching as:

- an improved an interpersonal activity (cf. Hesse *et al.* 2002);
- a better adaptation to individual needs (cf. Leutner, 2002);
- the creation of new communities (cf. Köhler *et al.,* 2003);
- the integration of everyone of the ones who are handicapped in any meaning;
- the improved possibility to meet challenges of our time by a continuous change of learning technology in dependence of the technological change (cf. Lievrouw *et al.,* 2000).

Further unexplored didactical forms of the use of 3D-ICT for teaching-learning purposes that are not in the centre of the considerations made here can be found at the online cooperation within the 3D virtual environment at school level or beyond. Here is still research needed from both, the technological and the educational perspective to allow for the realisation of cross-disciplinary projects as well as for the creation of necessary framework conditions and finally at the cooperation of the teachers for their specific eLearning scenarios.

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LIVEGUIDE – AN INTERACTIVE MOBILE COMPANION FOR CULTURAL LEARNING

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The Objective and Usage of LiveGuide

The LiveGuide Project is a feasibility study investigating possibilities of bringing streaming multimedia information directly to a user on a sightseeing tour. A cellular phone with Smartphone features or a PDA with an integrated cellular phone and the ability of processing Windows Media Series streaming files serves as a guide on demand and explains the cultural background of the sight. In real life a user either gets an automatically generated list of cultural points of interest (POIs) depending on his actual geographic position or selects a topic from a drop-down box which subsequently produces an interactive map with hot spots showing the relevant sights. Activating a hot spot triggers a panoramic view of the location and delivers spoken explanations in the language selected, synchronized with additional information delivered by still images. The actual prototyping system is driven by PHP, MySQL and the Microsoft MMS protocol as provided by the Windows 2003 Server Standard Edition.

Structure of the Content

The LiveGuide content is stored in a database together with the geographic coordinates of a cultural point of interest. The content is split up into two or three layers. The first layer is directly connected to an interactive Hot spot on a small map showing the surroundings of the POI. Clicking on a Hot spot triggers basic information (Layer 1) in the form of images and a short textual overview. Clicking a button delivers the textual overview as an audio file in the selected language. Requesting more details by clicking a further button leads to Layer 2 which gives a more detailed information on the topic, again either in a textual form or as an audio file. Depending on the complexity of the cultural background for the POI in question, there might be a third layer representing special knowledge. For educational purposes there is the possibility to take a multiple choice quiz after having consumed all the necessary LiveGuide information. A feature which is not implemented yet but planned for an upgraded version will generate an XML file if the multiple choice test has been passed with an acceptable score. The XML file could be subsequently pushed to an electronic personal portfolio automatically.

The Educational Context

Learning within the Regular Educational System

Excursions

LiveGuide may be used as a teaching and learning aid for various purposes in various subjects.

Since Smartphones are devices that have made their way into people's lives and seem to have become their steady companions, students will find LiveGuide easy to handle. Teachers' keeping in touch with their students on excursions and school trips via mobile phones has already become a common practice, anyway.

By using LiveGuide, students will be given the possibility of seeing points of interest either individually or in small groups, without having to depend on a teacher or tour guide.

LiveGuide walks will be applicable in a variety of subjects, as can be seen from the listing below that names some examples of LiveGuide usage:

- Geography: Students might be taken on walks in the countryside in order to find out about the surface features of a specific area.

- Arts and architecture: LiveGuide users could be taken on a tour of a city's outstanding buildings, with the software informing them of styles or construction details.
- History: Students might do a walk of historic sights, monuments or excavations, for example. LiveGuide would instruct them about the era they stem from.
- Cultural aspects in relation with any school subject could be a wide field of LiveGuide content.

Integrated Curricula

LiveGuide could be part of integrated academic instruction. The system itself, of course, could be the subject of a software engineering course. It may be a challenging task for students to build the same system by themselves.

eTwinning

The problem of how to obtain content will be solved by means of international collaboration. The makers of LiveGuide will try to combine content-seeking with the European Union's eTwinning programme. eTwinning promotes international virtual school partnerships and, at present, holds a pool of 11,949 schools[1] looking for partners. In a partnership of several schools from various countries, individual project groups will be asked to supply walks of the area or city they live in. The required audio files should be made available both in English and in the respective national languages. In return, they will be given access to the complete LiveGuide educational content.

Lifelong Learning

LiveGuide holds a high potential as a tool for lifelong learning and continuing professional development. It will enable users to improve their knowledge, as required by the European Commission's lifelong learning definition. It can be a contributing factor of users' adapting to our 21st century knowledge-based society. "In practice this should mean that citizens each have individual learning pathways, suitable to their needs and interests at all stages of their lives."[2]

ePortfolio

LiveGuide digital content could easily be uploaded to an ePortfolio as part of an individual's records of what he/she has done or learned. ePortfolios have made their way to the European educational system and will soon be widely used as a means of personal development planning. LiveGuide content thus could become part of the owner's digital repository.

Technical Overview

Operation Modes: AUTO-MODE versus SELECT-MODE

LiveGuide offers two operation modes. It can be run in AUTO-MODE, which means, that the client device is connected with a GPS module providing the actual geographic position with a typical GPS refresh rate and a typical GPS consumer precision. The GPS module in this case can either be integrated in the cellular phone itself or it accompanies the cellular phone as an extra module sending data via a Bluetooth wireless connection. Technical details about the connection protocol and the processing of position data will be given below. This operation mode enables the LiveGuide client to spot cultural points of interest automatically, by comparing the cellular phone's position with positions stored in the server's database. Cultural points of interest which appear in a reasonable walking distance (approx. 2000 meters) will be displayed in a drop-down box in the cellular phone's web browser indicating their type and the distance. The selection of such a choice will provide a map showing the near surroundings

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[1] eTwinning School partnerships in Europe website, *eTwinning Map,* retrieved 1st February 2006 18:14, from www.etwinning.net

[2] European Commission Lifelong Learning Website, *What is lifelong learning?* Retrieved 1st February 2006, from http://europa.eu.int/comm/education/policies/lll/life/what_islll_en.html

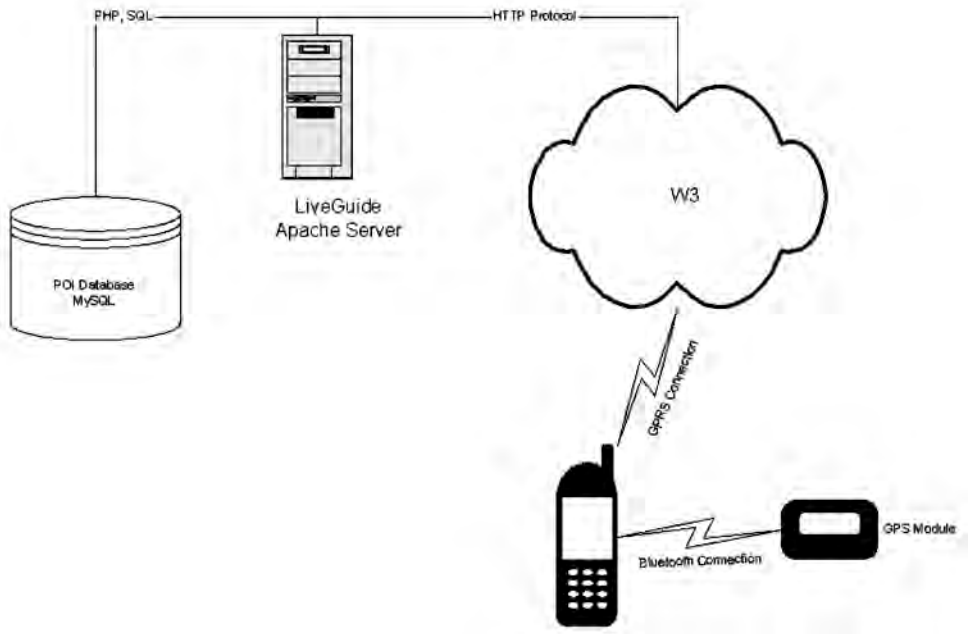
of the POI and will show the way towards this location. In SELECT-MODE no GPS component is necessary; instead a request towards the database submits a manually selected large scale location (e.g. a city) and returns available LiveGuide Walks for the requested area. Selecting a walk from the result set – which again is displayed in a drop-down list – provides a small map with available POIs implemented as Hot spots. The selection of a Hot spot delivers the appropriate content.

Processing Scheme of Position Data in AUTO-MODE

The GPS module – no matter whether the device is external to the phone or not – delivers position records in the NMEA data format and LiveGuide makes use of the GGA position sentence which provides the current Fix data in the following format:

$GPGGA,123519,**4807.038**,N,**01131.000**,E,1,08,0.9,545.4,M,46.9,M,,*47

An activated LiveGuide Client-Agent-Software-Engine (LG-CASE) will receive this sentence and will extract the latitude and longitude data chunks as indicated by bold type in the data example above. Subsequently the LG-CASE opens a socket to the server, sends the current position against the database and opens a PHP driven page on the server, which will send all database entries of POIs matching the maximum distance criteria of 2000 meters to the cellular phone's web-browser interface. The overall connection scheme is shown in the graph below:



Technical Requirements for the LiveGuide Client

The LiveGuide client device is either a Windows Mobile based Smartphone or a PDA-Phone. In case that there is no integrated GPS module, which at this time will apply certainly to most available devices, the phone must be Bluetooth enabled and has to provide a JavaScript enabled Web Browser. In addition to these features – which can be seen as fairly standard items – the client device must run a software module which is proprietary to the LiveGuide system (LiveGuide Client Agent Software Engine – LG-CASE).

Technical Requirements for the LiveGuide Server

The LiveGuide server runs Windows 2003 Server SE as its operating systems since this operating system includes Microsoft Media Server and provides the MMS-protocol in order to deliver the audio files for Windows Media Player Series 9 or later. The machine further requires PHP, Apache and MySQL for the processing of web pages and their content.

Involved Programming Languages

For the first approach – currently in the sense of a successful feasibility study – all the necessary programming has been done in PHP, JavaScript and Embedded Visual C++. Transmitting the sort of data connected to this project requires careful bandwidth considerations since the audio files eat up a large amount of available GPRS bandwidth. The use of the traditional mixture of server-sided and client-sided script languages has the considerable drawback that any call for a PHP driven web page means a reload of the complete page and thus creates an unnecessary traffic overhead. To improve the situation the next release will soften the problem by engaging AJAX technology.

Possible Educational Exploitation of the Technical Approach

The technical background of LiveGuide might appear rather complicated at first sight. But apart from some black box features, e.g. the technology of the GPS device, most programming tasks can be easily rebuilt by students with a little more than basic programming skills. One of the main benefits of the project embedded in technical educational surroundings is the fact, that the project invites for an interdisciplinary approach since a lot of traditional subjects get addressed. GPS navigation is closely connected to geographic knowledge, the cultural POIs are a major educational value themselves and the representation in different languages is a big challenge for interdisciplinary working and learning. For the purpose of the educational exploitation of the technical features the project team will provide a detailed documentation with example lesson plans.

Conclusion

Mobile learning with LiveGuide could open a new perspective of learning. It combines two learning methods: one will be obtaining easy-to-comprehend bilingual information via audio and photo in small chunks. The other is the classic learning-by-seeing approach of any excursion. The learning process will then be enhanced by following the virtual walks in reality and actually seeing the objects. The secondary and tertiary levels of education as well as the life long learning sector will be the main target groups of LiveGuide. One of the benefits of LiveGuide will most likely be an enjoyable learning process.

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CONTENT BROKERAGE AND RIGHTS MANAGEMENT AN INNOVATIVE E-LEARNING FRAMEWORK AND CONTENT CLUSTER

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eFit Austria, the Austrian IT-Initiative of the Federal Ministry of Education, Science and Culture encourages and establishes numerous initiatives and projects dealing with future-oriented topics in education, science and culture.

The successful use of new media and web-based technologies in education requires adequate support conditions and an efficient e-learning framework.

The architecture of the Austrian e-Learning Portal www.bildung.at is component-based and designed as a multi-faceted system for all educational initiatives with a focus on European and international standards, including:

- certified educational programmes for all fields of education;
- a community environment for e-learning initiatives;
- the integrated use of learning and content management systems;
- an identity and rights management for a personalised access to educational content and services;
- an education pool with a full content brokerage system.

Virtual Learning Environments

Learning and content management systems are core components of this e-learning framework and architecture. Over 450 platforms were evaluated worldwide, different technological and didactical criteria supported an objective and a public selection procedure. The results of this evaluation and usability-process led to a ranking and recommendation of nine suitable and cost-free platforms.

As a next step school-specific and customized “light-version” platforms will be established in the form of “out-of-the-box packages”. Virtual learning environments for professional platform providers will be built on the base of a platform-independent architecture with standardized interfaces to the distributed contentpools.

Content Project Schoolbook Extra

Parallel to this platform-evaluation the successful content project SbX (Schoolbook Extra) was initiated. In addition to schoolbooks, a high quality and approved digital content production and delivery was established. A contract between the Federal Ministry of Education and the schoolbook-publishers is the base for the content providing and delivery. The content-production is funded analogous to the schoolbooks by the Federal Ministry of Social Affairs.

Identity and Rights Management

One of the most important topics of this elearning-framework is to offer elementary learning objects in a reusable and web-based form. The personalised and secure access to these electronical learning materials will be realized via chipcards and electronical signatures at the base of an “education portal cluster”. All necessary informations about identity- and authentification-rights will be stored in decentralized regional directories. A single sign-on authentification mechanism is planned, which will facilitate access to all the services and available contents within the portal cluster.

Content Brokerage

A defined metadata specification (http://elearning.bildung.at) is the base on which distributed commercial and non-commercial content-servers are consolidated to form a logical eLearning Education Pool for all available elementary learning objects and resources. Metadata and permission rights are stored in the central Content-Repository of bildung.at. The first implementation of this brokerage platform is a content catalogue for the electronical and high quality learning materials of Schoolbook Extra (SbX).

The next step for this content brokerage platform is the integration of a standardized "Simple Query Interface" (SQI) to realize a Gateway for a federated content-search in an EU-wide context with an enlarged virtual content market.

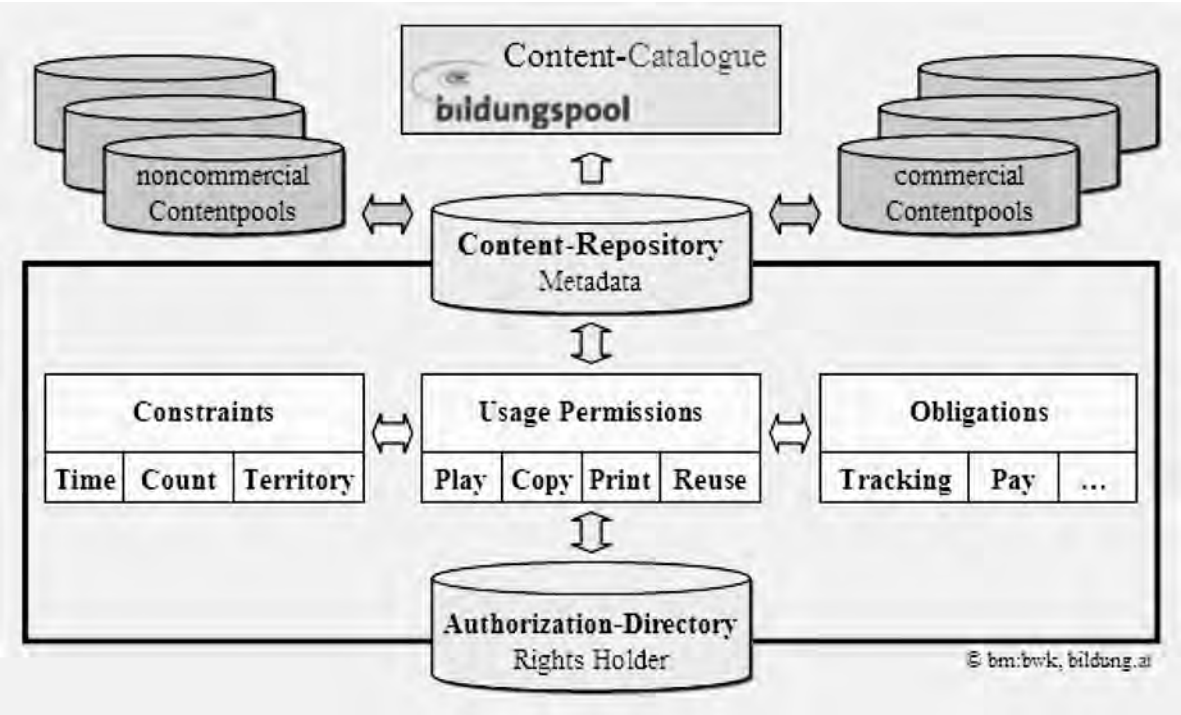

Figure 1. Content Brokerage and Rights Management

An important prerequisite during the content implementation process is the use of standards and modelling technologies to keep learning-objects and learning-sequences platform-independent and reusable by other learning platforms. Finally, this e-learning framework should be completed with an efficient content building and engineering environment to reach the whole didactical potential in this dynamical field of e-learning.

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E-LEARNING IN THE FIRST SEMESTER OF AN UNDERGRADUATE MEDICAL CURRICULUM

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Context of the virtual learning environment at the Medical University of Graz

In 2002, an integrated curriculum of human medicine was started at the Medical University of Graz, Austria. The curriculum was aimed at an early integration of basic sciences with clinical application, a problem-centred design and collaborative teaching of various disciplines [1-3]. The curriculum is organized in modules of five weeks each, with various specialities contributing to each module. In addition, tracks referring to biomedical background, medical skills, and communication/supervision/ reflexion extend through the whole curriculum. In the 6th year, a practical undergraduate internship and 4 weeks of general practice are implemented.

The integrated approach of the curriculum requires learning material beyond that of conventional textbooks, since standard textbooks do not fulfil the requirements of interdisciplinary teaching and learning. Therefore, a virtual learning environment was implemented with the start of the curriculum, which is designated as Virtual Medical Campus (VMC) Graz [4]. The VMC Graz was initially supported as a project by the Federal Ministry for Education, Science and Culture in 2002, and as a strategic development in 2005. From the beginning, the VMC was designed to provide an overview of the structure of the entire curriculum, which was gradually filled with learning objects referring to the needs of the various lectures, seminars and practical courses. At first, the VMC was only used to provide material in addition to face-to-face education. Meanwhile, an increasing number of lectures is available in electronic form instead of face-to-face teaching, providing blended learning in selected topics. In addition, besides human medicine, the curricula of dental medicine and of nursing science have been implemented in the VMC, and cooperative programs have been started with the Medical University of Vienna, Austria, and the Medical Faculty of Maribor, Slovenia.

At the Medical University of Graz, usually an average of 800 students start their curriculum in human medicine every year. According to Austrian federal law, up to 2004 each Austrian student applying for human medicine was admitted. In June 2005, the legal situation changed since the European Union considered it incompatible with European Union regulations that Austrian universities accepted all Austrian students, while requiring proof of a university place in their home country for students of other European countries. Therefore, from beginning of the academic year 2005/06 onwards, all European students applying for a university place in Austria had to be treated equally as the Austrian applicants. This is particularly important for human medicine, since about 25.000 applicants are rejected in Germany every year, and each of them has now gained the right to apply at an Austrian Medical University.

In the first run in 2005, more than 3000 students applied for human medicine at the Medical University of Graz, about 2000 of them coming from Germany. Therefore it became evident that the Medical University would not be able to accomplish traditional face-to-face teaching for such a large number of students. On the other hand, a selection process had already been designed for the end of the first semester. Therefore the Medical University rector and the vice-rector for teaching and studies decided to accept all applicants at the beginning of the semester, and to perform a selection examination at the end of the semester. In order to manage the large number of students, teaching in the first semester was entirely based on the virtual e-learning environment already available.

At the Medical University of Graz, a total of 300 university places are available from the second stage onwards every year. Since 200 places were already occupied by students who had finished the first stage during the last year, only 100 new places were available.

Content creation process

Structure of the first semester of the medical curriculum

The first semester of the medical curriculum of human medicine includes three modules and one track course. The majority of the courses was designed as lectures, only a minority was intended in an interactive workshop format. The contents of the first semester comprise mainly basic sciences (physiological chemistry, biophysics), anatomical nomenclature and general biology. In addition, however, first insights into clinical disciplines are provided. In a regular first semester, a practical course in nursing is included. In the academic year 2005/06, however, this course had to be postponed until the second semester, since more than 1.000 students were beyond the capacity of our teaching hospital.

The following list shows the formal structure of the first term:

- Module 01: From law of nature to life; 5.1 ECTS credit points
  - Basics of physiological chemistry I
  - Basics of biophysics I
  - Anatomical terms and definitions
- Module 02: Components of life; 4.7 ECTS credit points
  - Osteology
  - Basics of physiological chemistry II
  - Basics of biophysics II
- Module 03: Cell, tissue, health issues; 7.1 ECTS credit points
  - Chemical components of living organisms
  - The cell
  - Genetics
  - Tissues
  - Embryonic development
  - Preventive medicine
- Track: Introduction to medicine; 7.7 ECTS credit points
  - Practical course in nursing
  - Introductory clinical lectures
  - First aid
  - Physical examination

Strategy for content creation

Though several learning objects were already available from former years, the e-learning contents for pure online learning had to be reshaped, and a large number of learning objects had to be newly created.

The vice-rector's office for teaching and studies invited all academic staff involved in the first semester to five consecutive workshops, each of these workshops dealing with a certain aspect of the ongoing virtual semester. The workshops were dedicated to content requirements for virtual lectures, content requirements for virtual seminars, organization of the track "Introduction to medicine", organization of the final examinations, and eventual impact of high school credits.

The team of staff participating in the workshops agreed that each learning unit should refer to a particular textbook chapter when appropriate, and had to contain an electronic learning object of the computer-based training type, with a minimum of five frames for a lecture learning unit and a minimum of 20 frames for a seminar learning unit. Computer-based training learning objects of seminar learning units were considered to be obligatory for students. Additional presentation and visualization objects were encouraged. In learning units without a textbook reference, presentation and visualization objects covering the whole topic were mandatory. For practical aspects, interactive simulations and video clips were recommended. Furthermore, deadlines for the finalization of the electronic contents have been agreed upon. With 1st of October, the beginning of the semester, all textbook references of the virtual semester had to be online, together with the first part of Module 1. The other contents had to be finished gradually according to a fixed time table, with the last objects of the virtual semester to be finished by 20th of December.

Types of learning objects

A total of 200 learning objects of the interactive computer-based training (CBT) type were created [5], each comprising between 5 and 48 frames. This type of learning object is based on the branching tutorial programs of Crowder, with elaborated feedback to each choice according to the concept of Musch [6]. Many frames were accompanied by images. The CBT learning objects have been generated by a simple-to-use authoring tool developed for the Virtual Medical Campus Graz. At the end of each learning path, students have the opportunity to transmit an automatically created message to the system indicating individual data of the student and the scoring achieved in the particular CBT learning object. Submission of this message was obligatory for CBT learning objects linked to seminar-type learning units.

Presentation and visualization learning objects (150 learning objects) were mainly created using Powerpoint® or Acrobat PDF® format. In addition, several HTML-based presentations and visualization learning objects were created.

Three interactive simulations were used in biophysics, and four video clips were created for the topics “first aid” and “physical examination”.

Organization of the final examinations

After one semester of distance learning through the Virtual Medical Campus, all students were invited to take part in the final examinations which were scheduled on two consecutive days in Graz in January. On the first day, three consecutive examinations referring to modules 1, 2, and 3, respectively, had to be performed. Each of these module examinations consisted of 60 multiple choice questions. Students obtained regular marks ranging from 1 (very good) to 5 (not passed) for each of the three module examinations. The limit for gaining a positive mark was a proportion of at least 66 % correct answers. On the second day, a summative test comprising all topics of the semester was performed with 420 multiple choice questions. For this test, no regular marks, but only scoring points according to the number of correctly answered questions were given. Finally, a ranking of all students was created, where the marks of the module examinations were weighted with 40 % and the points achieved in the summative test with 60 %.

Student’s access, system performance and user interaction

3336 students pre-registered for the virtual semester. From the beginning, it was communicated that the semester will take place by e-learning only, and that only 100 students will earn a university place for the second semester. 1269 students finally registered, with about 40 % of students from Austria, 45 % students from Germany and 15 % of students from other countries.

Temporary log-in accounts were activated for all pre-registered students on 1st of October, and were gradually replaced by full accounts as soon as an individual had fulfilled all formal steps of registration. During the semester, 858.000 visits to learning objects were recorded. Students used the electronic learning system 24 hours a day for all days of the week, with up to 17.000 visits per day. The highest data traffic was recorded between 12.00 and 18.00 o’clock, but usage continued with tapering intensity until the early morning, with the number of visits rising again by 6.00 o’clock. There were only 4 scheduled interruptions of online access for a couple of hours due to system upgrading. There were no unscheduled or unexpected interruptions and no significant delays in online acess.

Students sent in a total of 257.000 feedback from CBT learning objects, most of the feedback indicating a score of 85 % correct answers and higher. Figure 1 shows the distribution of scores in the CBT feedback of a particular not obligatory CBT learning object referring to anatomical terminology.

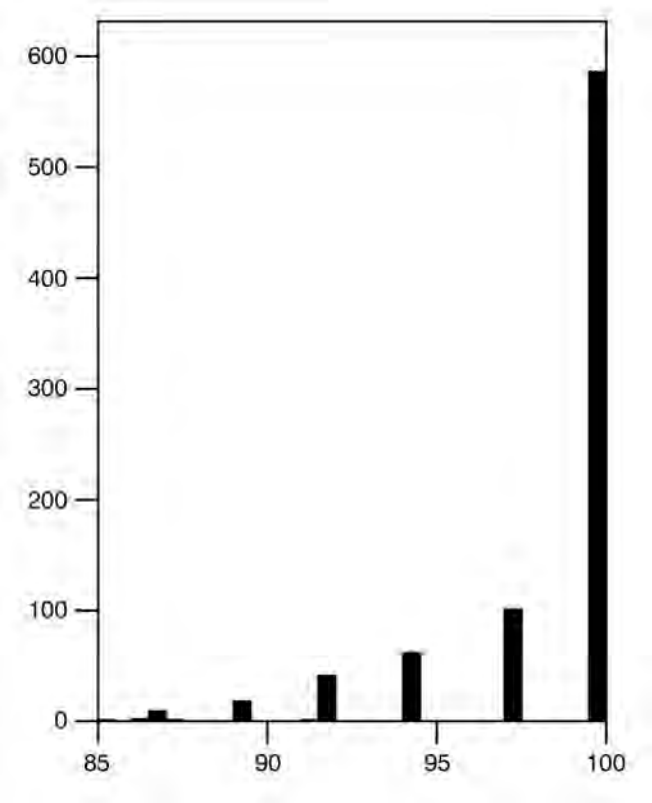

Figure 1. Student's feedback of learning object "Anatomia systemica I", Anatomical terms and definitions, Module 1. In 822 feedback, students achieved 98.3 ± 3.1 % correct answers

Communication between students and teachers was managed through e-mail forms submitted by students. The forms were forwarded to the particular teacher concerned, and the answer of the teacher was published together with the original question as an appendix to each of the modules. By this approach, repeated identical questions had only to be answered once. During the semester, 724 answers were created by teachers filling a total of 113 printed pages in A4 PDF format.

Examination results

In each of the module examinations, all marks ranging from 1 to 5 were represented. 104 students had positive marks in all three examinations, 96 of them were within the 100 best ranked students after the summative test has additionally been taken into account. Remarkably, there was a close correlation between the marks obtained in the module examinations and the scores obtained in the summative test ($r = 0.72$; $p < 0.00001$) already within the subgroup of the 100 best students. This finding illustrates that both parts of the ranking system (module examinations and summative test) have a high reproducibility within the subgroup of high performing students.

Positive marks were achieved in 17.1 %, 23.6 % and 14.5 % in the three module examinations, with 66 % correct answers being the pre-set threshold for a positive mark.

A more detailed analysis of module 1 examination revealed striking differences in outcomes depending on the electronic learning objects provided. When the contents were completely represented by computer-based training learning objects, 65.9 ± 0.7 % correct answers were achieved, compared to only 51.4 ± 0.5 % when the contents were not fully represented by computer-based training learning objects (t-test for paired values: $t = 28.3$, $p < 0.0001$).

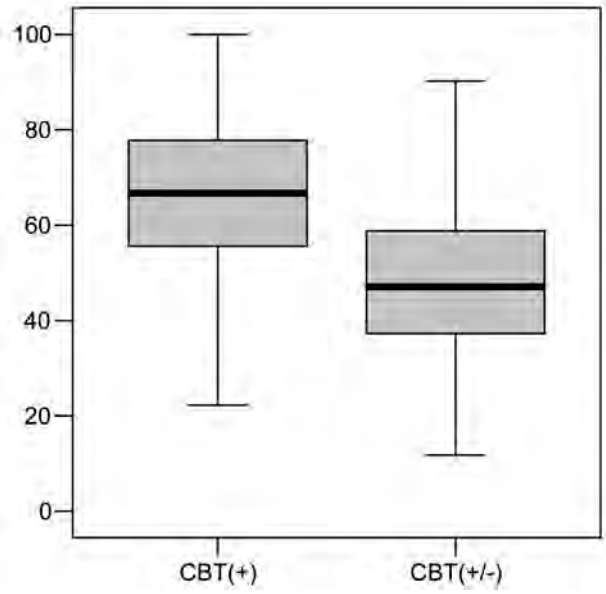

Figure 2. Multiple choice questions referring to topics which had been entirely represented by computer-based training learning objects (CBT(+)) were answered correctly in a significant higher proportion than questions referring to topics which had only partially been represented by computer-based training learning objects (CBT(+/-))

Lessons learned from the virtual semester

Our experience shows that it is possible to teach a large cohort of students in the first semester of human medicine through e-learning only. It became evident that high-performing students were particularly able to face the challenge successfully. On the other hand, it seems to be not so easy for medium- or low-performing students to acquire the necessary knowledge and intellectual skills through pure e-learning. This might particularly be true when – as in our case – the very first semester is entirely virtualized, and might be less important when only a proportion of lectures in higher semesters will be based on e-learning in a blended learning approach.

One has to take into account, however, that there were other changes beside the switch from face-to-face teaching to e-learning. At first, the amount of knowledge presented and examined was higher than in previous years, since there were more lecture units and fewer reflective seminars and practical courses. Furthermore, it was for the first time that all module examinations had to be passed on the same day, since in previous years the module examinations could be passed gradually at 5-8 week intervals. Finally, the whole amount of MC questions had been newly prepared, so that regular training of questions used in prior examinations was only of minor help.

Remarkably, examination results seem to depend on the method of electronic delivery of the contents. When computer-based training learning objects covered the contents of an entire topic, than the performance of all students at the examinations was considerably better than when there were only few computer-based training frames giving selected hints only and leaving the main part of knowledge transfer to textbook references or presentation and visualization learning objects.

Complete e-learning in the first semester of human medicine was performed in a singular situation confounded by political and organisational constraints. It became evident that it can be successfully performed from a formal point of view, relying on a technically stable virtual learning environment and dedicated staff ready to undertake the challenges of virtualization. When the first semester is studied entirely in a remote learning format, a high degree of self competencies is needed by students to perform successfully. Results obtained in the subsequent examinations seem to be highly selective and reproducible particularly in the subgroup of high-performing students.

In the future, special emphasis will have to be put on the mode of electronic delivery, the types of learning objects, degree of elaboration, guidance of the learning process according to individual needs, individual feedback and time consumption on the one hand, compared with examination results on the other. Thereby, the discussion on e-learning methods, drawbacks and merits will shift from formal and theoretical discussions towards collecting evidence from experimental and field data. This approach may finally result in a reliable concept of evidence-based e-learning.

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SEMIPROFESSIONAL CONTENT FOR SCHOOLS – EXPERIENCE OF TEN YEARS ASSESSING, EVALUATING AND MAINTAINING E-CONTENT

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Introduction

After 10 years with projects to create, explore, observe and evaluate eLearning material and eLearning environments with teachers and students at higher schools in Austria and trying to define procedures to gain professionalism and quality of participants and material some visions must be revised. Although a defined procedure for handling, assessment and evaluating as well as distribution for eLearning content exists today, room for enhancement and improvement obviously exists.

Just now the implementation of an Austrian wide concept (eContent Masterplan) is going to start.

"Dieser Weg war steinig und schwer"[1] (text based on Song of Xavier Naidoo).

In the following chapters a short overview and a critical evaluation of two projects out of others which influenced the eContent Masterplan will be given, followed by an analysis of problems and lessons learned as well as possible solution attempts.

Project FUBB-1 (April 1999-August 2000)

In the beginning we had the following goals (FUBB means "Fernunterricht in der Berufsbildung"):

- To produce and collect eLearning material for vocational schools in Austria
- Motivate teachers to deliver and produce material in a way that the outcome can be used by students directly or supporting other teachers in their teaching situations
- Deploy this material in an easy an non-burocratic way
- Implementation and operation of a system to organize, manage and support learning situations for at least 12 schools (we called this system electronic learning environments (ELE); today the acronyms LMS or LCMS would describe the intent and functionallity of this system quite accurately)
- Evaluation of quality and usage produced content and system
- This program (FUBB-1) was supported by the ESF (European Social Fund) and the bm:bwk, Federal Ministry of Education, Science and Culture[2]

The project ended successfully in most of relevant aspects.

Nevertheless we discovered several problem areas (See annex FUBB-1 – project results with problem areas and analysed reasons).

Summarizing FUBB-1, the following problem areas were identified to be severe and therefore of high importance for the follow up:

- The chosen authoring system, Authorware Version 5.2/6.0 with some extensions created unforeseen problems in several areas: the system was and is too complex for the average teacher producing content time by time, the poor text support esp with special characters

[1] A path of trial and tribulation

[2] Fernunterricht in der beruflichen Bildung Erwachsener: Vocational training of adult students

caused extra support and production time and very severe is the fact, that the produced content needs a special player to be installed within the used browser to view the content. Also the alternative, with executable content, is only solving this problem in specific situations. As a first result one could conclude, that the wrong system was used for production, but we will see later that this is not the core of the problem.

- The implemented server and available bandwidth did not support the users in a complete satisfactory way. This fact was increased by the used learning environment system.
- These two problem areas, together with a too small support team, created response problems for users of the learning environment as well as delays in supporting authors with running into troubles with the authoring software.
- A non-technical problem area popped up during the project: copyright issues. The awareness of authors was not as good as estimated. Main emphasis was done on technical and didactical checking of eLearning modules. The management team was confident that the contractual regulation with the authors regarding copyright issues was perfectly clear, but violations occurred up to a higher amount than the expected average.
- The dissemination was not seen as an important factor, due to the fact that the project originally was set up only for a defined number of schools.

Keeping this in mind a second project – FUBB-2 – was started.

Project FUBB-2 (Feb 2002 – June 2006)

Goals were quite similar to FUBB-1, but a higher level of quality was planned to be reached. An official final critical evaluation is not available yet, but several outcomes can be shown.

The technical issues with server, bandwidth and the Learning Management System disappeared after the system started to get hosted by a project partner company (bitmedia). This time a professional server and LMS (BlackBoard) was implemented.

Because of the high uptime (99,6%, 7 days, 24 hours) a lot of non-partner schools joined the Learning platform. At the end more than 70 schools and organizations with more than 15.000 (about 7500 active in same time-periods) users were supported.

Even evaluated as very positive, this last point demonstrated new problems and caused an overload in administering the system. To solve this problem in the future, a concept and a first prototype was developed. A first running implementation at one of the partner schools (1700 student, 180 teachers) since September 2005 demonstrates that the organizational effort can be reduced dramatically. One clear outcome is that whatever LMS will be used to serve a heterogeneous clientele, proper interfaces must exist for the automation of user and course organisation within the system. The techniques for this step are available (even as Open Source products), the main points here are organisational issues that have to be resolved to provide the necessary data upfront.

The mandatory usage of one authoring system was changed to reach a higher amount of flexibility for the authors. This step was taken due to the critics of several authors and the disadvantages with the authoring tool used in FUBB-1. In addition, an expectation was to motivate more authors delivering material over time. A new and easier (easier to start for beginners) authoring system was introduced and trained. Other techniques were welcome.

Unfortunately these steps did not increase the number of authors and delivered materials significantly. The support of different techniques had to be increased, which was expected by the management team, but together with a higher number of material.

The team for supporting the LMS and assessing and evaluating the delivered eLearning material got stocked up. So a higher satisfactory level could be reached.

The copyright issues still exist, real improvements can be seen only when material produced by experienced authors is evaluated. More than 50% of delivered material must be reworked by the authors.

Lessons learned and possible consequences or solutions

If there is a goal to provide teachers and students with eLearning content which is approved and checked against the curriculum, than procedures must exist to handle the whole activities and assure quality of delivered and maintained material.

In this article only material produced by semi-professionals or private persons is discussed though most of the conclusions are valid for professional content, too.

It took some time to come to a common agreement that these processes must be set up, evaluated and maintained. Today, Austrian wide procedures exist and a group of people is working to keep the processes up and running.

Both projects demonstrated that it is possible to get high quality eLearning content produced by teachers. But it is questionable if the effort needed for this kind of production can be justified. Before this question can be answered some assumptions and definitions must be laid out.

- Observation 1: The sense, for what is legal to use and publish and what is not is underdeveloped. This is consequently also true for students.[3] This creates extra workload for the quality systems.
- Observation 2: Teachers are to a high percentage "lonely fighters". It is difficult to motivate them to create material together or produce it in a way that it can be used at least by other teachers. Even if they get trained and supported, they may not deliver agreed material. (See following fact: The main duty of teachers is not to produce high quality eLearning material.)
- Observation 3: Most of the teachers involved in the two projects are not able or willing to develop their realization skills up to a level that would enable them to produce high quality material usable for others.[4]
- Observation 4: Only few teachers are willing to spend time and have the nerves to create professional eLearning content and have the technical skills to do that. Sometimes didactical skills are missing inside that group.

Today the amount of teachers using simple computer-based tools to produce presentations, text files, tables etc. and being able to do Internet researches and using communication tools like e-mail and, in some cases, forums is steadily increasing.

The material produced this way is rarely usable by others as it is produced to support the own teaching mainly.

This is working more or less without major troubles within a closed group even than when Learning Management Systems are used. In this circumstance a lack of control regarding the quality and legitimacy of the used material must be stated, only sample checks can be made.

In this case, dissemination is not taking place except locally, within the same school or organisation. Some internet portals are addressing this issue and trying to help. Result of an ongoing survey will be available at the conference date.

One additional problem area must be discussed before answering the question above:

Due to the fact that it is realistically impossible to stick to one creation and presentation system if more than one organization is involved, the support issues must be seen. Because of the fact, that more and more content tries to integrate rich media elements, more time is involved to evaluate and assess this content.

Today content isn't delivered in a well structured way with conformance to definition x or y. This causes additional workload to check the ability to distribute and run the material at client systems with different versions of software, as well as a recheck if software versions changes.

Therefore the only answer to the question above will be that the effort is too high, as long as standards are not implemented in a way that producers and procedures stick to them. Teachers should provide professionals (could well be other teachers!) with material and the concepts instead of wasting time and money producing low quality eLearning content.

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[3] Universities are not observed, only participants of higher educational and vocational schools are.

[4] Also material from many other projects is observed.

Dissemination and information about what material is around, would be a second important point to discuss. Although concepts and prototypes for a kind of a map that showswhere to find what kind of existing eLearning material, a valuable outcome for students and teachers, can only be seen if one knows the platforms where to search already and where only a small amount of available material can be found.

Conclusion

There are less illusions but also confidence, that students and teachers will get better access to eLearning material that is of adequate quality and affordable for the users. Strategies and concepts as well as platforms exist already, but they have to interface and to communicate in a better way than today. One real challenge for the close future will be to get the local projects and platforms as well as people working together in a streamlined manner to create a valuable marketplace for eLearning material.

Annex: Short status table FUBB projects:

Problem area	Reason	Solution during project runtime	Severity
Availability of necessary bandwidth	Internet bandwidth at place of installation of the ELE-Server not sufficient	Partial, enhanced during runtime	high
Functionality and Usability of used ELE-System	The main functionality did not support a typical class structure an necessary	Workaround used, no real solution	medium
Delivery of content within agreed timescales	We underestimated the time needed to train the used authoring system	About 80%	medium
High effort for authors (starters)	See above	Not solved for time to time authors, because of training effort due to used authoring system	high
Quality of delivered material	In many cases too much text based, didactical concept not followed	Seemed OK after rework, some copyright issues popped up later	high
Support for authors	See above, the used authoring tool was more complex for some of the authors as estimated	Enhanced during runtime	medium
Support for ELE-System	Our project was not a key project for the company delivering the system as the project started	Not really satisfactory until the end, as main requirement were not fulfilled by the chosen system	medium
Financial issues	First time running a European Union funded project, main problems caused because of lack of information and non-existing procedures	Solved, due to the patience and leniency of authors and other project members	medium
Dissemination	Underestimated and not a key priority for project management due to all other issues	partial	medium

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VIRTUAL UNIVERSITY MODEL IN FINLAND – FROM STRATEGY TO PRACTICE

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Introduction

The Finnish Virtual University, FVU (www.fvu.fi) was established in 2001. The timing and initial goals were not uncommon in Europe. At the beginning of the 21st century many European nations saw the need to enhance the utilization of ICT in education. The Finnish initiative is, however, unique in some ways. The FVU is not a new distance education university but a collaboration network established by all the 21 Finnish universities. It is based on collaboration, division of labour, shared knowledge and the expertise of these member universities. It promotes online learning and teaching and develops compatible information infrastructures to support student mobility. In the workshop, this unique collaboration across national university boundaries is introduced by giving five concrete examples of fields of action. In these fields, also European collaboration could be envisaged. European higher education institutions as part of EHEA have to bear their responsibility in educating e-learning students to meet the lifelong challenges of competent e-learning citizenship. The FVU initiative as policy and practice offers one model to be considered when developing wider collaboration in European higher education.

The Finnish Virtual University model

In the Finnish Virtual University model, a national, regional and local collaboration level can be distinguished. According to the recently approved strategy, the FVU operations focus on:

1. Facilitating flexible studies (student mobility) and developing electronic access services for this purpose;
2. Promoting the shared use of online courses and educational materials;
3. Ensuring that jointly produced ICT training and support services are adopted extensively;
4. Integrating the FVU operations into the European Higher Education Area (EHEA), and other international co-operation;
5. Ensuring that the FVU organisation, operating modes, decision making and financing models fit the needs of the network.

How education is organized

The FVU is not a new university in itself and it does not provide university education. Virtual (or online) studies are integrated in degree studies, and students have to enrol as degree students in one of the FVU member universities. As a rule, the university education in Finland is not aimed to be fully online. Instead, a blended learning approach is more common. The challenges are how to integrate ICT in campus-based university education and how the FVU collaboration would best enhance the efficiency of learning.

FVU's fields of competence

In the workshop, the main five competence areas of the FVU are discussed. These are:

1. ICT in education strategies;
2. Flexible studies (student mobility) and related electronic access services;

3. Quality management in e-learning;
4. Staff training in ICT;
5. Web-based tools for supporting learning and teaching.

ICT strategies

The Finnish Ministry of Education asked the universities to draw up strategies for educational ICT use by the end of 2002. Upon request, the FVU set up a strategy service consisting of articles, models and tools on the FVU portal to help universities in their strategy development. The service was further developed, and the ProAktori model and related web tool was launched in 2005. The tool enables multiple users to work collaboratively on the same strategy document, to divide up the work into sub-sections for different groups, or it can be used by a single person to evaluate the existing strategy. The production model is linear, but interim saves enable flexible work by multiple users.

Student mobility services

Student mobility in Finland is based on the nation-wide Agreement on Flexible Study Rights (JOO) signed by the university rectors in June 2003. The agreement entered into force in August 2004, and alongside the implementation of electronic services for flexible studies started with the launch of the Online Flexible Study Rights Service (JOOPAS).

Cross-university www-service access using a single user ID

The JOOPAS service supports students and academic affairs offices in accessing and managing the cross-university study opportunities – i.e., it enables students as part of their degree studies to take courses in different universities. The service is gradually being expanded into a fully electronic service. It is based on an infrastructure called Haka, which makes it possible for the user to log in to the JOOPAS service using his or her home university user name and password. The user's home organization maintains the personal data and authenticates the user's identity, and the service picks up the current personal data at the time of the login. The user identification method used in the service is the first of its kind in Finland, and it was developed in cooperation with the universities, polytechnics and CSC, the Finnish IT Center for Science. The system application is based on the SAML standard and the Shibboleth technology derived from it at universities in the United States. The operations of the Haka infrastructure are based on membership by the user institutions in the Haka Infrastructure Federation.

Unified curriculum description format

In addition to the single user ID, joint understanding of curriculum and course information definitions is another prerequisite for co-operation and information exchange between universities. The FVU has helped to co-ordinate university co-operation on definitions for curricula, educational provision, and study attainment. The definitions to be used in curriculum description were approved by the FVU Steering Group in early summer 2005, and definitions for educational provision in January 2006. A third set of definitions, concerning study attainment, is under preparation. There is still much work to be done in harmonizing definitions and formats, which are the foundation for planning and implementing electronic access across university boundaries for the Flexible Study Rights (JOO) system. Using the common description formats, course information can be directly downloaded from the target university database into the JOO application form and into the student's personalized electronic study plan. The final phase of the definition project will focus on common description formats for academic records, enabling the exchange of credit transcripts between universities.

E-learning quality management

The quality criteria define the characteristics of good web-learning materials

The FVU and the Virtual Polytechnic joined forces to produce a set of quality criteria and an evaluation tool for evaluating web-learning materials. The quality criteria are designed for evaluating and improving the text-based study and instruction materials provided on the portals of the FVU and the Virtual Polytechnic. Others may also find these criteria useful, including producers, administrators and

designers of e-learning materials, as well as external evaluators. The quality criteria define the characteristics of good web-learning materials including four fields to evaluate: use, contents, production, and utility. The criteria aim to ensure that web-learning materials communicate clearly, function technically and allow unhampered access. Quality materials must also fulfill all legislative requirements. The security of web-based materials is also an integral part of the quality criteria. The criteria for web-learning materials complement the overall quality service that the FVU is developing. They are also linked to the VOPLA quality project which recently published the first draft for comment of an E-Learning Quality Manual.

E-Learning Quality Manual

The E-Learning Quality Manual contains quality matrices for 1) e-learning and teaching, 2) digital materials and resources, and 3) e-learning support services. The matrices contain a three-level quality cycle (documenting present activities, defining criteria and measurement tools, and implementing criteria and evaluating the effects of implementation) and five quality aspects of e-learning: management, skills, resources, processes and evaluation. In the matrices, one can find questions that guide the user in his/her quality management work. The quality manual also includes examples of process descriptions for e-learning and teaching, digital materials and e-learning support services, various concepts on quality including the project's own quality concept, and instructions on how to use the Quality Manual. Testing of the Quality Manual will be done in 2006 by six pilot projects from Finnish universities. The aim is to use and test the contents of the manual by adapting it to the test users' own quality management processes. The pilot project' work will be monitored and tutored throughout the piloting year by the VOPLA mentors, and at the end of the year the pilots will report on their results. The results will be available on the VOPLA website for all the FVU member universities. On the website (www.vopla.fi) one can find examples of how to start and carry out an e-learning quality management cycle to improve one's own e-learning quality.

Staff training in ICT

The Finnish government set up a goal for 2007, by which year 75 % of the in-service teachers should be skilled in educational ICT. Thus, one of the most crucial areas in the FVU initiative has been the teacher training in ICT. In 2001, a national training program (TieVie) was launched as a wide university collaboration. During its six years of operation TieVie has trained a number of agents and experts nationally for the educational use of ICT in Finnish universities. According to the feedback from the participants, the TieVie project has clearly manifested its importance in building a common action culture and added value to collaboration in Finnish academic community. The course producers and participants have obtained plenty of models and materials for their own in-service training, as well as examples of the possibilities to apply ICT in teaching different fields of science. At the end of the project period a large challenge is to find an established training model to best serve the FVU member universities.

Web-based tools for supporting learning and teaching

FVU has developed several web-based tools for supporting learning and teaching, e.g. 1) *IQ Learn* offers information and support for students to develop as learners in web-based environments. For teachers it offers information about their students, as well as a general model and tools for tutoring. 2) *IQ Team* supports the teacher, Web group and its students in collaborative learning and group processes. 3) *VerkkoVelho* is a design tool that helps to acquaint teachers with the use of blended learning and web-based learning settings and to design their own web courses. 4) *ARVO* is a tool for evaluating the usability, pedagogical usability, graphical design, accessibility and informational quality of Web sites and Web-based course materials. 5) *OSKAR* is a skills assessment tool for teachers and educational planners to make a comprehensive and versatile assessment of their own or group of learners' proficiencies in educational ICT use and digital content production. Along with the national use, these tools have been introduced in a European project, eLene-TT (www.elen-tt.net), and some of them have been in pilot use in European teacher training workshops. The tools will also be available at a European Virtual Learning Resource Centre (VLRC), the aim of which is to pool and test tools and approaches developed in partner countries in the wider European context.

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INTEGRATING QUALITY INTO THE DNA OF DISTANCE EDUCATION

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Introduction

In the spirit of expanding dialog between European and American institutions of higher education, this paper reports on the efforts of Utah Valley State (UVS) to infuse quality into distance learning in a rather bold and innovative way for a college or university on this side of the Atlantic Ocean.

UVS is a fully accredited, comprehensive four-year college, with a student body of approximately 24,000 students and 380 faculty members. Its Distance Education Department now serves about 10,000 students each semester, among them dozens of citizens of European countries.

In a recent, highly successful collaboration between UVS and James Cook University in Australia, Dr. Jamie Seymour gave a lecture on biology to students on both continents. We would like to explore similar exchanges with universities in Europe. The author of this paper lived for two years in Germany and gained the greatest respect for European approaches to education.

The efforts described in this document to integrate quality into the very DNA of distance education began as a proposal to the Vice President for Academic Affairs and to the deans and faculty of the seven schools and thirty departments. It was entitled, "Toward a New Paradigm for Distance Education". Much of the original proposal format has been retained in this paper. However, some sections have been deleted and appendices removed to meet EDEN's submission standards.

The paradigm shifts that were implemented preface each of the following three sections.

1.	**FROM** a convoluted instructional compensation model for distance teaching that can encourage headcount over quality **TO** a simplified and more equitable model that follows best practices in distance and higher education and that provides meaningful pathways and incentives for quality

To attract faculty into the brave new world of distance teaching, a compensation model was devised several years ago at UVS that tied monetary reward to headcount. This was common practice at many American universities, and it seemed fair, because instructors often found themselves working harder in the new distance environment than in the classroom.

Unfortunately, the model included no incentive for quality, largely because distance learning was still relatively new and best practices were not well defined. But with the maturation of this learning mode, a credible definition of quality can now be formulated, and it is reasonable and progressive that meaningful incentives be provided for faculty participation in a culture of excellence that promotes scholarship and continuous improvement.

While this section addresses *instructional* compensation, it should be noted that the underlying quality of the course design and content certainly impacts how effectively an instructor can teach the material. Section 3 addresses this in detail and outlines a concurrent proposal to increase compensation to faculty for helping to develop truly instructionally rich distance courses.

Even with solid best-practice research to draw upon, formulating a rubric for measuring the quality of distance instruction is a significant challenge. And it would be a mistake to focus strictly on teaching with technology without acknowledging instructional constants that are valid for all modalities. Certainly the best measures will bridge the spectrum from classroom, to blended learning, to distance education.

To this end, an approach to quality is proposed based on the "Seven Principles for Good Practice in Undergraduate Education". These were distilled from decades of research on the undergraduate experience and first published in 1985 in the American Association for Higher Education Bulletin. In brief, the Seven Principles state that good practice:

1. Encourages contact between students and faculty
2. Develops reciprocity and cooperation among students
3. Encourages active learning
4. Gives prompt feedback
5. Emphasizes time on task
6. Communicates high expectations
7. Respects diverse talents and ways of learning

The authors later formed a non-profit, "The TLT Group", that employed the Seven Principles as a foundation for improving teaching and learning by making the most appropriate use of technology without sacrificing what matters most. They created a toolset, called Flashlight, to help faculty members, administrators, and students ask the right questions and gather data to guide and to improve their own educational uses of technology.

Flashlight contains both student and faculty inventories. The Current Student Inventory (CSI) is an indexed set of almost 500 validated questions for gathering information from enrolled students about teaching/learning practices, about the use of technology, about technology support, etc. (This is not the typical end-of-course assessment.) The accompanying Evaluation Handbook is an extensive guidebook to help design studies, and it includes articles on methods, along with case studies.

The Faculty Inventory (FI) is an indexed library of questions that can be used to develop surveys for instructors. The items closely parallel those in the CSI, making it easier to use the FI and the CSI in concert to gather both perspectives on the same phenomena, such as whether and how technology is being used to best advantage to facilitate faculty/student interaction, to promote active learning, and to support other principles of good practice.

It is proposed that UVS:

1. Become a subscriber to the TLT Group collection of manuals, articles, and web materials, which includes the Flashlight Online assessment system keyed to the Seven Principles, dozens of model surveys and templates, and analytic tools.
2. Establish a new baseline of compensation for distance instruction that, like classroom teaching, is not tied to headcount and that recognizes how the Distance Education Department today does far more than before to significantly reduce non-teaching demands on instructors. (See Section 2)
3. Augment the new baseline with a stipend that rewards and recognizes faculty members who make the effort to earn the UVS designation of Certified Distance Educator.
4. Augment the new baseline with an "assessment stipend" that rewards faculty 1) who participate in the Flashlight Faculty Inventory, 2) who participate in peer review, 3) who further "Scholarship of Teaching & Learning" by using Flashlight Online in an informed way to conduct their own periodic research to share, and 4) whose courses meet the Instructional Technology Richness standard explained in Section 3.

2.	**FROM** a need for faculty to often shoulder additional non-teaching work associated with distance courses **TO** a system in which Distance Education provides substantial assistance, thus allowing faculty to concentrate on teaching and minimizing any workload differences between classroom and distance instruction

Studies have indicated that effective distance teaching sometimes requires more effort on the part of the instructor, when compared to the classroom setting. As reported in the February 2004 *Journal of Asynchronous Learning Networks,* Rio Salado College discovered with one online course that "the majority of instructor's time was spent troubleshooting technology problems, helping students navigate through the material, and advising students rather than helping them learn mathematics".

However, with the provision of a course assistant, the instructor was freed to concentrate on academic rather than on logistic interactions and to effectively teach the subject matter to many times the number of students.

This dynamic and the solution is not news at Utah Valley State, where Distance Education has been quietly shifting this piece of the paradigm by offering ever increasing levels of assistance to instructors. But it is time to now formalize our four tiers of support. The first two tiers are provided for every course. The third and fourth tiers are reserved for qualified offerings.

Tier 1 – Support Coordinators are full-time members of the Distance Education Service Center staff. One coordinator is assigned to each of the three modes of distance delivery. They perform the following duties:

- Collaborate with instructors on needs assessment, on resource planning, and on the acquisition and analysis of service satisfaction data
- Screen, hire, train, supervise, and evaluate course support personnel
- Coordinate major distance course delivery operations such as site facilitation, resource distribution, exam proctoring and scoring, and general student communications
- Resolve problems and issues flagged by instructors
- Escalate unresolved technical problems to operations engineers and administrators

Tier 2 – Course Technicians are part-time members of the Distance Education Service Center staff, and they may service more than one course. They provide technical and logistical support to all distance faculty and students. Their responsibilities include:

- Monitoring technical operations and resolving issues
- Setting up courses for new semesters, which may include performing course rollovers, making minor information updates, and resetting quizzes and exams
- Providing live help and responding to "Ask the Tech" online postings

Tier 3 – Course Specialists are part-time members of the Service Center staff who work out of the Distance Education offices and provide non-content-specific support to faculty. They score Scantron-based assignments, quizzes, and exams and post results. A Specialist may be assigned multiple courses. Their services are available to instructors:

- Who are certified as UVS Distance Educators
- Who teach over 25 students and who do not qualify for a Learning Assistant

The maximum number of hours a Course Specialist may devote to supporting a course is calculated by multiplying the number of students by 45 minutes. For example, an instructor teaching 60 students has available 45 total hours of assistance during the semester.

Tier 4 – Learning Assistants are part-time members of the Service Center staff who possess course-content knowledge, typically from having successfully taken the class themselves. Faculty members may participate in their selection.

Learning Assistants (LAs) receive specific training in how best to perform their responsibilities, which include responding to student email, assisting in tracking student progress, scoring assignments, quizzes, and exams, and managing discussion groups. LAs are available to instructors:

- Who are certified as UVS Distance Educators and who earn the Assessment Stipend
- Whose courses meet the standards for Instructional Technology Richness
- Who teach over 50 students in a course
- Who are not teaching two sections of a course, that according to the evaluation process described in Section 4, could have been combined into a single section

The maximum number of work hours per course per semester for LAs is calculated by multiplying the number of students by 75 minutes. For example, an instructor teaching 100 students has a total of 125 hours of assistance available during the semester.

3.	**FROM** a one-size-fits-all model of compensation for development of distance courses, regardless of quality, and from the need for departments that wish to create distance courses to have technical and instructional design expertise in-house **TO** an approach in which compensation and the processes for development ensure instructionally rich courses, while shifting technical and design burdens to the Distance Education Department, thus allowing any faculty member to participate

The summation of an article in Volume 14.2 of the Journal of Distance Education includes these two statements:

> "It's the up-front investment that costs the faculty so much. It takes time to do the development properly. It's a lot more than putting your lecture notes together at the last moment."
>
> "Teaching at a distance involves 'hidden work,' such as creating extensive course materials and communicating with off-campus students."

At many colleges and universities the onus for developing and maintaining distance courses is largely on the faculty member, as reflected in the comments above. This tends to favor technophiles over other faculty members, polarizing attitudes toward teaching at a distance, and ultimately deterring many excellent instructors from participation.

Four major phases are involved in the creation and delivery of the typical distance course at UVS:

1. Proposal submission and review
2. Content organization and development
3. Instructional technology process
4. Course pilot, evaluation, and ongoing instruction

It is practice for the Distance Education Department to provide substantial technical and instructional-design services and support to faculty who wish to develop distance courses. By bearing most of the technological and as much as needed of the instructional design burden, Distance Education seeks to open the door to all faculty members, regardless of technical prowess.

The Development Role of Faculty in the UVS Model

In the UVS distance-course development model, faculty members are at the focal point of the first two phases listed above. In Phase 1, a template guides them through the proposal submission process.

Completion of the document is facilitated by a member of the Distance Education development team. The proposal is reviewed by the Distance Education Advisory Committee to help ensure support from other schools and departments potentially impacted.

In Phase 2, the faculty member might both organize existing content from various sources, as well as develop original content. The distinction is important for purposes of compensation, copyright, and intellectual property. For this phase, the faculty member is referred to as a *Content Expert,* since it is possible that the content might be developed by someone other than the person or persons who later teach the course.

Content includes: written or recorded lectures/lessons, examples, samples, interviews, lesson plans, discussion questions, quiz or exam questions, assignments, pre-constructed feedback, rubrics, concepts for multimedia interactions, demonstrations, simulations, etc.

The Development Role of Distance Education

Phase 3 of course development is called the Instructional Technology Process:

> *Instructional Technology is the systematic application of research, theory, and established best practices to the task of instructional design and development.*

In the UVS model, content is delivered to the Distance Education development team and its instructional and technological experts. Their role is to apply the instructional technology process in incorporating materials from the Content Expert into a highly effective, distance-learning framework. During this phase, the Content Expert continues to consult as the course is produced, and he/she and may revise, edit, or rewrite portions to best fit the mode of delivery.

Instructional Technology Richness

This is a term coined in Distance Education at UVS. A definition is important, as some people who read or hear it tend to put the emphasis on "technology richness", when "instructional technology" is the operative word combination.

> *Instructional Technology Richness (ITR) is a measure of the degree to which instructional technology has been applied in the design of a course.*

The ITR measure is reflective of the Seven Principles as they apply to the design of distance learning. Four levels of "richness" have been defined, which are based on an evaluation of such course elements as:

1. Student organizational and informational materials such as syllabi, objectives, study guides, lessons, review notes, articles, case studies, etc.
2. Significantly used taxonomies of learning
3. Quantity and quality of interactive activity, including student-to-content, student-to-student, and student-to-faculty
4. Accommodation of different student learning styles
5. Quality and quantity of formative and summative assessments
6. Use of distance-learning resources such as WebCT and other tools

As an example of the ITR levels, a TV course with a syllabus, a schedule, a few handouts, a primary learning taxonomy of "Remember", interactivity limited to email, basic assessments, and use of the WebCT "My Grades" feature might be categorized as a Level 1. Any course that depends on a commercial 'e-Pack' for most of its content and student interaction will typically fall into Level 1.

The same TV course described above but with added study guides and/or case studies, with some online interactive activities that promote active learning, and with a few online formative assessments, might be categorized at Level 2.

An online course that has strong organizational and informational materials, that consists of robust and original content not dependent on any particular textbook, that pursues some of the higher learning taxonomies, that promotes active and student-centered learning with appropriate types and quantities of interactivity, that uses formative and summative assessments that "flex" with different learning styles, and that employ technology resources to good advantage might be a Level 3 or 4.

Content Development Compensation

During the initial phase of development, the Content Expert and Distance Education, in collaboration with the department and school, determine an appropriate ITR level for the course. Based on this, a "Course Map" is produced that specifies target types and amounts of original material needed from the Content Expert.

Compensation may take the form of release time or a contracted monetary payment. In either case, the content is considered "work-for-hire" and is owned by the institution, with certain allowances detailed in the UVS *Work for Hire/Intellectual Property Policy*. For those who choose a monetary payment, the following chart provides the development compensation formula:

ITR Level	Compensation Formula
1	0.5x adjunct/overload rate
2	1.5x adjunct/overload rate
3	2.25x adjunct/overload rate
4	3x adjunct/overload rate

Compensation for Upgrading Courses to Higher ITR Levels

All existing distance courses will be evaluated by Distance Education instructional designers against the ITR matrix, and a level will be determined for each. This process will also generate specific ideas for advancing the ITR of each course. The findings and recommendations will be shared with departments and schools.

Revisions to existing courses follow the same basic processes as original development. Compensation is calculated as the difference between the starting and ending ITR levels.

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THE FOSTERING OF INNOVATIVE ELEARNING STRATEGIES IN EUROPEAN HIGHER EDUCATION

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Introduction

Although there are strong attempts being made by various European observatories and European Commission programmes to identify and disseminate innovative eLearning practices (MENON, 2006), the factors that determine educational effectiveness are, as yet, not well understood. In particular, while an extraordinarily wide range of university-level eLearning programmes are rapidly becoming available from large numbers of Higher Education Institutions (HEIs) across Europe, the sharing of good practice requires detailed accounts of successful innovative eLearning strategies. There are many relevant checklists and sets of principles described in EU websites (e.g. elearningeurope.info, 2006) and in the academic literature (e.g. Conole *et al.,* 2004), but it is often only through thoroughly appreciating what others have done that such abstract guidance come alive. However, it can still be difficult for HEIs to learn from others. While there are many media reports of innovation, these typically have to omit the level of detail that would enable optimal understanding by those HEIs wishing to apply such innovations in their own contexts. Meanwhile, case studies presented at conferences and in the academic literature can provide the necessary level of detail, but it can be difficult to collate such case studies into a form that facilitates consistent descriptions across the diversity of European HEIs.

By identifying the various eLearning programmes applied by HEIs in a number of EU member states and conducting a detailed assessment of a sample of eLearning strategies found to be effective supporters of higher education requirements, the EC-funded InnoUniLearning project is disseminating a range of eLearning strategy case studies. Where possible, this project is estimating the potential impact of the implemented eLearning programmes, but more importantly it will identify and detail the strategies applied by leading institutions and well-known success stories, as well as those institutions that have applied new and innovative eLearning programmes. It is hoped that the dissemination of these case studies will be of assistance to HEIs across Europe in implementing eLearning strategies that meet their own particular curricular and cohort requirements. The study is concentrating on illuminating a range of successful eLearning strategy cases, rather than necessarily determining best practice, which could be argued an impossible task at the moment because of a lack of learner feedback. Nevertheless, most, if not all, organisations that have implemented eLearning have gone through a period of adjustment in order to obtain an eLearning programme that is cost-efficient and effective; so capturing something of the challenges overcome by the HEIs leading this field, thus assisting the wider EU higher education community.

This paper describes the background and the methodological approach of the two-year study and some preliminary results, which will be elaborated in the conference presentation.

Phase 1: Identification of HEIs with noteworthy eLearning programmes

Phase 1(a): Comprehensive list of HEIs

The first phase of the study, involved project partners representing five member states – France, UK, Hungary, Austria and Portugal, is compiling a comprehensive list of HEIs with noteworthy eLearning

programmes. The European Commission's definition of eLearning was adopted: "the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration" (EC, 2001).

In case of some countries an element of selectivity was necessary. For example, some 95% of the UK's 200 (or so) HEIs are using Virtual Learning Environments (Jenkins, Browne & Walker, 2005), and the government is encouraging even greater eLearning (HEFCE, 2005). More generally, evidence suggests that European universities plan to expand their use of eLearning (BBC News, 2005).

A range of sources were used to compile lists, sources which varied from member state to member state. These sources identified HEIs which:

- have featured in previous surveys or case study collections in the particular member state (e.g. the "Forum neue Medien in der Lehre" in Austria);
- have a national reputation as long-standing eLearning players, or have high profile national media coverage in relation to eLearning;
- were nominated by eLearning practitioners in HEIs already identified;
- offer eLearning courses through well-known international consortia (e.g. the World Universities Network);
- have been referenced in academic literature;
- have featured in leading conferences in relation to eLearning (e.g. ELearnExpo in France; eLes04 in Portugal; Online Educa and EDEN internationally);
- have won awards, accreditation, or government funding for major initiatives that are related in some way to eLearning (e.g. a "Centre of Excellence in Teaching and Learning" in the UK);
- have been involved, either institutionally or through individual staff, in national organisations or projects with some kind of remit to promote eLearning in the higher education sector (e.g. JISC in the UK; or the Portuguese e-U initiative).

Judgements were then made, on the basis of aforementioned factors, about which HEIs seemed the most "noteworthy". These judgements were typically validated by experts in the relevant member state.

Basic data was collected on these HEIs from public websites, including (where available) the nature of the HEI, names of central units involved in eLearning, the range of technological tools and teaching methods used, particular curriculum strengths, and any eLearning initiatives with which the HEI was involved.

This list was reviewed by an Advisory Panel of eLearning experts largely drawn from member states other than those involved in collecting the data. The numbers of HEIs selected for the next phase are shown in Table 1.

Table 1: Numbers of HEIs selected for the next phase

Country	**n**
Austria	13
France	25
Hungary	7
Portugal	11
UK	31
Total	**87**

Phase 1(b): Development of review criteria and survey instrument

The next phase of the study developed criteria to identify HEI programmes that represent a range of applied strategies found to be effective supporters of higher educations requirements.

Paulsen (2003) observes that recurring themes in recommendations from European projects about success factors in large-scale online education are related to institutional processes, cost-effectiveness and sustainability, efficient and well-integrated ICT systems, and a focus on pedagogy and online teaching. To elaborate the criteria, a range of academic literature was used, including the review of eLearning by Wentling *et al.,* (2000), which emphasised a multi-level approach to evaluation, including organisational aspects and student satisfaction; WCET (2001), which looked at best practices in institutional activity relating to eLearning; Massey (2002), which surveyed 450 eLearning adopters across the EU; Franklin *et al.* (2004), which aimed to identify critical points for evaluating eLearning; Huang *et al.* (2004), which examined what factors an accreditation system for online teaching should take into account; Hodgson (2002), which considered pedagogical practices in EU-funded programmes; and JISC (2005) which summarised a range of projects looking at pedagogy in higher education.

In order to gather data relating to these criteria, a questionnaire was constructed and reviewed by the Advisory Panel. There are five sections in the questionnaire:

- *"Teachers"* asks about the types of training and support available for teaching staff responsible for content development and tutoring.
- *"Learners"* asks about the types of training and support available for learners, in relation to both technology and course content; and the range of services available to learners (online libraries, administration, assessment, accessibility services, and so on).
- *"Teaching methodology"* asks about the technologies and processes used to support learner-to-learner interaction, teacher-to-learner interaction and assessment and awards that have been won.
- *"Institution"* asks about the numbers of course that make use of eLearning in varying ways, degree of decentralisation of management of eLearning, and the methods used to determine course success.
- *"General comments"* allows respondents to highlight anything their HEI is doing that is particularly innovative that has not already been documented in the questionnaire.

Phase 1(c): Initial review process – survey data and additional evidence

The questionnaire was translated into the languages of the individual member states, and the HEIs selected to participate in this of the study were contacted to request their participation in a survey questionnaire. An overall response rate of 74% was achieved; and the responses were subjected to detailed quantitative and qualitative analysis.

Portugal came out particularly strongly overall, with Hungary showing strength in the section on Teachers, and the UK showing strength on the institutional aspects. However, one should be cautious in making country comparisons, not least because of the linguistic differences. It was also clear that the rankings within countries provided some surprises in comparison with the data on noteworthiness gathered in Phase 1(a). Much of this could be attributed to differences between respondents rather than between HEIs. A particular problem of this kind of survey is that in large HEIs in which responsibility for eLearning is decentralised to faculties or departments, there is not always a single individual that can represent the HEI simultaneously in terms of both innovation in particular curriculum areas and in the institution-level infrastructure and processes that support innovative eLearning. Sometimes it proved difficult for HEIs to identify which individuals collectively would be best-placed to complete the questionnaire. Some respondents were also clearly more enthusiastic than others in highlighting their institution's success.

In selecting HEIs to examine in more detail in the second phase of the study, it was therefore decided that in addition to ten HEIs selected purely on the basis of the questionnaire data, a further three institutions per participating member state would be selected (making a total of 25), by means of a process that supplemented the questionnaire with additional qualitative evidence available in the public

domain. This evidence built on the data on noteworthiness gathered in Phase 1(a), and so included national awards, participation in major eLearning initiatives, high profile media coverage, and appearance in academic literature. This process also enabled the project to represent a diversity of strategies across the EU, rather than simply selecting those HEIs that scored highest in total. As earlier, the Advisory Panel conducted a review prior to the start of the next phase.

Phase 2: A review of the 25 highlighted HEIs

The 25 HEIs that featured in Phase 2 are shown below.

Portugal Universidade de Aveiro Universidade do Minho Universidade Católica Portuguesa – Instituto de Ensino e Formação a Distância Universidade do Porto	**Hungary** Dennis Gabor College Eszterházy Károly College Eötvös Lóránt University University of Miskolc Budapest University of Technology and Economics
France ENIC Lille – Ecole Nouvelle d'Ingénieurs en Communication ESSEC – Ecole supérieure des sciences économiques et commerciales IAE Caen – Institut d'Administration des Entreprises de Caen Université Technologique de Troyes Université Lyon 1 Université Lyon 2	**UK** University of Birmingham University of London External Programme The Open University University of Leeds University of York UHI Millennium Institute University of Ulster
Austria Technische Universität Wien (Ecodesign) Wirtschaftsuniversität Wien (Learn@WU) Johannes-Kepler Universität-Linz (WeLearn)	

A review of each institution was conducted, which included telephone interviews. The schedule for these interviews was based on a benchmarking methodology developed by the United States' Institute for Higher Education Policy (2000), and intended to provide a measure of quality in relation to eLearning. The qualitative data derived from the telephone interviews also supplemented the data obtained from the questionnaires in relation to aspects such as course development processes; the pedagogical guidance and support available to staff; the range of activities the students undertake, the resources available to them, their interactions with tutors and other students, and their assessment; and the use made of data on educational effectiveness, enrolment and costs.

Summaries of the reviews of these 25 highlighted HEIs will shortly be available in a project output: the Noteworthy eLearning Programmes Report. Preliminary findings suggest:

- Blended learning is overwhelmingly the preferred teaching mode.
- A minority of HEIs have written eLearning strategies.
- The most important aspects to interviewees are clearly customer-focused: providing students with timely and constructive feedback on their students' assignments and questions; providing quick and accurate responses to student support requests; and facilitating student interaction with tutors and peers.
- Surprisingly that "data on enrolment, costs, and successful/innovative uses of technology are used to evaluate the programme's effectiveness" is seen as one of the least important aspects.

- Several institutions are targeting niche markets, such as international postgraduate professional programmes in particular departments, others are aiming for whole-institution strategies.

Phase 3: A detailed study of eLearning strategies – case study visits

At the time of writing, eight HEIs are being selected to be highlighted as detailed eLearning strategy case studies. Building on the data already collected, Phase 3 will consist of campus visits and interviews with senior management (experts and decision makers), with those involved in originally creating the programmes, and with the teachers and students currently involved in the programmes. Each case study will provide an overview of the institution, its educational structure, curriculum needs, and eLearning strategies.

It will be important to consider the student perspective, and available evidence of educational impact. Clegg *et al.* (2003) argue that uncritical acceptance of pressures to adopt new ICT for education, under the rhetoric of "student-centred learning", can turn out to have negative consequences for students. It will also be valuable for the European higher education community to learn how these strategies have developed over time.

The format of the case study visits is based on the template developed for JISC in the UK, and the interview schedules attempts to establish stakeholders' perceptions of quality and factors of success, in relation to aspects such as the environments for learning, pedagogic approaches, course development processes, and quality improvement processes.

Dissemination

The outputs of this project will be made available to the European higher education community through online interactive modules. There will also be four synchronous virtual conferences each highlighting two of the eight detailed case studies.

Through illuminating a range of innovative eLearning strategies from across Europe in this way, it is hoped that HEIs will be able to learn from the experiences of other institutions and that some light will be shed on factors that determine educational effectiveness.

Acknowledgments

The authors gratefully acknowledge the help of the InnoUniLearning Advisory Board, and the HEIs who kindly agreed to participate in the study. The project has been funded with support from the European Commission. All views expressed in this paper are those of the authors and do not necessarily represent the views of the European Commission.

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E-LITERACY AND THE ROLE OF ACADEMIC LIBRARIES IN LIFELONG LEARNING

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Abstract

This contribution focuses on the current and future role of academic libraries in e-literacy and lifelong learning. Lifelong learning has become a prerequisite to keep up with a fast evolving society. Information literacy forms the basis of lifelong learning. But the character of information literacy has changed and e-literacy has emerged. Therefore, it is the task of higher education to encourage students in lifelong learning by making them e-literate. Due to this evolution, e-learning has become more and more integrated in universities. In this paper we want to investigate which role the university libraries can play in e-learning and e-literacy. In our opinion there are two ways in which an academic library can play a role in lifelong learning. The first one is teaching and supporting e-literacy, so that students after graduation are information literate and know how to learn. The second way is linking the virtual learning environment of higher education institutions to the academic, digital libraries and giving students the opportunity to access both after they graduated. That way, they would be able to keep a portfolio with the knowledge they gathered during their study and they could extend their knowledge and their portfolio after graduation by using the digital library.

Introduction

The structure of the paper is as follows: we start with definitions of terminology relevant for this paper, followed by a general overview of the context in which the paper should be situated, i.e. lifelong learning and the origin of e-literacy. In the third paragraph, we focus on the role and place of university libraries. Next, we explain why it is important to link the virtual learning environment (VLE) with the digital library and try to identify some of the problems which could arise by integrating them.

Society is changing every day and new trends and technologies emerge in the new digital world. In this paragraph we formulate some working definitions for some of these trends, which are relevant for this paper, without having the intention to provide an exclusive definition.

- E-library: E-libraries or digital libraries have become increasingly important during the last two decades, especially for university libraries. According to Lynch, there are three typical characteristics of a digital library: interaction, community and coherence. A physical, traditional library is always a passive one, but a digital library can offer far more interaction via services as 'ask a librarian', ratings of publications, reading recommendations by the readers and communities for teachers, researchers and students, etc. In an ideal e-library, there is also a high level of coherence between the different information resources, supported by a digital rights management system [1]. Although all these 'active' elements are not yet available in most e-libraries, we agree with Lynch that this is the way to go. We will therefore use the following definition in this paper: an e-library or digital library gathers all kinds of electronic resources, including online journals, newspapers, electronic archives and electronic books, and provides coherent access to them in an interactive environment.
- Information literacy: 'Information Literacy is […] the ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand' [2].
- Networking: Real knowledge has become an economical resource that one wants to share with others in order to enlarge one's own knowledge: people start networking. This is also the reason why social software such as wiki technology, used for example in the Wikipedia [3], has become rather successful. The same evolution also applies to our society: the information and knowledge society gradually changes into a networked society [4].

Lifelong learning and the origin of e-literacy

Learning no longer stops after graduation. At present, we are all challenged to keep up with a society changing at a tremendous speed by lifelong learning. 'Information literacy forms the basis of lifelong learning. It is common to all disciplines, to all learning environments, and to all levels of education. It enables learners to master content and to extend their investigations, become more self-directed, and assume greater control over their own learning. […] Developing lifelong learners is central to the mission of higher education institutions. By ensuring that individuals have the intellectual abilities of reasoning and critical thinking, and by helping them construct a framework for learning how to learn, colleges and universities provide the foundation for continued growth throughout their careers, as well as in their roles as informed citizens and members of communities.' [5]

But there are currently two dimensions of information literacy. The erstwhile information divide is enhanced by a digital divide. It is in this context that words like e-literacy and e-learning gain importance. Where people used to experience difficulties in finding information, they now have problems with finding their way in an overload of information. Moreover, the character of information has changed: most of the information has become electronically available through the World Wide Web, digital libraries, databases, online journals, etc. A new, necessary skill has emerged: e-literacy.

On the one side, there is the need for information technology skills, i.e. skills to exploit technology to use information effectively. On the other side, there is the need for conceptual understanding and knowledge processes, i.e. the traditional functions of identifying, localising, evaluating, analysing and using information with a comprehension of the characteristics of information (intellectual property rights, authenticity, provenance, etc.). In a digital environment both aspects need to be combined. One has to have a basis ICT-knowledge and ICT-skills, such as time management in a digital environment, the skill of using netiquette, skills in reading and following threads, etc. Moreover, traditional literacy is getting more complex, since more information is available and accessible and the traditional signifiers of quality are absent [6, 7].

The discussion paper for the digital literacy workshop in Brussels, May 2001, comments on the eLearning Action Plan of the European Commission and states that 'the emergence of the knowledge-based society implies that every citizen must be digitally literate. […] All citizens need to have an understanding of the Digital Age and must be provided with the skills that are essential to learn and work in the Knowledge Society.' [8] Libraries, historically the specialists in information retrieval and literacy, took the opportunity to promote themselves as specialists in e-literacy.

The current and future role of libraries

University libraries have always been the centre of knowledge at universities. Originally, they were designed to collect, give access to and preserve print collections. With the development of ICT it was predicted that libraries would disappear, since they were no longer needed to store information. Virtual libraries would replace the physical ones. Today, we see that with the increasing percentage of information electronically available and accessible everywhere – on- and off-campus –, the role of university libraries is indeed very fragile. New technologies force libraries to innovate and to face new challenges, but we notice that physical libraries still exist, and that the usage of these libraries is increasing. How is this to be explained [9]?

Libraries as e-literacy specialists

Most of the university libraries nowadays consist of a physical collection and an electronic equivalent, an e-library. By focussing more and more on these digital libraries, library staff tries to play a role in the learning and research process of students and staff of the institution, more specifically in e-literacy. More and more, students and teachers need e-literacy skills, skills necessary for information inquiry in the digital world. In view of the importance of lifelong learning and the growing need for information resources, it seems more than logical that libraries play a role in this evolution. Several literacy standards were thus developed, among which the standards of the Association of College and Research Libraries (ACRL), Information Literacy Competency Standards for Higher Education, are the most known. There are five standards within the Information Literacy Competency Standards for Higher Education and twenty-two performance indicators. They provide a framework for assessing the information literate individual [10].

Countless online modules based on these ACRL or other standards were created to teach students and teachers e-skills. At the University of Texas for example the Texas Information Literacy Tutorial (TILT) was developed [11]. This project was translated and adapted to a Dutch environment within IHOL, a Dutch library consortium with the aim to improve the provision of scientific information in the province of Limburg [12, 13]. In December 2005, a two-year project with the title 'Improving literacy skills with flexible learning objects' started within the K.U.Leuven Association, a network of Flemish higher education institutions. This project aims to integrate information skills in the different components of curricula by investigating existing literacy standards and developing reusable learning objects for training information skills. Those learning objects will be offered in a content management system and supported by an advisory community. For one discipline an exemplary course will be created by packaging some of the learning objects [14]. Another example is a joint e-literacy course between Helsinki University of Technology (TKK) and K.U.Leuven. Both institutions participate in the REVE project within the eLearning programme [15]. The REVE project, an acronym for REal Virtual Erasmus, envisages virtual mobility as a complement to the physical exchange of students and teachers. Within this project, joint online courses are developed and supported. One of these courses is 'Searching for Scientific Information'. The aim of the course is to acquaint students with the most important scientific information sources within their field, to help them select and search efficiently for both printed and electronic information and to make students aware of the information evaluation methods. The course was developed by TKK and shared with K.U.Leuven who modified it to its needs [16, 17].

Libraries as social learning place

The need for guidance in the use of e-resources, does not, however, explain why physical libraries are still popular. There is another reason for this. Where the internet tends to isolate people, libraries gather people in a physical, social place. In order to continuously enlarge their knowledge, people exchange information with each other in networks. This is reflected in the learning behaviour of students who use the university library as an extension of the classroom for group discussions, preparing presentations, etc. The university library is becoming a social learning place. Consequently, the university library is the only place in the institution where traditional knowledge resources (print collection) and new, innovating technologies and resources are combined in a service-rich environment [9].

Integrating e-learning and e-libraries

In order to let the university library play a role in the learning process of students and the research behaviour of faculty members, more is possible and needed than offering courses and support for developing e-literacy. In our working definition of an e-library, we already argued that ideally it should be an interactive environment.

The integration of e-learning in higher education is an increasing trend since the 1990s and differs per institution and per discipline. It varies from the use of a virtual learning environment (VLE) as a fileserver for storing course materials or blended learning with interactive elements through discussion forums to real distance learning with no or very little face-to-face meetings and a strong use of social software (wiki, blog, chat, etc.). By linking the institutional VLE to the digital library, new options become available. For example, in their course materials, teachers can refer directly to journal articles, simulations, presentations, etc. available in the 'extended' university library. Students can analyse these materials, compare them with other e-resources, discuss them, etc. Searching and finding appropriate resources would then be part of the learning activity. One would not need to switch between different systems with different user accounts and logins, different metadata, different search possibilities, etc. Moreover, a personalised virtual library with a personal portfolio of the learning progress would definitely enlarge the user comfort of learners. All these actions aim at stimulating students and academic staff to make a better and more efficient use of the library materials and at supporting them in their learning and research process [18].

Most of the problems that are likely to occur when linking the VLE with the digital library will be of technical nature, for example digital rights management and access management, but there are also several other consequences. For example, who will be responsible for the metadata of learning objects and which standard will be used? Library staff usually provides the metadata of research materials while

the institution's VLE support team usually provides the metadata of the learning materials. Therefore, arrangements should be made which could result in organisational changes. The same applies for the pedagogical aspects: introducing e-learning and using multimedia in education requires a new pedagogical approach, different from the one used for traditional learning. It is therefore not only a matter of providing teachers with e-resources which they can use in their courses, but also of raising awareness about how to use them in a sound, efficient way. From a more economic perspective, new trends such as open access publishing could have an impact. Another example is the trend to make course content available to everybody free of charge, such as the OpenCourseWare Initiative of MIT [19] or MERLOT [20]. And last but not least, the main question behind all this will be how to guarantee the quality? How can we evaluate the value of the information? How can the library guarantee the quality of the e-resources it offers [4, 18]?

Integrating e-learning and e-libraries offers students – as stated above – the possibility to build a personalised e-library with a portfolio of the learning progress. But in general the access to the academic, digital library and VLE is denied for students once they are graduated. This implies that they loose their personalised collection of knowledge and learning progresses which they have carefully built during several years. Therefore, we argue that higher education institutions consider granting former students this access. Several universities have an Alumni Association, which gathers former students. One of the advantages at K.U.Leuven of being a member is the possibility to use library facilities (access to print and electronic collection, loan, reservations, etc.). We suggest that Alumni members also receive access to the VLE (in which the e-library is/will be integrated). That way, former students can keep using their personalised e-library and extend their portfolio during their working career.

Conclusion

The character of learning has changed in the last two decades. Two aspects of learning are increasingly important: social learning and information literacy.

Society is gradually changing into a networked society. The importance of networking is reflected in the popularity of social software, like wiki, blog, chat and discussion forums. This social element is also found in the new role of academic libraries. The university library is becoming a social learning place, as an extension of the classroom.

In this networked society, being information literate is – more than ever – very important. Content is rapidly outdated and it is the responsibility of universities and colleges to teach students how to learn. Since most of the information is now electronically available and accessible, this also implies a need for e-literacy. The need for developing e-literacy offers tremendous opportunities for academic libraries, such as the opportunity to extend their educational partnership role. Collaboration between the library and educational departments of the institution is needed. 'The division in universities between teaching, the library, ICT and educational technology is increasingly meaningless [21].' The importance of learning how to learn and of information literacy should bring those units together.

Students need to develop e-literacy during their study in order to be capable of independent learning after graduation. This is one issue in which libraries can play an important role, but their role in lifelong learning is not limited to teaching and stimulating e-literacy. E-learning is increasingly integrated in higher education, mostly through the use of a virtual learning environment. By linking this VLE to the digital library, students and academic staff can be supported in their learning and research process. Attention should be paid though to granting former students access to the VLE. They would then have the opportunity to extend their portfolio with learning progresses during their career and life by using the e-library in combination with their daily experience.

Acknowledgements

The current article was written within the framework of the REVE project. This project is funded by the European Commission within the eLearning programme. More information is available at http://reve.europace.org/.

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HOW TO ASSESS THE QUALITY OF ONLINE LEARNING AND TEACHING MATERIAL? QUALITY GUIDELINES FOR EDUCATIONAL ONLINE CONTENT AND ITS PRACTICAL APPLICABILITY ILLUSTRATED WITH A CURRENT CASE STUDY: EVALUATION OF AUSTRIAN E-CONTENT COLLECTIONS

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1. Introduction

In the last few years many European and national programmes were initiated to overcome the shortage of online teaching material in the educational sector (e.g. EU eContent Plus programme or e-fit Austria [1]). Both professional publishers (mainly a team of authors, lectors and web-designers) and non-professional publishers (media competent teachers in practise) had been motivated to develop online learning and teaching material. These digital materials are placed either onto a commercial web portal, to school portals of the teacher' s institution, a thematic web portal (e.g. www.mathe-online.at) and/or onto a nationwide public portal for educational resources often hosted by federal authorities (e.g. www.bildung.at). Although educational content portals nowadays address many different subjects and student levels, they contain a mix of different types of multimedia enriched teaching material, and are easily accessible via the Internet from school (directly in class or IT-rooms) or from home, it was observed that the rate of actual usage of online educational resources and their integration in general teaching practises in formal learning in german-speaking countries is low [2].

Some years ago, one would have thought that the existence of extrinsic factors such as insufficient IT-infrastructure, low bandwith or inadequate media competence of teachers could explain this phenomenon. However, given the fact that during the last ten years a lot of energy and money had been invested combating these barriers on the national and European level, the above explanations seem not satisfying anymore. Therefore in this paper we would like to question whether the *quality* of online learning and teaching materials simply does not meet the expectations of teachers and instructors and are therefore often used reluctantly. While trying to evaluate the usage and quality of eContent collections in Austria, the following questions had come up:

- How can the quality of online educational content be assessed (objectively/subjectively)?
- How important is the perception about pedagogical value of online material as usage and quality criteria for teachers/tutors?
- Do we find any indication that some specific types of learning and teaching material are selected for a specific educational setting more than others?
- What quality should new online teaching and learning material and resp. online collections offer in the near future?

2. Problem

The question of assessing "non-technical" quality in e-Learning is a rather young research topic in the European e-Learning scene, however heavily discussed now in journals, papers and blogs. For example an article on quality in eLearning in March 2005 was recalled 7369 times (see www.elearningeuropa.info [3]). Only lately the SEEQUEL project, the IST project "European Quality Observatory" and especially work from Ehlers, Ulf (2002-2004) laid the foundations for more research in this fiels. It can be said, that the problem of assessing the usage and quality of online learning materials is ultimately affected by the same factors that influence any learning material:

- the selection of relevant content;
- familiarity with the target audience;

- expertise of the content producers;
- a didactic approach;
- the applied concept of learning, and
- the quality of communication and expressions.

As the Finish National Board of Education points out, the quality of online learning materials as well as its usability as a support for teaching and learning is influenced by new phenomena and factors [4]. For example, the online environment enables distance learning, where not only the learning material is used in face-to-face teaching but also the instruction and steering of the learning process are provided online. Many online learning and teaching materials are structured as complete modules or courses that include the actual learning materials (available online or otherwise) and online interaction. Very often these two *cannot* be categorically separated from each other, and from the point of view of learning this may not even be sensible – the content to be learnt exists, in a manner, in both the content and the interaction, and the *true quality* of the learning material will only become evident once in use and in the right context. However, teachers base their decision of using online materials in different educational settings (regular class, afternoon lessons, projects, self-study sessions, learning at home, etc.) on the quality – respectively pedagogical value – of online material in contrast to other teaching materials.

In order to find answers for this problem and the above questions we have screened different quality guidelines and evaluation approaches specifically for developers of online learning and teaching materials. We critically discuss their dimensions and reflect their relevance in the context of educational settings in school. Finally we attempt to illustrate the practical applicability of such guidelines and quality perceptions in a case study carried out in the sector of secondary and primary schools in Austria. The case study describes quantifiable usage of educational online content in Austria for the year 2004-2005 in diverse school types and for different learners' levels. It explores factors influencing the decision of using online content for different educational scenarios, especially with the view to pedagogical content quality dimensions. It will summarise our experiences with evaluating online content collections and what can be concluded thereof for further research questions.

3. Theoretical aspects on the quality dimensions of e-Learning

In the following "e-Learning" quality concepts will be outlined and screened whether they can contribute to assess the quality of eContent collections from the view of e-Learning facilitators.

The individual learner's and teacher's perspective of quality

In order to assess e-Learning quality Ehler argues for a quality concept focusing on a learner's perspective: *"Quality in e-Learning has to be considered as a co-production process between the learning-environment and the learner – and is thus part of his/her own responsibility. A learning process is not something that is delivered to a learner by an e-learning-provider but rather constitutes a process of co-production between the learner and the learning-environment. That means that the product/outcome of an educational process can not exclusively be influenced by the 'production processes' of an educational institution." [4]* He further claims that research should be concerned (1) firstly with the question which dimensions are constituting quality in e-Learning from a learner's perspective; that is: which quality aspects, dimensions or criteria are important for learners? and (2) secondly, with the notion that quality is no longer viewed as a concept in which the same quality approaches or quality criteria apply to all learners, but rather where different learners have different preferences regarding quality in e-Learning [4].

This concept works well for assessing learning processes by autonomous learners using self-studying materials. However, in the context of formal learning teachers still have a decisive role when selecting and using online content. So their perception of quality is highly relevant, if one wants to extent or improve existing content collections. However, similar to the fact that learners are not a homogenous group, we may conclude that teachers also have different perceptions of e-Learning quality and of assessing online content collections. Influential factors maybe their level of e-Learning experiences or their subject and related educational settings.

Ehlers uses the following classification of subjective quality requirements in e-Learning and structured them in seven fields of quality, however content is not a separate section, rather is included in some of them (4, 5, 6, 7):

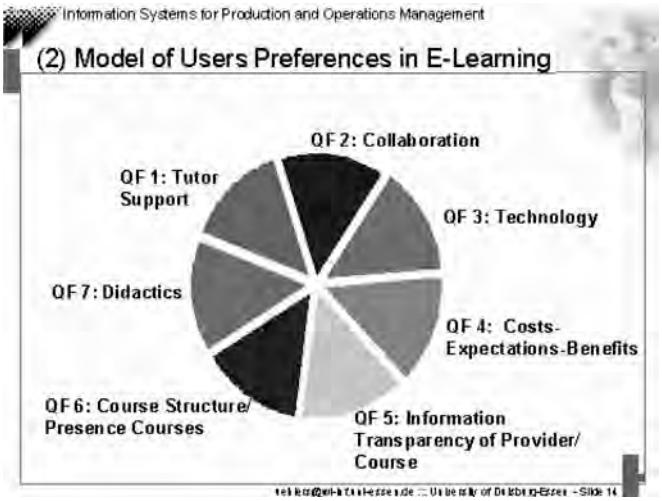

Figure 1. Model of subjective quality requirements (in Ehlers 2004)

Out of the over hundred dimensions, the following quality dimensions can be considered as useful also in the context of evaluating e-Learning quality (and especially online content) in the school context and from the perspective of teachers:

Dimension 3: *Learner vs. Content Centeredness*	Learners vary in their preferences of tutorial behaviour along the lines of a rather learner oriented interaction style, referring to their personal learning process on the one hand and a more content oriented interaction and communication processes between tutors and themselves on the other hand.
Dimension 5: *Goal- vs. Development Centeredness*	This differentiation expresses a tutorial behaviour that focuses primarily on the course goals on the one hand and a more learner oriented tutoring style that supports the personal development of learners learning- and social skills.
Dimension 21: *Information About Course Goals and Contents*	This dimension expresses the importance for learners to access detailed information about the course they are going to take (e.g. an prototype schedule).
Dimension 25: *Background Material*	This dimension expresses the importance of having access to background materials on the course topics.
Dimension 26: *Multimedia Enriched Presentation Material*	For certain groups of learners it is important to use materials that are enriched by multimedia and use not only one but several media resources (audio, visual, movies, texts, etc.).
Dimension 27: *Structured and Goal Oriented Course Material*	An important quality dimension can be to structure the course material in a goal oriented way.
Dimension 28: *Support of Learning*	This dimension contains criteria that express that the course should enable users to gain learning literacy and become more skilled in their life long learning competencies.
Dimension 29: *Feedback on Learning Progress*	Tests and exams should be integrated into the course material to get feedback on the learning progress.
Dimension 30: *Individualized Tasks*	The tasks should be especially designed to fit the learner's needs and goals.

Learners subjective quality requirements *Source: Ehlers, 2004*

Quality perception on multimedia production (based on cognitive theories on instructional design)

Another view on what constitues quality of content production can be found in the cognitive theory on multimedia production. Research findings from cognitve theorists suggest that there is "a place for CBT and online learning, but it also warns us to structure it in a way that efficiently maximizes learning.

What is most important is not whether the instruction takes place in a classroom or on a computer screen, but whether empirically-tested strategies for multimedia instruction are employed that facilitate knowledge construction by the learner." [5, p. 271] Especially guidelines from Mayer and Moreno (1998, 2003) for "meaningful learning", shall guide developers and users to assess "content quality". Influenced by cognitive theories (e.g. Theory of Working Memory, Dual Encoding Theory, Cognitive Load Theory, ACT-R Production System Theory, and the Cognitive Theory of Multimedia Learning, see also Mayer 2005) they describe meaningful learning as "deep understanding of the material, which includes attending to salient aspects of the presented material, retaining relevant information in both visual working memory and auditory working memory, organizing it into a coherent mental structure, and integrating it with relevant prior knowledge" [5. p. 272.]. They found that the following quality dimensions for the production of online content influence any learning outcome:

Modality Principle
The modality principle states that better transfer occurs when multimedia combines animation/ pictures and narration as opposed to animation/pictures and on-screen text, i.e. students learn better in multimedia messages when words are presented as spoken language rather than printed text. This relates directly to the Theory of Dual Coding which suggests that we have two types of working memory, one verbal and one visual, and that we learn best when both channels are used together, rather than overloading one or the other.

Contiguity Principle
The contiguity principle states that better transfer occurs when corresponding narration and animation are presented simultaneously, both temporally and spatially. Temporal contiguity means that corresponding words and pictures should be presented at the same time, while spatial contiguity means that corresponding words and pictures should be presented near rather than far from each other on a page or screen. In other words, do not place an important visual image on one page or frame, and then discuss it on a preceding or following page/frame without continuing to show the visual image.

Multimedia Principle
The multimedia principle states that better transfer occurs from animation/pictures and narration/words than from words alone. When words and pictures are both presented, learners have the chance to construct verbal and visual cognitive representations and integrate them.

Personalization Principle
The personalization principle states that better transfer occurs when narration is conducted in a conversational style (first or second person) rather than a formal style (third person).

Coherence Principle
The coherence principle states that better transfer occurs when extraneous material such as irrelevant video, animation, pictures, narration, and sounds are excluded. This is where instructional designers who employ gaming technology should be careful. I also like to compare this effect to humorous commercials that we all love and talk about, yet can not remember what the commercial was selling or who the sponsor was.

Redundancy Principle
The redundancy principle states that better transfer occurs when animation and narration are not combined with printed text. When pictures and words are both presented visually, it can overload visual working memory capacity.

Pre-training Principle
The pre-training principle states that better transfer occurs when training on components precedes a narrated animation. If the learner does not understand the nature of each component, trying to construct a model of each component while trying to understand how they integrate with each other will quickly overload working memory. It is better to do pre-training on each component so that the learners already possesses schemas for them before presenting material that requires the learner to integrate each component into larger schemas. This connects to the concept of chunking and building schemas. Learners have to create low level schemas about a concept, before they can combine them into larger, more complicated schemas.

Signaling Principle
The signaling principle states that better transfer occurs when narrations are signaled. Signaling reduces cognitive load in auditory working memory by providing cues to the learner about how to organize the material. Signaling assists learners in the process of organizing sounds, which can result in deeper, more meaningful learning.

Pacing Principle
The pacing principle states that better transfer occurs when the pace of presentation is controlled by the learner, rather than by the program. Learners vary in the time needed to engage in the cognitive processes of selecting, organizing, and integrating incoming information, so they must have the ability to work at their own pace to slow or pause the presentation if necessary. If the pace of the presented material is too fast, then these cognitive processes may not be properly carried out.

Source: eLearning Science – Mayer and Moreno (1998, 2003) in Sorden 2005 p.272.

Comprehensive criteria guidelines on online educational material by Educational Boards

Besides theoretical approaches, we have screened also a number of "eContent guidelines" issued by national educational bodies in the last few years. The Northern Ireland Partnership for eLearning issued the following "Quality and Standards Indicators for e-Learning in Schools" (2004, p. 7). As regards eContent they propose: *"eContent should be of high quality and fit for purpose so as to improve the quality experience of the elearner"* [6].

Indicator	*Feature*	*Characteristic*
being directly relevant to the curriculum / specification	- being directly relevant to the curriculum / specification - contributing to improving standards and encouraging excellence	- clearly identifying the intended learning goals - being free from bias and having integrity
format, presentation and accessibility should	- have a clear uniform structure - comparable in rigour, depth and breadth to off-line delivery methods - accommodate different learning styles or challenge the learner and allow for remediation - promote active learning and interaction with others - exploits the interactivity of the technology - conform to RAID principles (re-usable, accessible, interactive and discoverable)	- consistent in presentation and standard - demonstrate how to progress through the content - challenge the learner and allow for remediation - exploits the interactivity of the technology - and conforms to international technical standards for indexing - flexible, adaptable and able to be modified - free from copyright restrictions

Source: Quality and Standards Indicators for eLearning in Schools First Working Edition Version 1.0 June 2004 [7]

A working group from the Finish National Board of Education groups their guidelines for producing educational content of high quality in four sections [7]:

Pedagogical quality: refers to features in the learning material that support learning and the applicability of the material in teaching and learning processes.

Usability: refers to the technical structure and interface design of the learning material as well as the ease of use arising from these features. Usability is dependent on the user's experience.

Accessibility: in this context means that the online learning materials are accessible to everyone regardless of their age, physical or mental capacity, disabilities or health.

Production quality: the production of online learning materials fulfils quality criteria if it is carried out in a controlled and documented manner, steered by knowledge-based, skillsbased and learning-based goals, and if the end product meets professional standards.

Also in Austria the Federal Ministry for Education and Science released ten rules for eContent development (eContent Erlass, BMBWK, 2003). The set of proposed production guidelines are correctness, structure, emotionality, adaptivness, content, reflectivity, explorativity, standardisation and legal correctedness [8].

4. Case study

On behalf of the Austrian Federal Ministry for Science, Education and Culture, the authors are currently carrying out an evaluation about "Usage and quality of the Austrian educational eContent collections". Purpose of this evaluation is to:

- identify and analyse the actual usage of online content in different types of schools, at different learner levels and for different subjects for the period from 2004-2005
- explore today's barriers of using eContent specifically for different educational settings (regular class, afternoon lessons, projects, self-study sessions, learning at home, etc.) in primary and secondary schools and
- assess the quality of the most important educational content collections in Austria (e.g. pedagogical value for teachers; illustrated by best practise examples).

The evaluation targets seven different school types (VS, HS, BG, BORG, HTBLA, BHAK, HBLA) at all school levels. Three sources of data are used:

- Questionnaire surveys among teachers (n=385), students (n=3240), and administrative staff (n=80)
- Analyses of access to different Web platforms (five main portals)
- Telephone-interviews and discussions with teachers, administrative staff and e-Learning experts

As mentioned before, this study is currently under way and results will be ready at the end of March 2006. Only then we will be able to describe the major results and experiences with using quality dimensions and indicators as set out in the above guidelines in a revised paper version.

Results and reflections

Based on the results of the case study, we would like to include our observations and reflections on the applicability of existing eContent development and production guidelines aiming to ensure pedagogical quality. We will address further research issues here eg. what is needed to adapt those guidelines as to address the pedagogical value and quality perceptions of teachers.

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"TO CHANGE OR NOT TO CHANGE" – HOW PROFESIONALS COPE WITH THE DIGITAL CHANGE IN HIGHER EDUCATION

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Introduction

> "An innovative and quality oriented education system must put digital competence on the agenda. All learners (in and out of schools and universities/colleges) should utilize ICT in a secure, confident and creative way in order to develop the knowledge and skills they need to be competent participants in the information society" (Clemet[1] 2003).

The digital society leads to challenging global competition, in turn necessitating the ability to innovate and generate new areas of production in all types of organization. Digitalization is not only an aspect of the knowledge society; the digital processes will function as the main driving force of the knowledge society (Frønes, 2002). This change requires that all people need to acquire basic ICT skills. The Ministry of Education and Research in Norway emphasizes digital competence in their long term plans for all levels in the educational system. There will be a demand from the Ministry that the Norwegian educational system should be among the leading countries until 2008 with regard to the utilization of ICT in teaching and learning. This is supposed to promote innovation and quality improvement, and a national program for digital competence has been established to reach these goals. Exploiting the full potential of ICT, we need to acknowledge its capacity for compressing space and time and how it is becoming part of our lifelong learning, whether this be at school, at work, or at home (Lund, 2004). The education of today and tomorrow needs digitally competent citizens based on the vision of digital competence (Clemet, 2003).

There is no doubt that digital teaching methods have come to stay in higher education. The report "The Digital Condition in Higher Education" shows that use of ICT in teaching has increased considerably during recent years. This is especially due to most of higher education institutions having implemented a Learning Management System (LMS)[2]. Generally speaking, LMSs are used to share information, the administration of assignments for students, and the communication of teaching material. More advanced use occurs occasionally, which has also in some cases resulted in comprehensive adjustment of teaching. This situation in higher education in Norway can also be found in other European countries (Arneberg, 2005).

The integration of digital media in teaching methods is important for learners in order to develop digital competence. Academic staff members in higher education are often required to use digital media in their courses and teaching without possessing this competence themselves. This is how an assistant professor expressed her feelings in this kind of situation: "The blind leading the blind". The focus on digital competence for students is not enough to meet the vision of digitalization of the education system. Professionals need just as much support and training as the students. In order to facilitate digital learning environments for students, the integration of digital competence must be an overall vision in the educational system and become a part of the institutions' organizational culture. The facilitation of a life-long learning environment for professionals is important in order to meet the challenges of digital change.

This research is based on the implementation of digital teaching methods at a university college in Norway during the period 2004-2005. A "competence project" was started in order to meet the professionals' needs for help in the implementation process. The Centre for Life-Long Learning at the College has been responsible for the facilitation of training professional staff and other supportive

[1] Kristin Clemet was the Minister of Education and Research in Norway until September 2005.

[2] Classfronter and It'slearning are the most frequently used LMS's in Norway.

activities, as well as more strategic issues regarding the implementation process. The purpose of this paper is to describe and discuss what kind of activities can facilitate a life-long learning environment for professionals with regard to digital competence. There has been a challenge to find activities in order to reach those professionals who "hide in their office" because they feel that digital teaching methods are incompatible with their framework, or are just afraid of new technology.

Data was collected through a combination of student questionnaires and interviews with the professionals. Students were asked if the professionals used ICT on their courses. Field notes from participant observation of supportive activities and meetings about the progress of implementation were also used as data sources. One meeting in which members of the academic staff reflected on their appropriation of ICT was streamed and analyzed. Informants were users of support and training at the Centre for Life-Long Learning, facilitators of the activities, students on the professionals' courses, and leaders at the university college. Also, documents about the ICT strategy, the "Service Agreement"[3] and other written material were used as data sources. The research is of an exploratory nature, and both descriptive and action-based principles were used in the study.

Description of the activities

The university college has stated in its "Service Agreement"[4] that it should provide active use of e-learning systems as a supplement to other teaching methods on all its courses. The service agreement is meant to give the students and employees a concise, concrete and understandable overview of what students can expect of favors and service level. Furthermore the agreement commits the university college through the goals/aims stated. To meet some of the challenges related to ICT implementation, the university college started a "Competence Project" for their employees. This project is based on mapping the employees' needs for competence within different fields[5]. The Centre for Life-Long Learning and one or two representatives from each department at the university college are responsible for organizing activities with the aim of increasing digital competence. This includes training and support in the use of digital media both in the academic staff's teaching and research. The centre is both responsible for the facilitation of digital competence development and the evaluation of the effects of these activities. To enhance the use of digital teaching methods among academic staff a variety of activities were initiated.

ICT courses. Courses at different levels were offered to academic staff members. On these courses staff members from different research areas at the college attended. During the sessions the participants mainly learned how to handle different tools needed to use the LMS. It was also an arena in which professionals got ideas, not only from the lecturer, but also from other colleagues as to how to arrange their own digital teaching methods. Furthermore, they discussed the pedagogical utility values of the LMS. These courses where frequently used when they were first offered, but after a while the courses were cancelled because of lack of interest.

Pedagogical ICT courses (chat, digital portfolios, forum, etc.). The participants on these courses also came from different research areas. There were few participants on most of the courses. However, one course that reflected on the use of digital portfolio evaluation had many participants. The professionals explained that their interest in this had to do with the "Quality Reform". This is a reform formulated by the former Ministry of Education and Research and amongst other things they focus on the use of portfolio evaluation.

ICT-support lab was established in one of the PC-labs at campus. The lab was open twice a week for a couple of hours. The goal of this activity was to establish an arena in which the professionals could meet and exchange experience from their own practice and at the same time be guided by a tutor. Very few attended this activity. One of the reasons for this was that academic staff members were not able to log on with their personal setting in the PC labs set up for the students. Therefore, they could not reach their work (files). After this, one PC lab for academic staff members has been established.

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[3] A "Service Agreement" is a contract between the university college and the student. I will explain it later in the paper.

[4] The "Service Agreement" is reconsidered every second year.

[5] Power Point, Excel, English, AV-equipment, students exchange program, Net:Ed, etc.

One to one counseling with a tutor. This activity became very popular amongst the staff. The tutoring took place in the professionals' own offices, and therefore they could do their work at the same time as they received support. In this situation the tutor had a golden opportunity to inspire the professional to enhance their use of digital teaching methods. They could also base their arguments upon the pedagogical utility value related to the professional's specific course.

The types of activities described above, are mainly suitable for those who are interested in or have seen that digital teaching methods have come to stay. However, the challenge was to find activities to reach those professionals who "hide in their office" because they feel that digital teaching methods are incompatible with their framework or are afraid of the new technology. Some activities have been tried out in the project so far.

Working through/with the students and the student union. LMS-courses for the students were arranged, although these were not a part of the project. Through teaching/education the students, seeing the advantages of digital teaching methods, started to demand that the professionals should use the LMS on their courses. The student union was an important collaborator during this process. Through the union channel the project was able to reach the students with information about digital teaching methods. The student union also started to use the LMS to spread information about its union work.

Participation in formal and informal settings. Persons connected to the project also used time to spread information and discuss the use of LMS and ICT in general. Formal meetings with the management in the different departments were arranged to spread information about the project activities. There were also discussions about how and if digital teaching methods enhance learning effects, and what policy the professionals had at their own department. Personal meetings were also used to meet the professionals. Lunchbreaks and "hallway talks" were also a very important arena to inspire academic staff to attend the different activities.

The organisation of the LMS. Two of the departments at the university college rearranged the structure of the LMS, so that every course, not just a branch of studies, had its own "Classroom"[6]. The new structure made it impossible for the professional to just let his or her colleagues be active in using the LMS. This resulted in them asking their colleagues, a tutor on the project, or a student assistant for help. Some of them wanted to learn how to use the system, but others just wanted the job done.

All the activities described above have enhanced the use of the LMS, but there is still a long way to go before the statement in the university college's service agreement has been reached. One of the professors explained why she refused to use the LMS earlier and now uses it without any problems like this: "it's all about turning your head around". In the following I will discuss some of the critical factors in the implementation of digital teaching methods.

Theoretical framework

This paper uses Lund's (2004) assimilated framework to capture the professionals' appropriation of digital media. Lund refers to Grossman's (1999) theoretical framework for Research on Learning to Teach. The concept of appropriation is attributed to the Russian linguist and critic Michael Bakhtin (1895 – 1975). Bakhtin ties appropriation to the use of language, how it is always found in the midst of social interaction, borrowing from others and projecting intentions at the same time. To Bakhtin, language is 'half alien' to us until we adopt it to our own purposes. This principle may just as well describe how we encounter technologies in schools and other institutional contexts. Grossman's framework builds on Wertsch's (1998) discussion of appropriation, and consists of five dimensions of appropriation reflecting professionals' degree of in-depth understanding. Grossman's article does not refer to ICT directly, but Lund (2004) has modified this framework to capture more ICT specific issues. Lund's descriptions of the five dimensions of the appropriation of ICTs are:

Failed Appropriation. This type assumes an attempt (not necessarily premeditated or deliberate) on the part of the agent, but resulting in lack of appropriation. Regarding ICT, such a lack of appropriation might be explained by the complexity or instability of the technology, its incompatibility with the

[6] The "classroom" is in the simplest way used to spread information about the course. It can also be used in a more advanced way.

teacher's framework (curriculum, policies, teaching schedules) for teaching and learning, cultural mismatch between teachers' beliefs about teaching and the learning environment etc. Constraints dominate affordances, thereby reducing technology's functional potential for the user.

Nominal Appropriation. Regarding ICT, this would suggest awareness of different types, appropriating a 'label', but without any understanding of features that might prove conducive to learning. For instance, taking 'pedagogical software' at face value or not realizing the often idiosyncratic and sometimes plain faulty results of using spell and style checkers, would exemplify nominal appropriation. On a large scale, nominal appropriation might be illustrated by the "hype" that accompanies sales-promotion of technologies. This would explain the phenomenon of computers being "oversold and underused" in education (Cuban, 2001).

Instrumental Appropriation. Regarding ICTs, this would suggest some instrumental skills and a surface understanding of the concept of the (socially constructed) authoritative version of the concept. Such authoritative views would e.g. be found in national plans, particular in-service programs etc. There is little acknowledgement of the transformation potential in ICT's or of the potential for cultural renewal. The sum of the skills and the view does not add up to the conceptual wholeness of the tool, e.g., what word processing or the Internet means beyond facilitating certain mundane chores. Instrumental appropriation is often found at the heart of technology-driven projects and programs.

Conceptual Appropriation. Teachers who grasp the conceptual underpinnings of ICTs would have the potential to use the tools in innovative ways and/or in new contexts. Such teachers would design integration programs, ICT-rich settings and situations conducive to learning in which technologies are integrated in disciplinary, cross-disciplinary and social relations. However, grasping conceptual underpinnings does not necessarily materialize in full, instrumental appropriation of the tool. There is no guarantee that this dimension of appropriation is materialized in sustained, innovative practices.

Cultural Appropriation. The emphasis in this dimension is on the synergy of conceptual and instrumental appropriation while adding the notion of culture. Teachers who manage to appropriate ICTs culturally may not only adapt to and engage in current practices and discourses, a process of enculturation, but transform and transcend these as well – so that knowledge construction can be developed. In this lies an important future aspect of renewal and innovation, of what *might be*. It involves teaching beyond the curriculum, and would mean a reflective approach to ICT.

Such a set of appropriation dimensions might help generate insights into teachers' use of technology and hypotheses on how best to promote fruitful exploitation. Although not stated explicitly in the above dimensions, it is implicit that appropriating ICTs will fail unless they are introduced with their conceptual underpinnings, or removed from the social context in which they are meant to serve (Lund, 2004).

Findings and discussion

The university college stated in the service agreement that it should provide active use of e-learning systems. This goal is in accordance with cultural appropriation. Results show that colleague counselling, one-to-one training with a tutor, and sharing experience from practice are important activities in implementing ICT amongst the academic staff members. In addition, the implementation process must be deeply anchored in the management and among the students. Although there have been improvements in the use of digital teaching methods, the organization still has a long way to go if they want to appropriate ICT culturally. The report on "The Digital Condition in Higher Education" shows that the results in this study are not unique. Emphasis on how to facilitate life long learning for digital competence is important if the Norwegian education system is to become among the leading countries until 2008.

Findings indicate that some professionals have nominally appropriated the digital teaching methods, but without any understanding of features that might prove conducive to learning. These professionals ask colleagues or student assistants to take care of the digitalization of their course. Others have reached instrumental skills and a surface understanding of the LMS. Examples of this are professionals that use the LMS to send messages or hand out general information and written teaching material to their

students, which is only one-way communication. So far this is the most common way to use the LMS system at the university college. There are also some examples of professionals grasping the conceptual underpinnings of ICT, and using the tools in innovative ways and/or in new contexts. An example of this is an academic staff member using the chat function to facilitate role playing on his course. Professionals came up with different arguments against appropriating ICT. Hence, the implementation process is much more complex than just facilitating support and training for the professionals.

One of the reasons that the academic staff does not systematically utilize the LMS may be because they use traditional lectures and examination. Hence the use of this type of system becomes an additional work task, and is not integrated in the teaching and learning process. If we want to reach cultural appropriation we must also change our evaluation system. Through the "Quality Reform" the Ministry of Education and Research tries to lead the professionals to use process evaluation (portfolio). One of the problems with digital portfolio evaluation at the university college is that employees at the exam office feel incompetent in handling the LMS. Furthermore, the LMS is cumbersome when it comes to printing out the portfolios. There is also a problem with the exam legislation when it comes to storage of documentation. Some professionals also feel insecure about their intellectual rights to the digital learning resources. Some are afraid that if they stream their lectures, they will be out of work in the worst case, and useless to the organization.

The social aspect was another reason mentioned by academic staff members for not wanting to stream their lectures. They preferred to have students attending their lectures physically so they could have a dialogue, and not through online streaming on Internet which is considered more one-way communication. There is one course at the university college that uses the streaming technology and at the same time has students attending the lectures at campus. The students following the lectures online have the possibility to use the chat function to send questions to the academic staff member. There is always a facilitator in addition to the professional to handle the streaming and the chat. This demonstrates that it is possible to have students attending a class both physically and virtually at the same time. The geographic situation in this part of Norway, Northern Norway, makes it very expensive and time-consuming for some students to come to campus. When the tutor presented the professionals with the possibility that using such a method could lead to more students attending their courses, some became more interested. This argument is important for the professionals because the organization's financial system partly depends on how many students pass courses. A lack of students can mean less money for education and research. Therefore facilitation of digital teaching methods can result in more students from all over Norway.

Further challenges

In the next phase of the competence project, one of the activities will be to arrange a conference on intellectual rights to digital learning resources. The challenges in the coming years will still be of the same nature although several professionals have gone through an instrumental appropriation process. This presents an opportunity to focus on a more advanced use of LMS and digital teaching methods in general. Hopefully, more of the professionals would experience a conceptual appropriation process. An important factor is that management sees the need for a long term plan for implementing digital teaching methods and not just a one off "happening". As one in the administration; "They (the professionals) are now forced by the service agreement to use our e-learning system and we have given them the opportunity to attend the courses, and if they don't, well, it is their problem. When the project phase is over, we will no longer use money on training and support".

Forcing the professionals to use digital teaching methods does not lead to cultural appropriation. In the streamed evaluation meeting, the professionals emphasized the importance of having a facilitator or tutor in the appropriation phase. One of the professionals said after one year of regular tutorials: "I now feel that I have reached the doorstep to the digital world". A few months later she was off on sick leave because of tennis elbow, due to overuse of PC! Although she was still very enthusiastic about having acquired new knowledge, some questions were left floating. How can we improve the systems and processes for implementing digital teaching methods in order to prevent both physical and mental damage? Does the education of today and tomorrow really need digitally competent citizens based on the vision of digital competence?

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RE-EDUCATING PROFESSORS TO ENTER THE E-LEARNING ARENA

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Abstract

Flexible learning is highly dependant on the usage of new information and communication technology (ICT), particularly the Internet, for distribution of learning material and as a forum for collaboration. Subject professionals in charge of courses and study programmes need knowledge and skills within ICT, as well as an updated basis on relevant learning theories. Many traditional universities around the world are still at an early stage here. A branch of the United Nations University, The Global Virtual University (UNU/GVU) is trying to speed up this process, and has an urgent need for qualified on-line tutors around the world. Jointly with Agder University College (HiA) and Stord/Haugesund University College (HSH) in Norway they developed and ran an on-line, global e-learning course for staff at universities in different parts of the world. Professors and other staff members should learn how to exploit the potential of e-learning to facilitate knowledge and skills acquisition for both students and society in remote areas. Strategies and content as well as methods and experiences through a couple of cycles of this global e-learning course are presented in this paper. The course content and discussions are highly relevant for academic staff in both developed and in developing parts of the world.

Background

Universities and other higher education institutions are well situated with subject specialists, researchers, experts and professors to ensure high quality of content in courses, on campus as well as off campus and net based provisions. These persons, however, are not always qualified or motivated for going on-line with their knowledge and expertise. Age, traditions and fear of loosing authority may be reasons for holding back. It may be possible, however, to do something to improve their insight, qualifications – and perhaps also their interest and motivation.

Updating of pedagogical approaches and implementation of proper methodologies are not always strong characteristics in traditional university teaching. We believe that with a proper introduction to some of the relevant theories and principles, particularly those related to ICT supported learning, these fundamental factors for efficient higher education can be substantially improved. This will in most cases not only have an effect for ICT and net supported courses, but also on structure and methods applied in study programmes for on-campus students. Demands for flexible learning and study situations require efficient and professional usage of new information technology. Internet is the backbone for distribution of learning material as well as being a forum for collaborative and socioconstructivist approaches to learning. For this to take place a certain knowledge about ICT and skills in using it are needed.

One of the intentions with the aforementioned course was to provide some insight into educational theories, pedagogical principles and new methods for ICT supported learning. Then there is a hope for integration of properly structured content, use of the most relevant pedagogical methods, and optimal use of the available technology when traditional universities decide to go dual mode for both on campus and distant on-line students.

These means to improve the quality – and the quantity – of on-line available learning has been tested for several years in different fora. The clue seems to be “learning by doing”, to let professors enrol as on-line students for a course in on-line tutoring. Making sure they get experience with different pedagogical approaches, full usage of new ICT in learning environments, as well as time for reflection in action and reflection on action [1]. Experiences show that the learning curve becomes rather steep and the outcome is very encouraging.

United Nations University/The Global Virtual University (GVU) [2] had an urgent need for qualified on-line tutors around the world. This was initially related to a study programme at master's level, the Global Environmental Development Study (GEDS) [3]. Jointly with Agder [4] and Stord/Haugesund [5] University Colleges in Norway they have offered an on-line, global e-learning course for university staff at different locations. They want professors to experience the potential of e-learning on a global scale, in urban cities as well as in remote areas.

The online tutor course

Experiences indicate that participants in virtual courses benefit a lot from having at least one physical session, preferably early in the course so that students, tutors and leaders involved get a chance to meet each other face-to-face. With a student audience spread all around the globe, however, it is very hard to organise a physical meeting for all of them. The Pedagogy for On-line Learning course (POL) therefore had to base it all on virtual environments, with a software platform that could facilitate learning conditions. Most LMSes on the market have their pros and cons, and a simple choice was the one that was already being used by the course providers, a platform called Fronter [6]. It provides arenas for chats, for material archive, forum for discussion, student logs, etc., and the course study guide intended to create a lively and dynamic learning arena where professors, tutors-to-be, could experience what it means to be an on-line student and at the same time reflect on the role of the tutors.

The POL course content

Early in the process it became clear that a certain introduction to ICT and the use of LMS would be necessary for the international group of tutors. Further on, a deeper understanding of pedagogical approaches and methods would make them much better prepared for their future tasks. Within the framework of 10 credits (ECTS) [8] for the total course, a balance between these topics was outlined in the study guide for POL [7]. This guide was developed on the basis of previous courses and experiences, and the course was presented to the students at the opening of the study period in November 2004. The content should be reasonably clear from the following brief list of content:

Module 1, The virtual classroom: Log into the LMS. Asynchronous and synchronous conferencing. Threaded discussion. Tools, folders and files.

Module 2, Online learning and learning environments: Collaborative learning environments. Communities of practice. Online tutoring skills, e-moderating: the 5-step model (Salmon [9]).

Module 3, Pedagogical approaches: Instructivism, constructivism, socioconstructivist approach. Theoretical background for communities of practice, collaborative learning.

Module 4, Online technologies: Tools and media, hyper structures, LMS.

Module 5, Implementation: Developing students' online skills, scaffolding, and conferencing. Academic writing & referencing. Assessment & Feedback.

Aim and objectives

The course aims at enabling educators, tutors and subject professionals to develop, manage, implement, support and moderate online learning. On completion of the course the participants should have the ability to:

- build basic online learning environments
- support and guide online students in their learning processes
- describe, discuss and select pedagogical approaches at elementary level

Though the course participants will gain/improve skills in:

- production and use of online learning material
- collaborative work with peers by sharing ideas, analysing problems, negotiate meanings, and finding solutions

- participating in professional online networks
- reflecting on learning processes and improvement of learning skills
- give appropriate feedback to learners and groups of learners

The participants should have developed or strengthened attitudes on:

- e-learning as a recognised and valid supplement/alternative to on-campus studies
- the importance of situated learning
- learning as an independent as well as a social activity

Enrolment and organisation

The course was announced through the UNU/GVU, HiA and HSH web channels, in particular urging the involved persons at collaborating universities in the GEDS [3] master's degree programme to join in. This resulted in a first student group of 19 professionals from around the world, representing 10 different countries and even more cultures. All of them were registered as students at HSH in Norway; the course was run in English. The second group of students, starting in September 2005, was smaller, only 13 candidates enrolled.

Three tutors were involved, the one from GVU taking main responsibility, assisted by one from HiA and one from HSH. A time schedule was set up for each of the course groups, allowing enough time for part-time students to keep up with the plan. The first course was running from November 2004 till the exam in April 2005, the second was scheduled from September 2005 till February 2006, portioning out the work in modules, actions and tasks to be completed either individually or through group work and discussions. In accordance with the study guide, the course material consisted of a set book, a CD-ROM and online resources in different structures:

- Texts composed and posted particularly for certain modules, made available on the LMS
- The LMS was organised in
  - an Archive of more permanent texts
  - a Forum for asynchronous exchanges of opinions, for group work, threaded discussions
  - a Portfolio keeping track of student activities
  - a Chat room and a Whiteboard for synchronous interactions
  - in addition there were class lists, a message board and a newsroom
- References were given to online resources at other web sites
- Independent and guided activities and tasks to be performed/solved by students as part of their constructivist and joint learning activities, were posted for each module
- Minilectures and messages posted on the LMS when useful or necessary for further progress

The option for chat was not very much used, the same goes for the white board, and tutors had access to portfolios for everyone with statistics over activities and contributions.

Experiences

The first course was run in a pilot version, and an up-dated version was presented to the Sept. '06 group. Not all of the first 19 registered students were equally active along the line, and only 10 of them registered for the final exam. For the second group, statistics were even worse, only 5 of them seem to complete the course. Others were more or less "lurking" through the discussions and group works and appeared to take the course only as introductory information to what their future roles might be. After the course was over, however, some of the "lurkers" contacted the tutors to receive private tutoring and help in order to manage their duties as course designers and tutors.

Activity

The most active group, around 10 of the first group and around 5 of the second, showed very high involvement in the debates and learning activities, most of them with around 2-300 visits into the LMS during 5 months. An average of more than 1 visit every day is not bad! A couple of them were up to 4-600 visits, a couple even had more than 1200 visits during around 150 days, i.e. an average of 8 visits per day! Most of these visits were of course reading learning material and contributions by others, but a total of 65 own documents and 89 contributions to discussion by one person are impressive numbers.

The number of visits could of course indicate only lurking and skimming over what others had put in. But not so for these groups. There were inputs of 10-40 documents and 30-90 discussion elements by each, making the learning arena a rather lively spot for exchange and building of knowledge.

On the other hand, the other initially registered students did not show the same involvement. Some of them were visiting and reading some 50 documents and 5-60 discussion elements, but only contributed with 5-25 own inputs to discussions and literally no documents. A few were completely absent from contributions and were considered as drop-outs.

Particular difficulties

With a student group spread around the globe, it was hard to apply synchronous modes of communication, like chat. Participants from developing countries also had serious problems with proper access to Internet. Some of them had to travel for miles in order to visit an internet café, where they again had to line up for turn on a PC – and perhaps not obtain a proper connection at all. Others had access at their institutions or schools, but were interrupted by power failures, technical and software problems – or system protective fire walls. To get around some of these problems, GVU sent out a package of literature, printed guidelines, etc. to all students at the beginning of the course period. In this package there was also a CD containing most of the "heavy files" that were normally distributed via the network. For several students this came out very helpful, saving them a lot of connection time (and money!) for downloading of graphics, sound and other large files. Economy, by the way, turned out to be a more serious challenge than initially anticipated; some students had to withdraw due to lack of funds for the course fees.

Results

Not all of the students completed the course and got their credits. For some of them this was intentional already from the start; they were not looking for formal advancement or credits for a degree. Their goal was to manage their online courses and support their students over the Internet. No doubt, they would have gained much more by participating actively.

Assessment of students that went for credits was based on three components:

1. Handins during the course, group work, assignments
2. Their personal portfolios, records
3. A final written exam, distributed and submitted via the LMS (and by e-mail to be sure everyone received it on time)

All products were assessed by the three tutors, and the results came out very positive. Out of the first 10 students that completed the course, 4 got A (highest), 4 got B and 2 got C as their final mark. [For the second group, grades will be available before presentation at the conference.] Some of them are already engaged as tutors for the GVU/HiA master's study programme that started in September 2005, and others will apply their new qualifications at local and regional/national level.

Evaluation

With a student group consisting of professors, teachers and university staff, chances for critical opinions are obvious. There is also a high chance of differences in views on pedagogy, methods and content. The course tutors were well aware of this very competent target group, and were waiting for their evaluation of the course.

Informal evaluation

During the course several students informally gave positive feed-back to the tutors about the course content and organisation. They felt they learned a lot from the activities and contacts with other students in the group. Some expressed particular satisfaction with the introductions to pedagogical methods and different ways of presenting learning material. In particular they expressed satisfaction with an opportunity to be exposed to educational settings that were quite different from their own school and study days. Some were positive to being forced to learn and practice with the technology, discovering the potential they had previously only seen vague contours of. Now they felt more confident and prepared for new ways of providing learning to their own students.

A few of them expressed at an early stage of the course that they did not need "all this pedagogy"; they only wanted to learn the grips of technology and how to put their subject material on the net. It is felt that some were gradually convinced that awareness and choice of pedagogical approach are important factors for efficient e-learning. Several felt there was too much to do in the time slots they had available, others complained that there were not enough challenges to keep up the engagement.

Formal evaluation

At the very end of the course a questionnaire was sent out to all students, asking them about their opinion on some of the issues related to the course, what was good, what could be improved and what is relevant/irrelevant for their future activities as online tutors.

A set of 10 questions were distributed, asking for numerical evaluation on a scale from 1 (very poorly/ not at all) to 6 (very well, very much so), and the option to give further comments in free text, for each question and at the end. All registered students were asked the same questions, whether they had completed the course or not. Around 50% responded, only a few of them noted that they had not completed. The list below originates from the first course, numbers in brackets represent respectively overall average score and average score from active students only:

1. How well did you achieve the goals for the course? (4.1 – 4.7)
2. Were tasks and activities appropriate to achieve the goals? (5.1 – 5.0)
3. Were you given sufficient time for activities? (4.3 – 4.3)
4. Did you use learning resources provided in the package? (4.3 – 4.6)
5. Were the learning resources adequate? (4.8 – 4.7)
6. Did you use additional, external resources? (4.6 – 5.1)
7. Did the LMS (Fronter) function adequately? (4.7 – 4.6)
8. Did you find the course interesting, a rich learning experience? (5.2 – 5.3)
9. How did the group work function? (4.1 – 4.3)
10. How balanced was the tutor guidance? (3 alternatives: too little, well balanced, too much; 90% responded "well balanced")

For the course providers these were encouraging results, particularly that questions # 2 and # 8 came out very positive, even when the "lurkers" were included. This is a small sample, but the material is sufficient for the course providers to get an overview and plan for revisions.

Free text comments from students are also valuable when it comes to further planning and development. Here are a few quotes from responses to the questionnaires:

- I thought it would be a more practical course, designed on setting up online learning courses.
- I think the tasks and activities were appropriate. This is because, as a prospective on line tutor, I need the basic skills on how to use IT and reach my students.
- Wow! Yes! This was a great learning experience for me. I could not wait for time when I would knock off from my regular job to visit the internet café.

- I met many new friends online in the form of "classmates". We managed to work together as a team in search of a common goal. We met at the virtual café and metareflections.
- Truly this was a community or practice, true collaborative learning.

As can be seen, there are both positive and negative comments, some sugar and some pepper. To keep up the good spirit it is nice to finish the quoting session with one of the most positive evaluations:

- I want to congratulate and thank the organizers and tutors of the POL course. They were so supportive and really encouraged the learners in all the ways they could.

Trying to take all these hints into consideration, it is encouraging for the tutors to start a slight revision of the course content and structure.

Conclusion

The course was staged as a necessary activity in order to qualify university professors and other staff members for a planned master's study programme. As such it seems to have met its goals. The majority of participants feel that they are now able to take on a role as online tutors – and even be part of the team that produces the course material. An extension of the course to train people for the production of material is next in line.

For the second version of the POL course some adjustments of structure and content were made, and there was more material and references available from the start. The pilot students contributed greatly to the construction of a valuable base of learning material and a reference library.

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LANGUAGE TUTORS AT THE OUUK – THEIR (E)-COMPETENCIES IN OPEN AND DISTANCE LEARNING

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Abstract

The Open Unuversity, UK (OUUK) has been teaching distance courses in languages for more than ten years. Students learn by means of specially-designed course materials, increasingly web-based resources and through direct interaction with tutors, who provide personalised feedback on the students' assignments as well as offering tutorials for communicative practice. The role of OUUK tutors embraces, however, more than just teaching and giving feedback. They play a central role in supporting students in every aspect of their learning, forming the interface between the institution and the learner. The importance of the tutor role in ODL in general has been the subject of some informative research, but much less has been written about the skills needed by tutors of languages at a distance. This international research project has been set up to address this shortfall, and to gather evidence and insights into this particular role. The project aims to investigate the skills, attributes and (e-)competencies required by language tutors of whom a substantial number deliver the tuition online. Initially, a selected group of OUUK language tutors generated what they perceived to be the knowledge, skills and attributes necessary to carry out this complex and demanding role which included the requisite skills for online tuition delivery. In the next stage the outcomes they had produced were refined and regrouped by the researchers. In the third stage a wider sample of tutors commented and added to the listings. This paper will report on the findings so far and summarise the next stages which are planned.

Background

The Department of Languages (previously the Centre for Modern Languages) at the OUUK was founded in the early 1990s. It now offers courses in French, German and Spanish from beginners' to graduate level, a degree in Modern Language Studies and its courses can count towards a variety of other named degrees in the OUUK, such as Humanities, European Studies and International Studies. Initiatives to widen the curriculum by the introduction of Italian for beginners and English Language Teaching are under way. There are currently (2006) around 7600 students registered on the language courses. The courses include continuous assessment and either end-of-course assessments or examinations.

The courses follow the open and distance learning model of supported self-study with specially designed core study course materials; audiovisual materials (for the new generation of courses currently under development these materials are delivered as interactive DVD-ROMs) and other supplementary materials. The students have access to a wide variety of support services provided by the University, including on-line access to the library, designated course websites and e-mail conferences. More and more emphasis is being placed on the availability of different formats: for instance, the new language courses offer the course books as e-books online as standard. Similarly, it is anticipated that language courses will make full use of the Virtual Learning Environment (VLE) that is currently being developed at the University. Students are offered around 21 hours of non-compulsory tuition throughout the academic year, delivered either face-to-face or on-line via a computer-mediated audio-graphic conferencing system called Lyceum, which has been developed in-house. This system allows for real-time oral communication from networked computers. Tuition offers students the opportunity to practise interactive speaking and to engage in group activities. Each student is assigned to a dedicated personal tutor (Associate Lecturer).

The role of the tutor

Tutors at the OUUK have an important role to play as the interface between the university and the students, providing cognitive, affective and systemic support. They are the first point of contact for students regarding any academic and course-related issues; they deliver tuition in their role as learning facilitator in either face-to-face or online mode; they mark assignments and provide written and spoken personalized feedback to the learners and generally support and encourage students offering advice and help. In short, they provide a human face (Tait, J., 2004:102) and a personal touch to a large and complex organization.

Despite the perceived importance of the tutor role, very little research has been undertaken that relates to tutoring at a distance.

> While there has […] appeared a substantial literature on methodologies relating to the production of learning materials and resources for open and distance learning (ODL), relatively little has been written about the planning and management of student support. (Tait, A, 2000:287)

There are various possible explanations for this relative paucity of research. There is, for example, the notion in academia that teaching is less prestigious than research and this appears to be equally applicable in distance education (Lentell, 2003:64). She emphasizes the fact that tutors are the unheard voices of distance education (Lentell, 1994) and that they are generally undervalued (Lentell, 2003).

> Tutoring tends to be the less visible element of ODL, but is no less essential than good materials and effective administration. Distance education cannot exist without tutors who provide feedback and guidance to students. (Lentell & O'Rourke, 2004)

The OUUK's model of ODL is based on course materials being produced by academic staff, certain aspects of the student support system being facilitated by regional academic staff and the actual delivery being undertaken by a large pool of part-time tutoring staff (Tait, J., 2002). Tait argues that undervaluing tutors makes it difficult to develop effective channels of communication between the tutor's experience of teaching and the design of courses (Tait, J., 2002:156). There is an emerging consensus that the role of the tutor as the interface between the learners and the institution is gaining importance because

> [the tutors'] feedback forms a crucial link between course designers and student learning outcomes and, because of the model of student learning that underpins UKOU course design and student support, feedback aims to build a relationship and a sense of contact between the student and the tutor. (Tait, J., 2004:99)

Institutional research at the OUUK has demonstrated that students at the University rate the continuous assessment and its marking by tutors as 'very helpful' (Tait, J., 2004: 100). This view is supported by the recent publication of a national student satisfaction survey (Teaching Quality Information, 2005) which rated the overall satisfaction of OUUK students as very high; languages at the OUUK were among those subjects which were rated highly.

While there is some, albeit limited, research available on the role of the tutor in ODL, there is even less research which focuses directly onto the role of the distance language tutor. Although there is some peripheral evidence on feedback from tutors for example (Ros i Sole & Truman, 2005), this is an area which has received very little attention.

Tutoring online

With the increasing emphasis on supported open and distance e-learning, there are new demands and challenges for tutors. Computer literacy and access to computing facilities (including e-mail, conferencing and Internet) have become a prerequisite for many OUUK tutors, including those who tutor languages. The Department of Languages has pioneered the use of audio-graphic computer conferencing since 1997, and now, in 2006, almost all the language courses offer optional online tuition. This new form of tuition has meant that the established pedagogical principles of teaching languages needed to be adapted to the new environment (Hampel & Hauck, 2004; Hampel, in press). Tutors working on such courses required considerable training to familiarise themselves with the new

environment and be able to teach successfully using this medium. Despite the wealth of materials and the increase in online courses, it has been noted that 'there is still a dearth of high quality training to teach online' (Hampel & Stickler, 2005:311) and, indeed, 'less knowledge about the skills that tutors need' (Hampel & Stickler, 2005:316). Online tutors need to develop 'electronic literacy' (Warschauer, 1999:11) just as learners do. They have to be able to fulfil a variety of roles as tutors in an online environment:

> the role of the tutor is no longer that of an instructor and a transmitter of knowledge. Instead, as well as facilitating the communication between the learners, the tutor guides the learners through the tasks, moderates and, in addition, acts as a participant in the learning process. (Hauck & Hampel, 2005:270).

The research project

This ongoing research project, based on collaboration between academics at the OUUK and Massey University in New Zealand, aims to

- articulate the professional background and expertise which are required of distance language teaching professionals
- gain insights into the nature of the professional practice in the field
- gather evidence for an under-researched area of international significance and relevance
- provide a basis for future professional development.

The study developed around an unfolding research design (White *et al.*, 2005) which facilitates the inclusion of different perspectives from a variety of participants working in various roles: as course designers and writers, as regional academics who are responsible for the management of important aspects of student support and who deal directly with tutors, and the tutors themselves. The project is of a cyclical progressive nature and is taking in several stages.

Phase One involved tutors from one of the thirteen OUUK regions who deliver courses in German, French and Spanish. They met in groups to consider what they regarded as the knowledge, skills and attitudes required to fulfil their roles, using a brain-storming technique. Tutors responded first individually and then discussed the findings in groups.

The initial findings were analysed by the project team, classified and refined to remove some overlap and repetition. Additionally, the findings were supplemented by referring to relevant literature and drawing on the professional expertise of the project team, since one area, ICT for learning at a distance, had drawn very few comments from the tutors and needed to be expanded. Eight broad categories were identified.

The project team had some concerns that the lists of statements appeared largely decontextualised and codified, providing little indication of the interpretation or significance of each item. Therefore Phase Two involved asking the tutors to reflect on the importance of the statements. This was done via open-ended questionnaires to allow for the exploration of the tutors' personal understandings of the attributes and expertise which underpin tutoring. An indirect technique was employed to elicit full responses: the yoked subject technique (White, 1994) where tutors were asked to select and elaborate on statements which they considered particularly important in distance language teaching, as if they were talking to a new tutor.

The data from the questionnaires were analysed and as a result, the listings of statements within the eight categories underwent substantial revision and streamlining in response to the feedback from tutors.

Phase three of the research project

This stage of the project offered around twenty tutors the opportunity to take part in group discussions about the statements. Three sessions of discussion groups were held, recorded and transcribed. Participants were asked to comment on the list of statements, responding to the broad categories and to individual items. In addition, the tutors were asked whether they felt there were general principles or

belief systems (or maxims) which determined the way in which teachers perceived and prioritised the skills they needed to teach (Richards, 1998). Richards explores the maxims which relate to the approach teachers in face-to-face classrooms take to dealing with their students:

> teachers' belief systems lead to the development of rational principles that serve as a source of how teachers interpret their responsibilities […]. These principles function like rules for best behaviour in that they guide the teachers' selection of choices from among a range of alternatives. Hence they function as maxims that guide the teachers' actions. (Richards, 1998:53-54)

General outcomes of the discussions

The list of statements generated animated debate in all groups, and helped these tutors with different levels of experience in teaching languages at a distance to explore their roles in a way for which they do not normally have either time or opportunity. One theme which emerged from each of the three groups was the difference between face-to-face and distance teaching. The vast majority of OU languages tutors have experienced both and this is an important discussion, especially for those relatively new to teaching at a distance.

It's a unique role, because in the classroom it's very much hands on, you're there, they're in front of you, they can consult you all through the lesson, on almost a day-to-day basis, whereas with something like this, it's much more hands off […] they might be hundreds of miles away from you, so they've got to work by themselves to a large extent and we've got to work out how to help them.

The implications of distance for dealing with students were highlighted:

What I'd focus on, the encouraging […] because we've got to look at the potential isolation of the OU students, […] sitting there at home and wondering and worrying. So I think what I would really focus on out of all of this, what sets a distance learning tutor apart? It would be the support.

All these points could, of course, be raised by any distance teacher dealing with students who they may never see. The participants identified particular challenges arising from teaching languages at a distance.

One of them was how to deal with correcting students' work:

If I correct someone who actually comes to class, I may do it differently, I may not actually correct everything, because in a class I may decide to put a point on the board for everybody […] but [for distance students] I personally correct every single mistake.

Another issue which can be a problem with these classes of adult language learners are mixed ability and learning needs and wishes.

I know, for instance, that I might have one or two students who are really keen on an in-depth explanation of grammar and love it to bits but I also have some who will be completely overwhelmed if I start talking about direct or indirect objects or whatever it is so I've got to make sure that I don't scare the ones who are not very grammar oriented off completely, but do enough so the others are satisfied and don't feel, oh what a waste of time. So it has to be balanced depending on who you are working with at the time.

Maxims

While the tutors were keen to talk about the statements on particular skills that distance language tutors need, they found thinking about the maxims that might lie behind those skills more difficult to discuss. The maxims which were suggested (White *et al.*, 2005) were empowerment, appropriateness, honesty and openness, and the tutors felt that these wider concepts subsumed the specific skills and attitudes they used in their work. One tutor, however, came up with a fifth maxim, humility.

I mean humility of the tutor in the face of a student who is, after all, an intelligent human being perhaps with more intelligence and experience of the world than you have, so listen to the student, be prepared to learn from the student in some ways and really respect what they're doing.

E-tutoring

Tutors found it challenging to transfer face-to-face qualities to online tuition.

'I think that IT and email is fine, you can send them the materials and tell them things but nothing can replace the human voice, the friendliness and the personality and the warmth of knowing there is a real person – well, they know, anyway – but the human voice does give, I think, a warmth and encouragement that …well, perhaps we'll learn it one day with IT, it must be a skill that you can attain that way.'

The tutors saw clear advantages of the Lyceum online mode and demonstrated as well a change in attitudes and beliefs about tutoring.

'It's very good for them [students] because no matter where they are, or how isolated they are, they can talk to people through it, they can hear voices, and it's very much an isolation breakdown and, I can tell you, I wouldn't have said this two years ago!'

'If you can't have face to face it's the next best thing.'

'And you can do it any time, it's flexible, you can do it from your own home, you can contact people, you don't have to come into a centre like this disrupting your work schedule, disrupting your family schedule.'

'You can pass on enthusiasm in Lyceum, because in Lyceum you can actually type and speak…'

A further challenge for tutors teaching languages online emerged as the problem for students with poor IT skills.

'They find it very difficult to concentrate on the skills involved in the use of Lyceum and using their language skills as well. So basically I can see two things they need. They need more training with the use of Lyceum so they can feel more at ease with it and another point is that we ought to try to encourage them ideally, when we are using Lyceum, to just use that means to meet each other.'

Using Lyceum required the development of particular communication skills.

The Lyceum aspect that's particularly interesting for me […] I particularly find that very difficult on Lyceum delivery on a course because you know you're not going to see them. So you have to right from the beginning try to find a way to be friendly – to be, you know, encouraging, approachable and all that.'

Online tuition and the availability of the platform at all times meant that there were new possibilities for self-help:

'Self-help doesn't really mean you have to be there next to the person. They have got IT skills as well so even if it is not Lyceum, exchanging telephone numbers, setting up a five minute conversation once a week or writing emails to each other…'

Discussion of results

The findings so far indicate clearly that the approach chosen to research this new area has been successful, since it allows for flexibility and high level of stakeholder involvement. The research design has been successful in involving tutors, giving them a voice and offering them the opportunity to articulate their professional beliefs and attributes in the context of teaching languages at a distance at the OUUK. By emphasizing the direct involvement of the tutors, the perceived undervaluing of tutors, as described by Tait and Lentell, has been counterbalanced. The research has been both qualitative and quantitative, and has yielded a wealth of data.

More specifically, in Phase One a substantial amount of raw data was collected from tutors which covered almost all aspects of tutoring a language at a distance. This data was essential since it provided the basis for the categorisation that formed the backbone of the research project.

Phase Two provided prioritisation and refocusing of the statements generated in Phase One. The use of the yoked subject technique facilitated the free expression of views, thus building on, and expanding the original statements, linking them to practice and relevant literature about tutor beliefs and attributes.

Phase Three provided an opportunity to enlarge on the most important aspects of the tutors' work and to consider the possibility of what lay behind their responses – the maxims. Given a free choice as to the areas they concentrated on, they gravitated to the discussion of the issues arising from teaching at a distance, rather than the more specific ones of teaching languages in this way. However, they were aware of the context and background to their discussion, often giving examples and explanations based on their language teaching. These tutors' comments indicate clearly that they were aware of the need to develop students' cognitive skills, support the affective aspects of language learning and contribute to a systemic approach to study.

The particular challenges of tutoring online were seen to be the lack of visual support and body language; there was recognition that online tutoring needs different skills from classroom teaching and the flexibility of this mode of tuition was acknowledged.

Conclusion

This project is open-ended and has concentrated thus far on the tutors. It has been successful in eliciting detailed and constructive responses from previously undervalued practitioners teaching languages at a distance with the OUUK, offering them the opportunity to reflect on their practice and value their skills, knowledge and expertise in this field. More specifically, it has generated a substantial body of raw data which have been processed and condensed into eight different categories with a number of statements for each. Evidence from this work supports the claim for the need for tailored training to enable tutors to become e-literate and fulfil the potential of the medium.

The project will now be extended to include almost all OUUK language tutors, who have been circulated with the list of statements and invited to comment on them. These tutors work across the UK and, in some instances, the rest of Europe.

It is also planned to carry out a series of interviews with tutors of languages at a distance in other parts of Europe and elsewhere, so as to gain an overview of other contexts, teaching systems and language groups. These interviews will serve as a basis for case studies, adding another dimension to the research. A similar series of interviews with those who write and produce distance education materials, as well as with students of languages at a distance is also planned.

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FROM CLASSROOM TO ONLINE: TRANSITION IN THE INSTRUCTOR'S ROLES IN HIGHER EDUCATION

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Abstract

This article deals with the roles of the instructor who is in transition from a traditional lecturer to an online teacher in higher education. Roles of the instructor serve as an excellent point of view to deal with change that concerns instructor's activities in tertiary education. Another theoretical point to clarify the change is theory of instruction's progress, which makes longitudinal perspective of instruction visible. Massive change and development in information and communication technology (ICT) particularly in education has evoked alterations in the instructor's every day routines. Different kinds of national ICT strategies and the guidelines from the ministry of education have added pressure not only to educational organizations but also to individual instructors. It is of paramount importance to find out the crucial features in instruction, which have to be modified when instruction is shifted from the classroom to the online structure. Better understanding of the processes of online instruction facilitates the implementation of the new technology. This article presents theoretical background for the research, but some tentative results are available by the time of the conference in Vienna.

Introduction

As information and communication technology has become increasingly important and as an essential part of instruction changes are inevitable in the instructor's work. However, it is a known fact that the instructor will become a facilitator of learning rather than a supplier of information. But we do not know what else will change when the instructor moves from a traditional lecturer to an online instructor, nor what will happen to the instructor's tasks or instructional work in general. The main purpose of this research is to find the crucial points of change in the instructor's activities, when ICT is applied and online instruction becomes a part of the work. This knowledge is not only important for teacher education, but also to an ordinary instructor who is willing to pick up ICT in one's own instruction. Theory basis of the research emphasizes two different theories: 1) the theory of instruction, which describes the instructional process from planning to assessment, and 2) the theory of instructor's roles, which describes different kind of roles included in instruction as pedagogical, social, managerial, and technical roles. With these perspectives it is possible to construct a two dimensional picture about instructor's work, which is in transition. But, at first we have to know what we mean with ICT in education, or with online instruction.

In this research the concept of online instruction is used as clarified in the Quality of the Online Instruction – project in the University of Helsinki, 2005:

> *In the online instruction a significant part of instruction and learning uses the Internet and other networks according to a planned idea. In online instruction the student is in interaction with the instructor, peer students, or learning materials through the Internet or other networks. Online instruction in higher education relies on research, adopting of scientific thinking as an objective of learning as in other higher education. Typically the online instruction in higher education is blended instruction and learning, which integrates face to face instruction, networking, and independent learning in order to construct a logical entity. (Nevgi & Heikkilä 2005, 31)*

ICT as part of the instruction has been known for a long time. Access to the Internet and a possibility to show digital learning materials in the classroom have been as critical issues as a blackboard and chalk were maybe quite short time ago (Meerts, 2004, 4). During this time a general agreement of the change in the instructor's role from the teacher becoming rather a facilitator of learning than a knowledge supplier as earlier is increased. The online instructor assists and directs students to the goals of

instruction, and has to manage different functional and pedagogical roles and tasks for higher quality of instruction (Rouvinen, 2005, 50). However, the online environment as a part of instruction changes both the instruction and studying practices by offering diverse ways of action, which differ from the traditional lecturing.

Online instruction and particularly blended instruction with a professional instructor can offer a content rich, flexible almost technologically transparent way of instruction. Online instruction can contain a possibility to develop students' collaboration and community, life long learning, and different kinds of skills, which are needed by courses of action. It is unnecessary only to stick to information searching and content area's practices. (King, 2005, 244) Moving partly outside a campus towards more decentralized instruction and learning environment can be seen as a significant change in instruction. This change means differences in the nature of interaction, implementation of courses, and resources of instruction. Additionally there will be continuously new equipment for communication and information. The online environment affects assessment, and for example registration of course grades, and support offered to students. Pedagogically sound use of ICT demands more planning, resources, and support from the management than traditional instruction. This is due to the nature of online education, it requires collaboration instead of individual operation. (Löfström, Heikkilä & Haarala-Muhonen, 2005, 112-113, 124) Because instruction and learning are not free of emotions, higher education alters usually the instructor. Instructors in higher education are thinking and feeling persons, if their identity and independency is challenged they will answer with both feeling and sense. (Martin & Lueckenhausen, 2005, 407, 410) Therefore, for the quality of online learning activities, it is important to bring novices to the hands-on stage with ICT. This means learning by doing and that online instruction has to become an inherent part of instruction. (Korhonen & Pantzar, 2004, 21-22)

Theory of instruction

Instruction is preplanned activity, which aims at facilitation of learning. The instructor acts as an expert, a guide, a director, a supporter, and a critic during instruction. (Nevgi & Lindblom-Ylänne, 2003, 24) The progress of the instruction can be described with four-phase basic model. In the first phase the goals of instruction are defined controlled by the values and the norms of the culture. In the second phase the actual instruction is planned, when questions like what, when, where, what kind of students, and what kind of instructor, have to be observed. In the third phase the practical instruction takes place, where the context of instruction and interaction will have an effect on instruction. The fourth phase contains assessments of students' and the instructor's performances, and the whole instruction process. (Lahdes, 1997, 14; Kansanen, 2004, 25-35) One other way to analyze the progress of instruction is to divide events of the instruction to pre-active, interactive, and post-active phases. Thus instruction, task setting, and assessment are divided to these periods (see Table 1). Shortly, the secret of successful instruction lays on a continuous chain of goals of instruction, practical instruction, and assessment (Berge, 2002, 182). Instruction in higher education should be based on the latest researched contents. Also, instruction methods and style should be based on research of instruction and learning. (Nevgi & Lindblom-Ylänne, 2005, 83)

Table 1: Instruction's practical tasks in different phases (Knight, 2002, 106)

	Pre-active	***Interactive***	***Post-active***
Instruction	Setting goals and planning of course.	Actual course or conducting seminars, communications and so on in classroom and online.	Being reachable for students either f2f or through ICT. Assessment of instruction and tasks, and development of plans.
Task setting	Preparation of exercises and tasks.	Giving tasks, explaining, and demonstrations.	
Assessment	Making of assessment plans and tests.	Following and direction of students if needed.	Giving assessment to the students. Revising the whole process.

Transition from a conventional lecturer to an online instructor as experienced by the instructor has been studied to some extent. Some research has been done from changing roles of the instructor by semi-structured interviews (see Coppola *et al.* 2002), and the instructor's self-concept is researched among instructors who were involved in blended instruction (see McShane, 2004). Also differences in the instructor experiences between classroom instruction and online instruction have been researched (see Smith *et al.* 2002). The roles of the instructor are not only things that are in transition. Instructors also feel that their person confronted changes. In this case, results are not significant because of lack of experiences and research. Anyway, the instructors have described changes in their person by two ways. Firstly their formality has been increased, which is described with additional accuracy, intimacy, and lack of humor. Secondly they have noticed that they use more Socratic instruction methods, which means instruction through enquiry. Though instruction person became more formal with accuracy, it became more informal in more giving and taking instruction when questions are raised and dialogue is one goal. (Coppola *et al.* 2002, 182-183, 186) Alteration of the self-concept of the instructor has been researched in blended learning situations. One topic for researchers has been the challenges created by blended learning to the instructor's roles and self-concept. According to research preplanning and instruction have became more conscious tasks, because more components of online environment have been taken as a part of instruction. Along with conscious it's possible that online material's and interaction's visibility's and constancy's reflectivity have to be thought more carefully. In order to start online activities more time and labour is needed. Therefore, when the instructor starts online instruction, more preplanning of events in online environment has to be done than in traditional face-to-face instruction. These decisions formed by values and beliefs about instruction will affect to the instructor's roles in instruction and instruction strategies. (McShane, 2004) In research of the instructor experiences, instructors felt that they could not use their presence and classroom mastery in online instruction. Secondly they were unable to make use of their verbal articulacy in managing instruction situations and controlling possible trouble situations. (Smith *et al.* 2002)

Roles of the instructor

The instructor has always had many a number of roles in his work and primarily those roles have to be emphasized differently while moving to online instruction. Online instruction neither creates nor develops new roles or tasks as compared to traditional instruction. For example Tella *et al.* (2001) write about the online instructor, but they emphasize that there is no separation between the online instructor and the classroom instructor but the instructor acts and meets different tasks and roles both in class and in online. Need for the instructor and guidance will grow in the online instruction, as an example. (Tella *et al.* 2001, 221-247)

Earlier research has introduced many different roles for the online instructor. Although the roles are named differently, contents and meaning of a part of the roles are same. The following kinds of role can be found such as organizational (Mason, 1991), planning and organizing instruction (Anderson *et al*. 2001), organizer (Tella *et al.* 2001), and managerial (Berge, 1995; Bonk *et al.* 2001; Coppola *et al.* 2002; Maor, 2003) roles practically describe planning of an online course like setting goals, courses of action, norms, and rules. Further there can be found that social (Berge, 1995; Bonk *et al.* 2001; Coppola *et al.* 2002; Maor, 2003), discourse facilitator's (Anderson *et al.* 2001), motivator's, communicator's, performing as networker, and being as networked (Tella *et al.* 2001), and affective (Coppola *et al.* 2002) roles describe the instructor as a creator for good and high-quality social environment for the course. Moreover, intellectual (Mason, 1991), pedagogical (Berge, 1995; Bonk *et al.* 2001; Coppola *et al.* 2002; Maor, 2003), direct instruction's (Anderson *et al.* 2001), tutor's (Tella *et al.* 2001), and cognitive (Coppola *et al.* 2002) roles describe the instructor as teacher asking about content, questions, and facilitating learning. The instructor's technical role is included only in one role theory as an independent role (see Berge, 1995; Bonk *et al.* 2001; Coppola *et al*. 2002; Maor, 2003), though Anderson *et al.* (2001) have integrated technical questions on the role of direct instruction. Anyway, the technical role is a part of the online instructor's every day work, because unfortunately it is very rare that an online course is managed without technical questions and problems.

In this article and research the basis for the instructor's roles is Berge's (1995) role concept, which is also used by Bonk *et al.* (2001), and Maor (2003). This concept divides the instructor's roles to four different types: 1) pedagogical, 2) social, 3) managerial, and 4) technical role. In the middle of nineties Berge (1995) used to write about the computer conferencing moderator roles, but Bonk *et al.* (2001), and Maor (2003) used the same role concept for the online instructor. Thus, the preceeding role classification is suitable also for this article's purposes. While e.g. Anderson *et al.* (2001, 4) is claiming that Berge's role distribution overlaps, especially the pedagogical role with others, this research doesn't take this overlapping as a problem. This is due to the objective of this research that it does not intend to describe and research the roles themselves, but to find elements for the online instructor's work with the role concept. With the knowledge about these elements it is possible to find out how the instructor's roles and work handle change when moving from classroom lecturer to online instructor.

The *pedagogical role* is one of the most important roles of the online instructor. It deals with the duties of an educational facilitator. (Collins & Berge, 1996) The pedagogical role refers to everything done to support the learning process of students or groups (Teles *et al.* 2001, 47). In the pedagogical role one asks questions relating to strategies of learning, and this role appeared to be the most essential and important in promoting interactive learning (Maor, 2003, 131, 135). *The social role* grows with the lack of nonverbal signals and social context cues and has to be built on virtual tools and interactions (Teles *et al.* 2001, 47). For the successful online instruction it's essential that learning is promoted with created friendly, social environment (Collins & Berge, 1996). In the social role one asks questions that relate to social behavior. For example, is joking allowed, and what is the general tone? (Maor, 2003, 133) *The managerial role* refers to an administrative level, on which activities designed to make the course run smoothly is needed (Teles *et al.* 2001, 47). The couple of most important managerial tasks are setting of agenda and course pacing (Collins & Berge, 1996). In the managerial role questions relate to course structure and navigating the web site, for example (Maor, 2003, 134). In *the technical role* the instructor is involved to choose appropriate software to meet learning goals, and assist students to use the chosen software comfortably and competently (Teles *et al.* 2001, 47). The first task for the online instructor in online instruction is to become comfortable and proficient with the technology and then assist students to use needed technology (Collins & Berge, 1996). The technical role's issues relate to needed equipment and use of it (Maor, 2003, 134).

Research methods and next steps

The research will be based on interviews, which will be analyzed with the content analysis method. The main data collection method will be constructed on a semi-structured interview of online instructors. In the first phase the interviews will include about 20 interviews of the Networked University of Craft Science's instructors, who had been involved in web-based video lecturing. This group of 20 interviews can be seen as pilot group. After analyzing these, the interviewees', the informant group will be increased with the instructors from the other academic fields. Also at that point it is possible to revise and modify the semi-structured interview, if needed.

The semi-structured interview will be based on the theory of instruction and the role theory of the online instructor. Main purpose of those theories is to find a way to describe the instructor's work. The theory of instruction may help to find a sound way of describing the whole instruction process, which is needed, if we want to know what kind of sectors this process includes. The role theory of the instructors will help to find aspects of different tasks, which the instructor will encounter while instructing. As a result, these two approaches describe the instruction process not only from longitudinal perspective from planning to assessments, but also from a contentual perspective, which includes pedagogies, social aspects, managerial tasks, and technical questions of instruction.

Unfortunately this research is in its initial stages and it means that no results can be included at present. The interviews will start in February 2006, so it seems possible to present first preliminary results in the EDEN conference in Vienna this summer.

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PROFESSIONAL DEVELOPMENT ONLINE FOR EDUCATORS WORLDWIDE

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Summary

Cambridge Assessment (a non-teaching department of the University of Cambridge) is a major provider of examinations both within the UK and internationally. It is committed to providing high quality support and training to teachers of its syllabuses and has an extensive programme of in-service training.

University of Cambridge International Examinations (CIE) provides assessments for schools in more than 150 countries. Providing training at reasonable cost and useful intervals for a teacher community so disparate and geographically widespread is a continuous challenge.

Cambridge Assessment Network is a newly established unit which offers professional development in the field of assessment to both the staff of the organisation and the wider assessment community. It also has the remit to develop a virtual community of practice for assessment professionals.

This paper traces the learning curve of the work in e-learning by CIE and Cambridge Assessment Network. At the EDEN conference in 2002, Chris Daw and Phil Riding described the development of a course designed to prepare on-line teacher trainers (e-moderators) to deliver an international on-line teacher training course. This course used a simple 'home-grown' virtual learning environment (VLE) consisting of ordinary e-mail and e-mail-based discussion lists.

This teacher-training programme has recently been converted to a web-based VLE, using Moodle, the open source CMS. This now offers 27 courses for teachers of CIE syllabuses world-wide. These courses are at intermediate level (for teachers who have been teaching CIE syllabuses for one year or more) and are designed to improve the delivery of CIE syllabuses, as well as offering teachers the support of their peers and a CIE trainer. Teachers are able to access course materials and supporting resources, download and submit assignments and receive feedback from the e-tutor; discuss ideas, teaching strategies and issues in asynchronous forums, experience real time communication with the e-tutor and other participants and communicate privately with the e-tutor through the messaging feature.

CIE's previous platform for online training events was developed in 2001 and has been surpassed by developments in educational software. The tools available were limited to viewing content on a website and downloading documents, and communication between participants and an e-tutor via e-mail. The platform had become out-dated and disjointed with the course interaction and the materials held in separate places.

The Moodle VLE offers tools specifically developed to support online learning including collaborative tools such as wikis, lesson plans and course journals. This will enable CIE to develop new models of online training including seminars with Principal Examiners after exam sessions, short online courses which ask participants to carry out an activity such as delivering a lesson, and then reflect on its success with peers – and bite-sized chunks of self-supported materials that participants can work through and receive feedback on. The VLE has unified the course discussion and course materials into a single point of delivery, so that the route through the training is clear for participants from the outset.

The content of the courses typically follow a three unit pattern over six weeks. The first unit asks participants to reflect on their teaching environment and the strategies they employ in their current teaching. Units two and three focus on a variety of teaching techniques including student centred learning, cooperative learning, critical thinking and teaching with ICT. Participants are asked to try out a new technique in the classroom and then to reflect and evaluate this experience. All assignments are then posted to the VLE so that peers can share and reflect on each others experience. This format

emphasises both the importance of peer interaction and the essential concept of putting theory into practice and reflection as outlined by Kolb (1976) and Schön (1983).

Initial findings have revealed that 96% of course participants found the new features on the platform easy to use and useful (with the exception of chat which was felt to be useful, but difficult to use). There have been some technical difficulties with chat during the initial courses and chat sessions are difficult to manage with large groups. There were significantly fewer emails from participants asking how to contact their e-tutor and where to download assignments during the courses. The e-tutor reported that the platform appeared simple to use and offered more for participants with interactive activities. Completion rates from courses have increased from 70% on the old platform to 93% on the new VLE.

One of the first issues to be addressed was transferring the existing content of courses on to the VLE and ensuring our e-tutors had the requisite skills to use the platform. Following the model established by Phil Riding and Chris Daw in 2001, an online e-tutor course over three weeks has been developed. The course aims to ensure CIE trainers are not only competent in the use of this technology, but are also familiar with the basic principles of e-tutor pedagogy. The importance of context, collaboration and the creation of networks and communities is emphasised.

The initial version of the course has worked well, with e-tutors adapting to the new platform and successfully seeing the majority of their participants through to the end of the course. The materials produced for the courses are increasingly interactive and often give participants the chance to experience some of the tools they might choose to use in their own classes.

An emerging issue is finding out which tools work best for different tasks. Established tools such as forums and assignments are usually successful but some of the other tools available need to be treated with caution. For example, the messaging option has given e-tutors a confidential way to communicate with participants without having to step outside the VLE to use email, and all our e-tutors have been keen to use it. However it has brought with it the danger of participants using messaging instead of the forums, therefore compromising the community aspect of the course. A variety of different tactics are currently being used to address this issue and future courses will clearly direct participants to use messaging for confidential discussions only.

CIE runs three sessions of six-week professional development courses on the VLE each year, with an iteration of the e-tutor course running at the same time. At the end of each session observations about the success of the courses and feedback from participants and the tutors are reviewed. Lessons learnt are reflected upon and fed into guidance for future course authors and e-tutors. It is a continuous process of learning and improvement. We have also identified a number of other issues which will need to be addressed in time. For example, at present different technology is used to support our discussion groups, separate from the VLE-based courses and this will makes it harder for CIE to continue to grow its community of practice in a seamless way. CIE's e-tutors have come a long way in their use of the VLE, but it would be good to experiment with collaborative tools such as wikis to enrich the participants' experience further. It is important, however, that tools are tested and their use considered for appropriateness – rather than using technology for technology's sake.

CIE began developing online professional development for its teachers worldwide as a way of ensuring equity of access to training opportunities. These courses develop teachers' skills – promoting digital literacy and encouraging increased use of ICT in the classroom, helping CIE teachers to keep up with the ever-changing pace of education. The main benefit of these courses continues to be the communication between teachers with a syllabus in common, sharing their different experiences, similar issues and teaching strategies. It also offers them the opportunity to discuss assessment issues with examiners and a community of assessment professionals. The work of the Cambridge Assessment Network will complement this work (see below).

A separate, but closely related development within Cambridge Assessment was the initiation by Cambridge Assessment Network of two further Moodle-based instances, this time to support and develop assessment Communities of Practice (Wenger, 1998).

These Communities of Practice are open to anyone interested in assessment, beginning with the staff and examiners of Cambridge Assessment. The Moodle CMS offers a range of resources (as we have

mentioned above), usually framed within 'courses'. Our initiative at Cambridge Assessment has been to use the CMS not only to structure specific courses and programmes of learning (both blended and wholly online) but also to provide users with a completely open flexible forum to visit whenever it suits them. The name CAMPUS has been adopted for the inhouse CMS to underline the open access nature of the site.

We are currently in our first year of offering professional development in assessment and, benefiting from the CIE experience, moving swiftly along the learning curve. We have developed two Moodle instances, Campus for in-house use and Assessnet for our wider community. So far we have provided:

- In-house blended courses;
- In-house open access resources;
- Public open access resources.

These resources are also intended to assist in developing the digital literacy of staff and examiners, required for the growth of Cambridge Assessment as a whole.

Our key principles in developing resources are:

- Following Stephenson (2001) in his Endpiece: to provide not just 'electronic page turning', but 'bite-sized learning objects';
- To plan the structure of our resources so that learners will be able to define their own goals;
- As befits an assessment agency, we will use a range of modes of assessment, including portfolio, peer-assessment and collaborative projects;
- Our courses and flexible programmes of learning will acknowledge the primacy of peer interaction;
- Members of the Community of Practice will be encouraged to continue to reflect on their experience;
- The Community of Practice will support and enthuse adult learners in their professional development, encouraging life long learning habits.

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E-TRAINING AS A KEY TOOL FOR LIFELONG AND CROSS-SECTORAL LEARNING: THE EXAMPLE OF "TEACHING EUROPE"

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Introduction

This paper will focus on two aspects of education through e-learning: it will not only look at the use of e-learning as a tool for the transfer of knowledge (the classical approach to teaching and teaching tools), it will equally look at the use of e-learning to train certain "skills".

For this, our paper presents an e-learning project which is organised at the Institute for European Studies (IES)[1] at the Vrije Universiteit Brussel (VUB)[2]. This project incorporates the two elements stated above: knowledge transfer, and e-skills. In particular the use of general European information sources on the internet and EUR-Lex are dealt with.

The paper is structured as follows:

- A brief reminder of why Europe is important for every single European citizen (section 2);
- The concept of e-learning, its advantages and possible pitfalls (section 3);
- E-learning at the IES: content, methodology, technical aspects (section 4);
- E-learning as a possible tool to train the use of Europa and EUR-Lex (section 5);
- Conclusions (section 6).

Where is Europe? And why does everybody need to know it?

It might be useful to remember that, certainly these days with the ever more expanding reach of the European policies, the answer to this question is similar to the answer once found in Catholic Cathecisms on the question: where is God? The answer was: everywhere.

These days, in any given Member State, over 50% of all legislative work in the national parliaments is made up of the transposition and implementation of European legislation. An increasing amount of policy fields has ties with the European level and is being coordinated by the European institutions. Consequently, national policies of the Member States are ever more drawn up along lines set out in Brussels. All this implies that there are thousands of people, in all sectors of society, which are regularly confronted with (legal) documents originating at the European level.

Moreover, some aspects of European law have "direct effect", meaning that they confer rights on individuals which they may enforce before national courts. Many individuals and private companies are thus directly confronted with European legislation in their daily lives.

All this leads to the same conclusion: it is quite necessary, even vital, for a growing number of people to understand the European Union and European law.

In order to do so, they need access to legal information. Access to specialised legal information has, for the better, changed considerably over time: now everybody, in principle has access to the same, often free, databases which are available via the internet[3]. However, there is more to it than just access to

[1] www.ies.be

[2] www.vub.ac.be

[3] M. Drachsler, A. Geist, E. Schweighofer, The Potential of Semantic Maps to Improve Access to EU Legal Information, JURIX 2005 Workshop proceedings "Free EU Information on the Web: The Future beyond the new EUR-LEX"

information. They also need to know how to "master", use and interpret, that information. Maybe e-learning can help them with this.

What is e-learning?

In a world increasingly based on knowledge and knowledge ever faster aging, people are confronted with recurrent needs for new knowledge and skills to master the vast amount of information available. Lifelong learning becomes essential in order to cope with future challenges and e-learning is one of the topics at the forefront of educational reform and strategies for achieving this lifelong learning. However, it should be clear from the beginning that e-learning not only has potential benefits, but also possible pitfalls and that e-learning not necessarily is the best tool to transfer knowledge and skills in every given circumstance.

Defining e-learning

E-learning can be defined as the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration[4].

In other words, e-learning is *the delivery of a learning, training or education program by electronic means. E-learning involves Information, Activities, Processes, People and Techniques*.

Information (data, content) is what needs to be transmitted, through the chosen means, in this case electronic tools. *Activities*: can be multiple and depend on your role in the e-learning. As teacher, this involves the creation of the materials, scripting the learning trajectories, creating the thesaurus and other databases required to help the student understand the subject. As a student, this is self-study, using the interface, entering into contact with the teacher or peers via the in-built or external tools. *Techniques* means not only the range of front-end and back-end ICT tools, but also the learning trajectory and educational techniques chosen by the teacher. These can include the use of case studies, problem-oriented learning, experiments on which reporting is required, ICT-assisted or even (strictly) managed exercises, online testing... (list not exhaustive).

In essence, e-learning can be defined as a *learning process*.

E-learning starts from a different paradigm than classical education (the teacher-student paradigm) and its characteristics define how the learning process will evolve.

First of all, e-learning redefines and replaces classical paths of communication, such as the direct interaction with the teacher (educator) with an indirect contact[5] with an electronic contact possibility, which might be organised in different ways: through e-mail, forums, dedicated contact hours… Secondly, the teaching materials are not presented ex-cathedra, but are offered in a reading form on a computer screen[6].

To understand how e-learning works, and to make an e-learning project a success, one should look beyond ICT and turn to knowledge from disciplines, such as cognitive sciences, psychology, pedagogical sciences, neuro-psychology.

Learning via electronic means should exploit the possibilities of the medium, and can therefore be organised along the lines of mind-mapping, allowing the human mind to learn in different ways. The final question to be answered is: how to script a learning trajectory that works? As the case study of this paper will show, the answer to this question depends both on the ICT tools at the educator's disposal and the subject matter to be taught.

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[4] The eLearning Action Plan, Designing tomorrow's education, 28.3.2001, COM(2001)172 final

[5] This depends on the system used. There are also e-learning systems which do not have a contact possibility with an educator and are fully based on the self-teaching skills of the student.

[6] Here again, various forms exist: some courses are entirely computer-based, others use computers to complement printed materials (blended learning).

What are the advantages and possible pitfalls of e-learning?

The advantages of e-learning

Amongst the potential advantages of e-learning are[7]:

- Students are able to learn in small "chunks" at times and places of their choice;
- Self-directed and selective learning puts the learner in a position to choose what is relevant from a variety of materials;
- Courses can be tailored to specific needs of individual students, as can student support;
- Reduction in the cost of delivering content to many students and reuse of content;
- Student-teacher interactions can be organised through electronic means (e-mail, forums, videoconferencing), also lowering thresholds of participation for less outspoken individuals.

The possible pitfalls of e-learning

It should also be noted that e-learning not only offers advantages and new learning opportunities. E-learning also raises some problems and concerns:

- Depending on the application used or the system chosen, the entry-level may be too high for certain people with limited or subject-specific ICT skills;
- Students need a high degree of self-discipline to organise a strict follow-up. This is not always as easy as in traditional face-to-face learning;
- The risk of "derailment" when students are in a position to choose what is relevant and interesting to themselves or the risk of drop out due to a lack of self-discipline.

Experience has shown that e-learning courses often do not pay enough attention to this and limit themselves to provide standardised content to learners or isolate the learners. All these possible pitfalls have to be addressed properly by any e-learning course wishing to be successful, and even than one should ask him/herself whether e-learning is the right tool in the right place.

E-learning at the IES

The e-learning modules developed at the IES aim to provide useful knowledge on EU affairs to students and non-specialised professionals. For students, the focus is on those students without a course on the EU in their regular programme. For non-specialised professionals, the focus is on those, either in private or public sector environments, who are confronted on a regular basis with EU issues, documents and law.

The IES e-learning modules try to combine a clear methodology, including tailor-made learner support, with an easy to use application and up-to-date content.

Methodology

The methodology the IES uses is based upon the following key elements:

- Major attention for usability factors: we have opted for making the site maximum compatible (low technical requirements), there is no need to install extra software, and all embedded applications are purely web-based. Furthermore, we foresaw that pages are formatted so they can easily be printed, in case the user would like to study from paper rather than on-screen.
- Logical interlinking within the course: linkage is given between related topics, but always with a clear way back, so study of the original topic can be resumed.
- Use of a thesaurus and glossaries: besides a general "master glossary", several other topic related glossaries exist.
- Relevant external linking policy: relevant external websites are included in the course.

[7] Conference Report: European e-skills 2004 Conference, Thessalonica, Greece, 20-21 September 2004.

- Use of Rich Content: the inclusion of images, maps, audio, and video where possible, without jeopardising maximum usability.
- Basic classification of learning materials as "need to know" versus "nice to know", with a clear visual code showing this difference. This is the basic philosophy of the course: all materials are coded, which is reflected in the priority course documents are given, and in the learning targets for the students. This classification is adaptable to the student profile, as certain students have a given background allowing or necessitating the more advanced study of certain topics.
- Student tracking/learner support: in the system, a tool is included which shows both student and teacher what issues and materials have already been studied and (self-) tested. It also warns the student if extra materials have been changed in a chapter he/she has already covered. The student is "guided" through the course materials, and whilst departing from the so-called "book-paradigm" (searching in any given book, and per extension, chapter from front to back), he is not allowed to advance faster than logical (in the view of the instructors) through the material. The classification of the material is also done by the instructors. This is what we call learning through "guided association", and obtaining insights via content linkages which are only possible due to the specific nature of the medium used.

Technical aspects

From a technical point of view, one can distinguish 3 major elements: the content-database (descriptive text-pages, XML-format), a common glossary used throughout the course modules; and specific linked databases containing case-law, biographies of personalities mentioned in the course.

The IES e-learning modules

The e-learning modules the IES developed focus on 2 major elements: the transfer of knowledge (e-learning), and the teaching of skills (e-training). The description of each module will look at why the module is made, what there is to learn and what students are expected to know afterwards.

Common between all modules is the methodology, based upon the principles outlined above.

The module "European History, Institutions and Decision-making"

The rationale of this module lies in the necessity that, to acquire the practical skills of information retrieval (see module 3), the student/user also needs to have an overview of the basics: structures, history, instruments, which form the basis of the European construction.

The module consists of several chapters each outlining a part of the European construction (e.g. history; institutions; decision making; procedures...), using rich content to clarify and enlighten the texts.

After studying this module, the student must, *inter alia*, be able to describe the Union's objectives and place them in a wider framework; have an insight in the various decision-making procedures and the policy fields to which they apply; have a basic understanding of EU law.

The module "European Union Law"

Each year, on the basis of the Community Treaties, thousands of decisions are taken that crucially affect the Member States and the lives of their citizens. For this reason alone it is of crucial importance that the Community citizen should be informed about the legal order that affects his/her daily life[8].

The European Union law module provides an overview of the nature of European Union law and its scope. Next to the different policy fields that are explained in the same order of the treaty, also the second and third pillar are dealt with in a comprehensive way. The practical results of the application of European Union law is explained by referring as much as possible to judgments of the Court of Justice of the European Communities.

[8] Dr. Klaus-Dieter Borchardt, The ABC of community law, European Commission, 1999, p. 9-10

After having studied this module, students should have a working knowledge of the principles of European Union law, the various Community competences and policies and the second and third pillar. In addition to this, students should also be able to use the treaties to find relevant information on all Community policies, and the second and third pillar.

The module "European Information Sources"

The rationale of this module is double. First, it aims to transfer knowledge of EU information sources. Secondly, it also aims to train the theoretical skills of EU information retrieval through the use of a few practical exercises.

The main part of the module "European Information Sources" explains the information to be found on "Europa", the portal site of the European Union. Besides this, also other relevant EU information sources are dealt with. This includes the most relevant sources outside the institutions, such as press, interest representations, etc. As the Europa portal is updated on a daily basis, the module does not only explain what can be found on "Europa", but also how EU information can be retrieved. For this, students are confronted with real life situations on which they have to find useful information.

After having studied this module, students should be able to retrieve whatever EU information they need in a time-efficient manner, using a variety of information sources. The Europa portal and EUR-Lex are some of those information sources and the question arises whether e-learning can be used to learn people how to retrieve information on "Europa" and EUR-Lex.

E-learning as a tool to train the use of "Europa"

"Europa", the European Union's portal website, provides a vast array of information on European integration, policies and institutional set-up. EUR-Lex, as part of the Europa portal, provides free access to European Union law. A wealth of information is available free of charge and in most to all official languages.

Although they both try to offer users easy access to information and documents, a number of shortcomings can be identified. This is especially true when looking at the user, who does not always have a good understanding of the EU or European legal terms. For them, finding the information they are looking for in a time-efficient manner is not always that simple, even with the help of the Frequently Asked Questions (FAQs). These FAQs can indeed provide some useful information on how to use the sites, they are not always available in all official languages and they remain quite general. In other words, the FAQs are not always adapted to the needs of the average user, and this is where the IES e-learning module "European Information Sources" comes in the picture.

The methodology used in e-learning can be a valuable addition to the creation of a functional interface for a database. To understand this statement, its components need to be defined.

Methodology: both the use of electronic databases such as EUR-Lex as e-learning courses share one obvious element: the interaction with a source of information, located at a distance. There are no "physical" or human intermediaries as documentalists present, as in other libraries. All documents remain in electronic form, and are searched, retrieved and consulted through an on-screen interface and a computer.

Interface: a "functional interface" can be seen as an interface leading to the desired results in as short a time span as possible. Just as e-learning, databases such as EUR-Lex work through a complex network of interlinkings, glossaries and thesaurus, and therefore use the same basic building blocks.

Often, tools such as many of the public accessible, and searchable databases on "Europa", lack the "touch and feel" required to expand their potential user group to all those who might benefit from these tools (see also the introduction). We therefore advocate the use of an e-learning methodology to familiarise users with the available tools. This would be centred on transmitting a skill on *how to use each database* individually, rather than transmitting knowledge (or: e-training).

Similar to the Austrian "Help" project[9], the IES[10] also foresees real-life situations to help people retrieve information quickly and efficiently on "Europa". The approach combines mind-mapping and thinking-by-association, and referencing to the lay-out of the "Europa". Two examples will illustrate this: the module has a case study of a student wanting to study abroad. He/she is guided in this complex and vague problem statement, and the issue is broken down in various components. After this, each one is solved separately, leading to the resolution of the issue and the user having obtained all information he needs. Another example is the IDEA-database: it is not obvious on "Europa" to find the contacts of the people you need. Our module offers a small training session, thus creating the skills needed to retrieve the information autonomously.

Figure 1. e-training on the use of the IDEA-database

Conclusion

Beyond the functioning of search tools (Idea, the databases hosted on the "Europa", EUR-Lex, etc.), one should ask a few existential questions: for whom do we make it; what is its purpose; where do we want it to go? Besides optimal functionality and efficiency, attention should also be given to training, and especially to training the users who might not be that familiar with the complex nature and nomenclatura of the European law and administrative documents. It might be wise to think of methods to remedy that issue as well. The IES e-learning modules try to give a helping hand in this so that learners learn the skills for using internet information sources and "Europa".

[9] HELP homepage: http://www.help.gv.at. A similar thematic approach can be found at the federal Belgian homepage: http://www.belgium.be.

[10] in its 3rd e-learning module, "European Information Sources"

THE HOGESCHOOL GENT EXPERIENCE: CHANGE MANAGEMENT AS THE KEY TO SUCCESS

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Abstract

This paper attempts to offer a concise overview of the policy at Hogeschool Gent (Ghent, Flanders) regarding the introduction of both innovative learning and teaching strategies and the use of an open source virtual learning environment (VLE) in a blended learning context. Though there need not be a direct link between the two, both the successful introduction of a VLE and innovative strategies are related to change management. The paper shows how the two can be integrated in a coordinated policy so that both processes reinforce each other and better and more durable results can be reached in both domains. Particular attention is paid to an innovative project of teaching staff development and knowledge dissemination on learning technologies at Hogeschool Gent (Ghent University College) in collaboration with some counterparts in the Netherlands.

1. Introduction

It is common knowledge that online and Internet technology has opened up new opportunities and practices in education and especially, but certainly not only, in open distance education. However, new technologies are also resulting in global competition between universities (Bates, 1997).

It is also argued that the explosive growth of new information and communication technology and particularly the Internet is one of the main factors in the wave of globalisation in education. A lot of creativity from public conventional higher education institutions will be required to cope with the globally operating, most often privately run, virtual universities (Aelterman and Van Damme, 2001). 'Internationally, university staff are under increasing pressure to respond to patterns of globalisation, and changes in local labour markets. This is most apparent in relation to the capacity for information and communication technologies to change the way education is delivered' (Clegg *et al.,* 2000).

Furthermore it has been expressed that 'information and communication technologies can be conceived of as useful instruments to support drastic innovations in line with the paradigm shift from externally controlled learning and teaching towards support of constructive learning in open environments' (Dillemans *et al.,* 1998).

Elen *et al.,* 1999 articulate these feelings of technological optimism as follows: 'The expectation that the availability of technology in education will automatically change teaching process, learning process and learning outcomes is widespread. Based on technological optimism, there is a strong tendency to distribute as much as possible technological equipment in the educational system.' Some critical publications however argue that there is no direct link between introducing ICT and an innovative learning approach (Cuban, 2001). Most virtual learning environments are pedagogically neutral, i.e. they do not favour a particular pedagogical approach. In fact many if not most VLE's start from a traditional course metaphor.

Most higher education institutions in Flanders have introduced VLE's as part of their plans regarding educational innovation. Recent investigations show the wide-spread availability of electronic learning environments in Dutch higher education establishments (Lubberman and Klein, 2001), most of these electronic learning environments being delivery oriented (Moll 2001). The general situation regarding the educational use of information and communication technology (Verreck and De Volder, 2001) and consequently also the use of electronic learning environments, is very much alike in Flanders. But one should realise that such environments don't make education: people do (de Wolf, 1999). And, 'it is clear that a mere technology driven approach nowadays is out of the picture. Technology becomes a natural part of the learning environment' (Lowyck, 2001).

2. Hogeschool Gent policy

Blackboard was first introduced on a modest scale after Hogeschool Gent took over Mercator Hogeschool (2001). At first the growing use of Blackboard was mainly the result of a steady but relatively slow bottom-up process, partly due to a lack of staff and an integrated view on the use of ICT and VLE's and innovation. In 2002-2003 the Project Digitaal Leren was started, now simply named Digitaal Leren (Digital learning), as part of the service of educational development and innovation. From then onwards the use of a VLE was strategically linked to the use of innovative learning strategies and the dissemination of good practices both internally and externally. The University Ghent association to which our college belongs, decided to work with the open source VLE Dokeos. In 2003-2004 a limited series of tests were run with Dokeos. By the start of 2004-2005 Dokeos was in production and fully integrated with the administrative back office programs of the college. The migration from Blackboard to Dokeos was completed by the start of the academic year 2005. The system now has over two thousand active courses and more than 15000 users, including about all students.

Furthermore Hogeschool Gent decided to invest in the development of Dokeos, making it possible for the college to help setting out the course of development of Dokeos and to invest in those developments that it considers important. Basically the policy of our college is twofold. On the one hand we are actively helping to develop an open software VLE, on the other hand we have set up various initiatives in the field of training teachers in the innovative use of educational technology and more generally in academic staff development.

2.1 The choice for the open source VLE Dokeos

As our use of Blackboard had gradually grown to the limits of a basic licence, we had to decide whether to move to the more expensive enterprise version or to consider alternatives. Generally spoken our experiences with Blackboard were positive, with one important exception: support was heavily deficient and feedback from users to Blackboard received hardly any follow-up. As Dokeos offered us overall comparable features and its developers base had grown from Belgium, it was decided to invest the recurrent licence costs in the development of this relatively new open software VLE. This has made it possible for us to invest in developments we think will help foster pedagogically valuable aims such as offering support for collaborative and peer-to-peer work through a VLE.

There are other important advantages of open source software. The problem of support with many commercial programs has already been mentioned. If users signal bugs you can only state the problem with the support staff and hope that they will be able to solve them. The experiences from our and other colleges in this respect are mainly negative. It always took too long a time to get a solution, if any, and in most of the cases we had to wait for a new release which then in turn created new problems. Now with unlimited access to the source code we are able to solve most bugs within a matter of hours. Suggestions for small improvements are often taken up almost immediately and implemented within a few days. This has not only earned us a good reputation but also an important amount of goodwill with users. They know that their input is appreciated and put to good use as quickly as feasible. Another important advantage has been the smooth integration with our own administrative back office programs. Students are automatically entered in all the curriculum courses they have selected and teaching staff automatically get access to courses that are part of their assignment. Furthermore it has been made easy to set up non-curriculum courses for all kinds of purposes. Teaching staff can themselves give access to colleagues if they so wish. The whole system requires minimal efforts from users to get started so that they can focus on what is really important for them: communicate, learn, interact, work together, build knowledge, teach and coach.

2.2 VLE in a blended learning context

Flanders is a heavily populated small region. Distances do not play an important role. So we do not use VLE's in the first place to offer education to far-off regions as would be the case in countries such as Norway. We want to use the possibilities a VLE offers to make face to face teaching more efficient on the one hand, and on the other hand support innovative learning approaches stimulating peer collaboration, project work and the like. We therefore do not suffer from the problems that are typical

for distance learning, such as decreasing user motivation and user drop-out. We are fully aware of the fact that learning is a social process and we use the VLE to add extra dimensions to the social interactions of its users, combined with real-life social contacts in class- and meeting rooms – blended learning, in other words.

Group work is important not only in education but certainly also in most professional environments. One of the first developments the college invested in, was the improvement of the group functionalities in Dokeos (1.6). It is now perfectly possible to form subgroups from groups or from other subgroups (which is not easily feasible in many commercial products). As we have linked Dokeos to our back office, teachers can now automatically populate the groups in Dokeos from the class groups defined in the back office. They can then easily create subgroups from those, even semi-automatically if they prefer. Groups now have more extensive tools: a document tool with the same possibilities as the one on the course level, discussion forums, their own agenda and ad valvas announcements. These tools will be further improved upon by next academic year. At our college we have added a simple wiki to those tools on the course level and later it will be added on the level of (sub)groups. We will have several experiments in the next year using the wiki as a means of knowledge building in peer to peer projects and we hope to learn a lot from those.

Wiki's are one successful example of what one could call the technology of cooperation. There are others and there will be more in the future. We as educators should have a close look at the tools young people tend to use anyhow, such as mobile communication and computing, the explosively growing use of weblogs which seem to become a popular and more personal alternative to portfolio's, and many more. Social software is another emerging tool. It enables the user to flexibly manage his or her own personal social networks in a simple web interface. Most if not all of these tools have to do with networks, socialising and communication. They are all characterized by low thresholds and an open and dynamic structure. All of these emerging tools should help us rethink and redesign our virtual learning environment. One example of such an emerging useful tool is RSS. We have integrated it in Dokeos so that users do not have to login to check whether there is anything new. As open software in general is user driven and collaborative in nature, it offers the best possible development platform for our future needs.

2.3 Staff development

Our developments in the VLE go hand in hand with projects in various faculties (called departments at out college) that aim to stimulate collaborative learning and project work and even integrate it in the curriculum (e.g. in the engineering and technology departments). Each department has at least one project related to this area. Furthermore we keep motivating teaching staff through various successful programmes of staff development. In the academic year 2004-2005 a series of successful half day seminars were organized (in collaboration with the Association partners) around a central theme, each consisting of a key note, various practical workshops and a plenary closing discussion. In the previous year our college organised a very successful good practice day on the use of the VLE, once more in collaboration with the Association partners. This year the good practice day will focus the sessions on experience exchange and sessions on future developments.

We will continue initiatives like these to help our teaching staff to make the most of all available means, knowledge and experience available within the college and the University Ghent Association. In the future staff development on learning technologies will be aimed even more at the pedagogical implications of using those technologies, both opportunities and pitfalls. Our lecturers are actively encouraged to work together. Possibilities in this respect will grow even further through the integration of content management in the VLE and the development of extensive search functions of learning objects. Finally we have entered another important initiative called 'digital didactics', that is dealt with separately in point 4.

3. Change management as the key to success both in innovation and the use of a VLE

Both the introduction of ICT-tools and innovative learning and teaching strategies have a profound effect on learners as well as on teaching staff. Implementing both at the same time is quite a challenge. Change in education has always tended to be a slow and gradual process. Trends and hypes of all kinds

appear to only have had passing and ephemeral effects. So if we want changes to be profound and effective in the long term, we have to introduce them carefully. Without the commitment and active participation of all involved, changes are bound to fail. Books have been written about change management, but in this context we can only be extremely brief.

A VLE (Blackboard) entered the college as a result of a merger. It was not immediately taken up on a large scale, neither was it part of a grand scheme of promoting its use. Support was offered on demand, to those interested. With hindsight this proved to be a happy coincidence. Usage grew slowly but very steadily. Nobody felt obliged or forced to use the VLE, but those that made use of it, did it because they thought it was helpful to them, made their work easier or at least more efficient. By the time that management came up with a long term strategy, the VLE already had a significant user base. It functioned as a live showcase that partly took care of its own promotion.

It has always been our policy to promote the use of the VLE to improve the quality of education. The use of a VLE is not something you can impose on people. Our strategy throughout has been one of motivation, of commitment and socialisation. In fact students are quite often the best promotors for the VLE and their pull is more efficient than any management impositions. The choice for an open software platform has helped us a lot as it has enabled us to influence future developments and to help develop those elements we think are important in the light of innovative teaching strategies. It has enabled us to use user feedback as input for redesigning and adapting the VLE. As a result the VLE is now used on an extensive scale for communication purposes, the presentation of content and exercises for coached self-study, the activation of lectures through online pre and post assignments and discussion boards, peer work, projects, and more. It is linked to a video and audio streaming server. Links to external library and related sources are easy to establish through a semi-automatic link builder. There are quite a number of projects related to e-learning such as e-portfolio, a mentoring and study trajectory system, competency based e-learning and the like.

As faculties at our college are to an important degree independent units, we have adapted the administrative structure of Dokeos to this situation. Each faculty has appointed a VLE coordinator who also is subadministrator within Dokeos. We use Dokeos itself to closely communicate and work together and there are several coordination meetings throughout the academic year to steer future developments, e.g. content management.

It is our explicit aim to promote cooperation between teaching staff over departmental boundaries. Just like we are in favour of open software, we also promote open courseware. This will also encourage lecturers to work together on related content and this in turn can only improve the quality of content through peer review. Peer review is also the basis of the project discussed in 4.

4. Digit@l Did@ctics: an Internet-based staff development project

Academic staff development is suffering from different bottlenecks. According to Veen *et al.*, 1999 these bottlenecks include: (1) teachers have to move towards new education practice, but they lack the time to make the switch; (2) teachers lack insight in ICT development; (3) teachers lack ICT skills. The identification of these bottlenecks has lead to the recommendation to stimulate expertise development in this field through an on-line learning environment. Three Dutch partners, the OECR (Education Expert Centre Rotterdam), EDUTEC of Delft Technical University and ECOO and UCLO of the University of Groningen joined their efforts and launched Digit@l Did@ctics with as important starting point: sharing, storing and dissemination of knowledge (Baars, *et al.,* 2002). Collaboration between the partner organisations is a key issue in this project and has lead to the construction of a knowledge management system, a search engine and a website (www.digitaledidactiek.nl) as the interface to the knowledge management system. The system discloses an online collection of good practices, educational materials and instruments, which are all going through a peer review system. As described elsewhere (Baars *et al.,* 2002, 2005) the good practice descriptions within the system can be considered as building blocks enabling teachers and educational developers to design technology supported/based education. The focus of the knowledge management system is the use of ICT in: (1) different (activating) educational formats; (2) offering feedback; (3) different types of assessment; (4) course evaluation; (5) adapting education to differences in learning styles or learning strategies; etc.

Contributions on good practices are all formatted in a fixed template and they include — besides author's name and affiliation, keywords, summary and a practical field example — an answer to the following questions: (1) why using ICT?; (2) when to use it?; (3) how to do it as a teacher? An e-journal was launched recently in order to draw attention to new contributions and offer an extra dissemination tool.

5. Involvement of Hogeschool Gent in Digit@l Did@ctics

In Flanders and more particularly at Hogeschool Gent similar bottlenecks in academic staff development as mentioned above were impeding the implementation of learning technologies. Looking for possibilities to cope with these bottlenecks, Hogeschool Gent responded to the call of the initial Dutch project partners and joined the Digit@l Did@ctics project, along with two Dutch university colleges. By doing so, Hogeschool Gent enabled itself to provide new and adequate opportunities to its teaching staff for in-service training in the field of leaning technology. Furthermore teaching staff at Gent Hogeschool also contributed to the content providing peer review comments as well as producing knowledge elements. Especially the expertise of some members of the teaching staff on the use of learning technologies in the framework of internationalisation in education was highly appreciated by the project partners and the target group. Other contributions from Hogeschool Gent staff include the use of wikis and the assessment of student's contributions in discussion boards. Notwithstanding the involvement in this particular project, teaching staff has also been informed via the electronic learning platform about similar initiatives in Flanders and worldwide such as: www.klascement.net, goodpractices.surf.nl, www.merlot.org, www.heacademy.ac.uk.

6. Conclusions

Digit@l Did@ctics has added another channel of knowledge dissemination specifically enabling just in time learning, i.e. learning at one's own pace and place. It has proved to be a showcase for the power of learning technology and as such it is appreciated by many lecturers at Hogeschool Gent. Moreover the trans-border co-operation and the feeling of belonging to a wider learning community with peers adds an extra and positive dimension to the project. There is no doubt that this project has already enabled many lecturers to acquire inspiring knowledge and good practice examples on learning technology. It has added a virtual but very real dimension to our staff development efforts. It fits in very well with our overall policy of promoting cooperation and the use of a VLE as a strategic tool in most of our innovation processes. All of these elements are part of conscious effort of change management in order to improve overall quality of education and to prepare our students to the learning society of the future.

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INTEGRATING NEW MEDIA INTO UNIVERSITY TEACHING OR INTEGRATING TEACHERS INTO NEW MEDIA?

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In 2003 the University of Umeå, Sweden, started a web-based Pharmaceutical Science programme. The programme was developed in response to the need for qualified pharmacists in rural, sparsely populated areas. A web-based programme offers many possibilities such as increased access to higher education for citizens living in remote areas, but at the same time the development and delivery of such a programme are associated with difficulties, such as the creation of a favourable online environment and the introduction of online teaching into a 'traditional' university setting.

Introduction

The concept of "Lifelong learning" has created an increased demand for flexible education for adults and a growing number of universities and schools are adopting distance modes of delivery to satisfy this need. Particularly in the field of web-based courses for professional education and continuing education, the demand for further development is substantial. In Sweden there is an acute scarcity of certain professions in rural areas: in particular teachers, health care professionals, and pharmacists. The Pharmaceutical Science programme was initiated in response to a request by the Swedish pharmacy chain *Apoteket* to aid in their recruitment of pharmacists in northern Sweden and also to meet with the needs of the biotechnology enterprises in the region for qualified staff. In order to educate learners already living and working in more remote areas, it was necessary to create a web-based, distance programme enabling students to study without having to disrupt their lives by moving to a university campus.

Web-based distance education has many advantages to offer the adult learner such as flexibility in time and space and the provision of access to higher education for new groups of students. However, distance education also has several shortcomings. Dropout rates are often high and distance may be expressed not only as a geographical but also a psychological barrier: not meeting tutors or peer learners may create feelings of isolation and alienation.

Research has shown that collaborative learning may be one method of bridging the isolation of the distance learner. A study by Benbunan-Fich and Hiltz (2003) shows that outcomes of web-based courses improve when courses are structured in a way that supports the growth of a learning community. Collaborative learning and active participation online were found to be strong mediators of the outcomes of online courses. A structure of local and online tutors was therefore envisioned to provide students on the Pharmaceutical Science programme with the necessary support to improve learning and reduce attrition.

In a recently published dissertation, Svensson (2003) has studied how distance students interact with each other in the social learning environment, for example, at learning centres. His research also provides evidence that the learners' motivation is not only dependent on the learning task concerned, but is also dependent upon the socio-emotional climate of the learning environment.

In Sweden an increasing number of local learning centres are evolving as the foci of education networks for both higher and further education. Roos (2000) and Rennie (2003) have demonstrated the pedagogical and organisational advantages offered by local learning centres and the importance of local learning centres in recruiting "non-traditional" learners unaccustomed to academic study and unfamiliar with the technology involved in web-based learning. An initial survey into the category of learners expected to study on a web-based Pharmaceutical Science Programme indicated that they would most probably be older than the average student, rooted in their present residential area and come from a non-academic background. It was therefore decided at an early stage that for students not choosing to study independently, local tutors and learning centres should be utilised to facilitate the creation of a learning community. In the case of the independent students online tutors were provided to support students and promote a sense of community.

Learning environments for professional education must support the achievement of both generic skills, such as communication, IT-literacy, collaboration, critical thinking and problem solving and also that of discipline-specific skills. When taking part in web-based education, students also develop competency in areas such as computer literacy, Internet use and other software used in the programme. Skills such as the ability to access online information, electronic prescriptions and Internet communication with customers living far from the nearest pharmacy are becoming increasingly important in working life in Sweden. For students on the Pharmaceutical Science programme, professional competency is facilitated by workplace learning placements in the field and by contact with local tutors, who are qualified pharmacists.

The purpose of this paper is to describe the development and implementation of a distance programme in Pharmaceutical Science and to consider how the use of new media affects teaching staff.

1. Description of the programme

Taking all factors into consideration, it was decided that a web-based distance programme using a support structure of online and local tutors would be the most suitable solution for the Pharmaceutical Science programme.

The programme is almost entirely web-based, however students may participate in local study groups centred at learning centres or study as individual distance students not linked to any particular locality. Independent of to which category the student belongs, digital course materials are delivered using a learning management system[1] (LMS). Teacher-student communication and student-student communication are also enabled by means of the LMS as is the delivery of lectures, seminars and tutorials. All study groups including those studying independently are assigned an experienced pharmacist as tutor. The students also have access to teachers and experts at the university throughout the programme using ICT (web cameras[2], chat rooms, discussion forums, etc.). No detailed previous knowledge of computer use is necessary. Instruction in the necessary technology and software is provided during the introductory course on campus.

Students participating in local study groups gather once or twice per week for group discussions or question sessions at the local study centres. In addition there are meetings at the local centres for certain obligatory elements of the course. Students studying independently meet their tutor and have the opportunity to ask questions via Internet using both text messaging and web cameras. There are also two to four meetings per term at the university in Umeå for laboratory training and practical work.

The programme includes ten weeks practical experience at a pharmacy, with the assistance of an experienced pharmacist or dispensing chemist as tutor. There is also a final thesis, carried out at a pharmacy, hospital, research institute or in the pharmaceutical industry. The programme leads to a degree in Pharmaceutical Science.

2. Development of the programme

Umeå University is one of Sweden's leading universities with regard to distance education and the implementation of ICT in education, and has a well established technical infrastructure for the delivery of net-based education. However, the development of the Pharmaceutical Science Programme required considerable planning since it involved staff from different faculties and departments within the university, and for the majority of teaching staff was a new way of working. A programme planning committee, consisting of representatives from the various university departments involved, the pharmacy chain *Apoteket*, learning centres, students and pharmacists was responsible for the overall structure and content of the programme.

[1] A commercial LMS, Ping Pong developed in Sweden by Partitur is used. http://pingpong.se/index.en.html

[2] The communications software Marratech is used http://www.marratech.com/

Designing a net-based programme is a complex process involving many separate activities:

- in-service training for teaching staff involved in the production and implementation of the programme;
- the development and production of web-based materials;
- technical support for both staff and students during the delivery of the programme;
- quality assurance, maintenance and revision of course modules.

Responsibility for the co-ordination of the development of the programme was assigned to the Centre for Educational Technology, a joint resource for the university in the implementation of ICT. Continual evaluation of the programme and the courses involved has been carried out by the Centre for Regional Science (CERUM), Umeå University.

2.1 Staff development

An in-service training programme was offered to all staff involved in the programme, thirty teaching staff in all. This induction programme consisted of three phases: a workshop on the background and development of the Pharmaceutical Science Programme, a series of seminars on, among other things, online collaboration, video streaming, simulation and visualisation and legal questions concerning copyright, and finally practical training in the technology to be used; the LMS Ping Pong and the communication tool Marratech.

2.2 Development of materials

In order to develop the courses to be included in the programme and produce web-based modules to be delivered over a period of three years, a large-scale development project was required, where content experts, personnel working within the pharmaceutical industry, pharmacists, educational technologists, web designers and technicians all acted together as a team.

Subject experts and teachers were appointed by the Director of Studies to guarantee the qualitative level of course content. They defined the content of the course and also suggested a structure. A storyboard and script were then produced in collaboration with educational technologists from CUT, which was used by web technicians and designers in the production of course modules.

The web modules contain not only text and illustrations but also interactive exercises, tests, streaming video, visualisations and simulations of processes. Great care has been taken to ensure best possible usability and to adapt the material both to the subject matter and students studying on the programme.

2.3 Technical support

Technical support was provided for staff both prior to and during delivery of the programme. Students enrolled on the programme received instruction in the technology and software to be used during their introductory course on campus. For students studying at learning centres it is also possible to receive support from technical staff at the learning centre. Telephone support is also available for all students and staff.

2.4 Quality assurance, maintenance and revision of course materials

The modules produced were tested by students and teachers before implementation in the programme. Further, a schema for the continual evaluation and revision of course modules during the lifetime of the programme was devised and implemented.

3. Results

All results are based on questionnaires and interviews carried out with teachers, tutors, technical staff and management as part of the evaluation carried out by the Centre for Regional Science, CERUM (Nordström & Englund, 2004).

3.1 Staff development

When interviewed the teaching staff of the Pharmaceutical Science Programme indicated that despite having little previous experience of online teaching, few had chosen to participate in the series of seminars intended to introduce them to the methods and pedagogy of net-based learning. The most common reasons given for non-attendance were time constraints and the fact that the seminars were too general and not sufficiently "hands-on" to be of interest. Finding time for competence development is a common problem for university lecturers where research, teaching and administrative duties all have to be balanced against the need to develop new skills and competencies. It is therefore perhaps not surprising that staff choose only to attend seminars considered to be essential. This should be compared to the more practical training provided in the use of ICT technology, where participation was almost 100%.

For the sake of coherence, it is essential that teaching staff on the programme have a common attitude to teaching and learning. More time needs to be devoted to developing not only technical skills but also attitudes to online learning. It is obvious from the evaluation results that the provision of seminars is not the best way of achieving this.

On-going, peer supported learning about effective distance teaching practice is viewed by many as being an effective solution to staff development, providing collegial support for teachers venturing into online teaching for the first time (Burge & Rourke, 1998). Team teaching or even more informally the 'vicarious experience' of staff watching their colleagues who are teaching online could also be a solution. Conversations and discussions concerning online pedagogy and practice in an informal setting can be a more successful method in changing attitudes and motivating staff who are more used to traditional face-to-face teaching than seminars and formal in-service training sessions.

Many of the teachers involved expressed an interest in having a 'mentor' or more experienced colleague to provide support and discuss problems with in the initial phase of their online teaching. Learning "on the job" was seen as being preferable to attending seminars prior to beginning teaching. How this should be organised and how the mentors should be compensated for their time is a problem yet to be solved.

A positive spin-off effect from the development of the net-based Pharmaceutical Programme has been the increased willingness of staff to use ICT in other areas. When interviewed, the majority of staff expressed a positive attitude to using ICT in the future either as a complement to more traditional methods of delivery in campus-based courses or in stand-alone short courses for industry. An increase in flexibility not only for the student but also for staff was frequently stated as a positive attribute. The pedagogical possibilities provided by simulations and animations to illustrate complicated processes, and the possibility of reaching new student groups were also considered positive aspects of net-based learning.

3.2 Development of materials

Distance or net-based education challenges current ideas of power and control in higher education. Traditionally, teaching staff have control over the content of the knowledge they distribute, but in net-based education it is necessary to collaborate with other staff such as educational technologists and technicians and materials become more open to scrutiny. This loss of control may help to explain why some staff reacted in a negative fashion to working as a team member in production. Several expressed frustration at not being able to edit content freely and were unenthusiastic about handing over material to technical staff for production.

Initially, not all teaching staff were aware of what is involved in planning and implementing a web-based course. At worst the attitude was that it is just a question of re-packaging existing materials or eventually recording lectures to be delivered digitally. The necessity of adapting material for net-based delivery and taking the needs of the student populations into consideration were not always obvious to teaching staff, making co-operation with more experienced educational technologists essential. Inexperience in estimating the time needed to develop and deliver material for online delivery also caused problems in keeping time schedules and holding deadlines for the production of material. This was a problem for many staff members but also for the technical production team.

The successful development and implementation of a net-based education depends on the integration of a variety of activities that all need to work together; a management structure that controls and co-ordinates the various activities or sub-systems is necessary. In the case of the Pharmaceutical Science Programme this role is taken by the planning committee.

3.3 Technical support

The technology used offers increased possibilities but also places heavy demands on the users. Technical support is a crucial element in the success of online teaching and learning; it is a well-researched fact that if the technology does not function from the start and sufficient support is not available students and staff soon lose motivation. Results indicate (Nordström & Englund, 2004) that on the whole technical support has functioned well and that staff perceive the existence of a well-functioning technical infrastructure as a positive factor in the delivery of the programme.

3.4 Quality assurance, maintenance and revision of course materials

Despite the existence of the planning committee, the roles and responsibilities of the parties involved were not clear initially. In particular the role of the tutors proved problematical. The original idea was that they should provide social support for the students and function as a link between students and teachers. Further, the tutors were to provide a valuable connection to the profession of pharmacy. However, over time the tutors' role as teachers also became more important. This is perhaps a natural consequence of the fact that many of the students on the programme needed extra support in the subject and that teachers were dealing with relatively large numbers of students. In this respect the tutors provided valuable relief for teachers and improved the quality of teaching.

The lack of clarity in roles and responsibilities also had a negative effect on the quality control of course material, where it was unclear where the final responsibility for the overall quality of content lay. This is especially important in a programme where materials are produced by many different authors but the programme must form a cohesive whole, with uniform quality in both content and delivery. This problem has now been alleviated by the documentation of roles and responsibilities for teaching staff, tutors, production staff, administration and management.

The creation of routines for the evaluation and revision of course modules is also essential, as is the question of financing not only during the development phase but also throughout the envisioned lifetime of the programme.

4. Conclusions

In common with MacDonald & Thompson (2005) we would like to emphasise that the successful development and implementation of high-quality net-based programmes and courses requires that they are part of a systematic integration of technology into the education system of the university. Online teaching needs be supported through systematic and well-organised faculty initiatives and ample opportunities for teaching staff to improve their competency in ICT.

The introduction of online teaching changes roles, demands new skills and often new attitudes to teaching. It is frequently at odds with established norms for measuring workload or allocating finance, and when programmes are spread across several faculties and departments it can bring to light differing cultures and practices. Developing and implementing a net-based programme is not just a question of developing course material; a technical infrastructure, support structure, in-service training for staff and routines for maintenance and delivery are also needed.

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LIVING THE E-CAMPUS DREAM

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Introduction

In 2003 institutional strategy of the Faculty of Electrical Engineering and Computing, University of Zagreb, called for establishment of IT infrastructure, which would be capable of hosting and delivering online courses and synchronous communication and collaboration. The first implementation of this strategy saw daylight in early 2006, as the development of the new Content management system (CMS) of the Faculty was completed, and integration with other IT systems went from the testing phase to production. The entire integrated infrastructure was named E-Campus.

For some, E-Campus is still a futuristic idea. For others, it's the name of a new project. But for the Faculty of Electrical Engineering and Computing, largest technical faculty in Croatia, it has become a daily routine and yet another way of communication and collaboration of teaching staff, technical support and students. A common misconception is that E-Campus is all about choosing the right Learning management system, selecting the appropriate Student information system or Content management system. All that is very important, of course, but the most important thing is to connect all these pieces together. Even when selecting the best software products, it is necessary to check whether they satisfy all the needs. The question that everyone should ask is: have the developers of the selected software predicted all the needs of the E-Campus users at a certain institution?

Examining the E-Campus puzzle

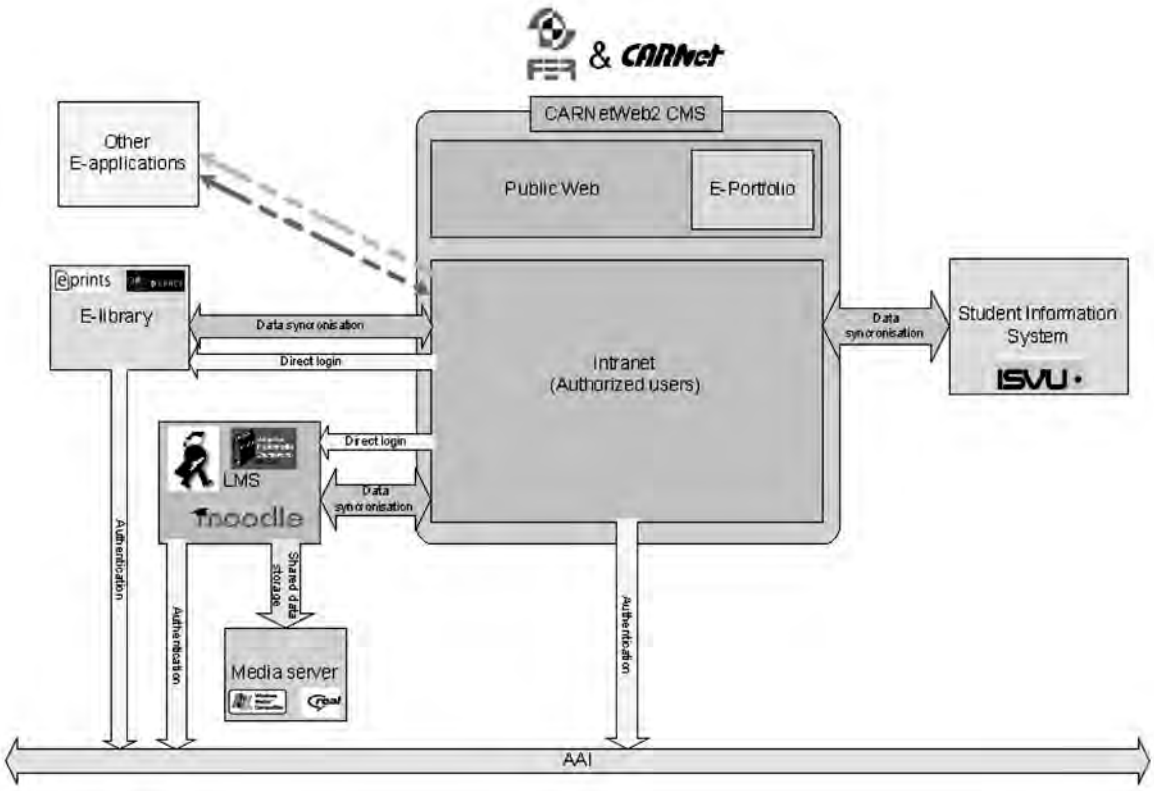

Figure 1. E-Campus model developed at the Faculty of Engineering and Computing, University of Zagreb

It is often not possible to find software that can do everything that is needed exactly the way an institution wants it. In such cases it is best to do it in-house or to have it custom made. Building an E-Campus is a lot like building a real brick-and-mortar campus. It's better to call experts than to guess how thick the walls should be or how deep the foundations should go. During more than two years of development, many experts in all required fields were consulted. Solutions, especially those in the Open Source domain, as well as open standards and protocols were carefully examined.

Current version of the E-Campus deployed at the Faculty consists of eight main elements:

- **Content Management System (CMS)** which serves as a public Web server, intranet and teacher and student portal
- **Student Information System (SIS)** which provides complete student information infrastructure and information about all the courses that are available at the Faculty
- **Learning Management System (LMS)** which provides space for all course materials, quizzes, polls, grading, wikis, forums and chat
- ***E-Library*** which provides space for e-books and materials shared between courses
- ***Media server*** which provides necessary infrastructure for delivering streaming video and audio components of courses
- **E-portfolio** which is completely integrated in the Content management system, as a module
- **Other integrated e-applications** which handle various tasks such as room and item reservation, department intranets, other smaller applications and make room for large scale applications such as financial, HR and procurement software
- **Authentication and authorization infrastructure (AAI)**, used by all E-Campus elements to ensure Single-sign-on.

Selecting the pieces for the puzzle

Content management system (CMS) plays a central role in process of integration of all elements in the E-Campus. It not only presents all information to users from different systems in a unified way, but also handles necessary conversions and notifications between the systems.

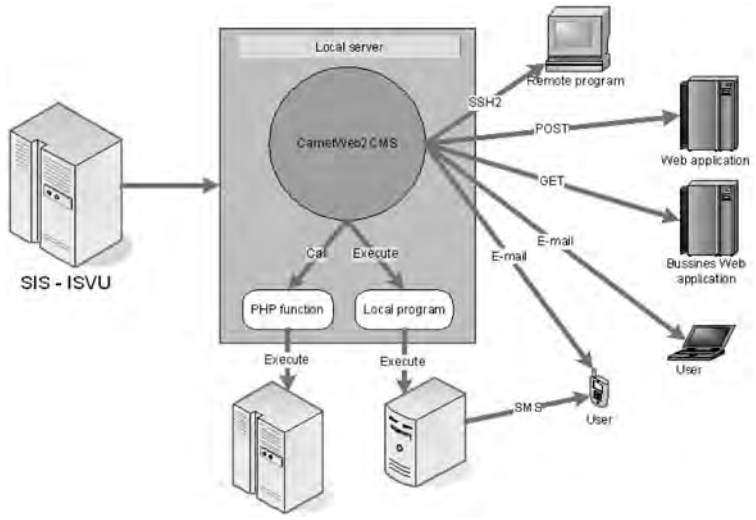

Figure 2. Integrating data from SIS with other elements of the E-Campus

Due to the importance of this part of the system, it was necessary for the Faculty to have complete control over it. Apart from control, it was important that the CMS is designed for academic purposes and not for general use. Therefore, a decision was made to develop a new CMS that could provide all that was needed and still be focused on students and their learning.

The Student information system (SIS) had already existed at the institution and its data and functionalities were integrated into the E-Campus. It wasn't necessary to change SIS since CMS was able to extend its functionalities with its integration and notification capabilities. The integration layer of the CMS also ensured that even in the case of major changes to the SIS, data exchange between the CMS and SIS would still be possible, with only smaller changes of the integration layer.

In the case of Student information system, the Faculty had to decide to use only one system. But the Faculty does not have to be limited to only one Learning management system (LMS). It is a common practice today for institutions to select only one LMS, to avoid problems with integration and to simplify user support. This kind of approach often does not allow for needed creativity in development of online courses and in online tutoring.

In order to achieve the integration of multiple similar systems it was necessary to design and develop a special integration layer. The layer speeds up the integration between LMS and all other parts of the E-Campus using a well-defined protocol for establishing communication and data exchange. Multiple levels of integration with LMS are available and therefore even custom made LMS's can be easily integrated into the E-Campus.

Currently E-Campus is integrated with three different LMS's: one of the leading commercial systems WebCT, using WebCT API, one of the most popular Open Source solutions, Moodle, using self-developed IMS API and home-grown AHyCo LMS. There are plans for integration with even more LMS's when they become necessary.

E-Library enables the teaching staff and librarians to store digital books and represents an electronic expansion of the existing Faculty library. For this purpose, the Faculty selected a well-established Open Source E-Library, which has a capability to be integrated into the E-Campus. The current plans for integration include EPrints and DSpace.

Media server enables the teaching staff to store and distribute streaming audio and video materials such as SMIL presentations or video streaming of previously recorded courses. Since there are currently no high-quality Open Source streaming servers available, it was decided that Windows Media Server and Real Media Server would be used.

E-portfolio presents achievements of each student. It contains all the information that a student wants to display publicly. The information about a student is automatically generated from the courses they are enrolled in and grades they were awarded, but can be extended using several free form fields. The data which a student does not want to be public is not displayed on this page.

Authentication and authorization infrastructure (AAI), used by all E-Campus elements to ensure users Single-sign-on is done using synchronized LDAP and Active Directory servers, due to historical reasons and the Faculty needs.

All these connected elements form the base of the E-Campus. But these are not all the systems that are included into the E-Campus. There are a lot of smaller and larger systems that provide smaller amounts of information such as reservation system, phone book or simple weather report. All these smaller systems expand the E-Campus with additional functionalities that are necessary for better teaching, and learning.

E-Campus and its integration layers enable many departmental and student projects to connect their applications to the E-Campus, use the AAI infrastructure, data and reporting simply and securely.

Connecting the E-Campus

Properly connecting all the elements of E-Campus is a challenge. Although it may seem that nothing more than implementation of a few protocols and synchronization of a few databases is needed, it takes more than that. As user requirements start to grow, it is important to select internationally accepted protocols and open standards, such as those by IMS.

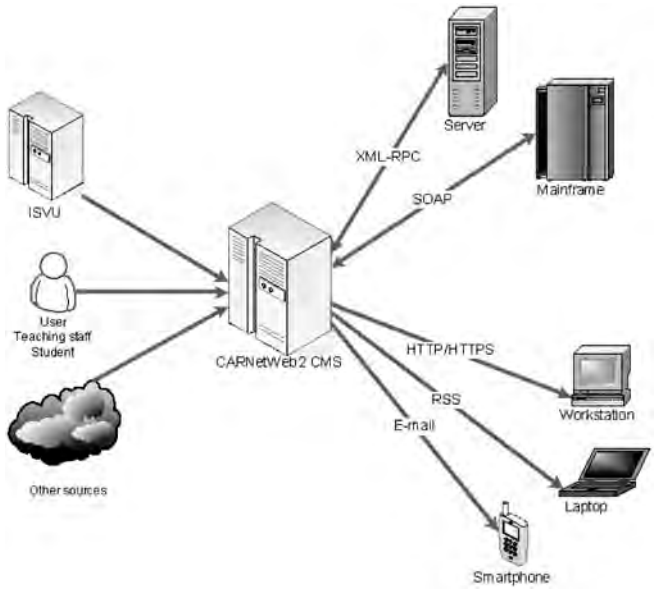

Figure 3. Connecting the E-Campus with the world

It is also important to decide what type of information will be available for E-Campus as well as the source of information. Some information may be provided by more than one system. For example, if the institution uses more then one LMS, it is necessary to retrieve student results from all the LMS's. In addition, some systems share similar data: LMS and SIS both keep information about students that are enrolled into a certain course. In such cases, it is important to understand how both systems work and retrieve only part of data from each of them.

Data synchronization is done by using the CMS as the central point of synchronization. Since most systems cannot establish all required connections with other parts of the E-Campus, it was necessary to form a data exchange layer that enables CMS to communicate with all the systems. Two separated systems can then communicate using the CMS as a central point.

Currently, two systems cannot exchange data directly using the developed layer for integration, but can send notifications to the CMS, which can then send the notifications to other systems that form a part of the E-Campus. One example of this would be a notification from SIS about a newly enrolled student. SIS notifies the CMS about the new student and sends all the necessary information. CMS sends segments of received information to all the other systems within the E-Campus such as LMS and E-library, where the account is automatically created for the new student. It is also possible to send e-mail notifications to users in order, for example, to notify the system administrator about the new user.

If all the systems within the E-Campus are properly connected, at the beginning of a workday the administrator will receive only the information about what was done during the night or the previous day, without any need for intervention. In the case of large-scale problems, it is possible to send urgent e-mail notifications to the administrator of the system, to administrator of the E-Campus or even to the Faculty management in order to solve the problem as soon as possible.

Using the E-Campus

The established E-Campus should provide its users with a simple and intuitive place, which will enable them to easily switch between systems without having to repeatedly go through the authorization procedure. However, E-Campus is not only about using the Single-sign-on procedure to switch between systems. It also enables the users to check the status of one system from one of the other systems, as well as see all the important information in one place.

E-Campus, as implemented on the Faculty of Electrical Engineering and Computing enables the teaching staff to automatically open new courses, enrol students into them based on enrolment data from the SIS, add new teaching staff as "Teaching assistant" or "Designer", even to view student scores

and final grades directly from the CMS. All this is implemented using the LMS integration layer which provides similar functionality for WebCT, Moodle and AHyCo.

All information, regardless of the course it came from, is displayed in a unified way within the CMS and is already compiled into a report that is the most suitable for academic purposes. This means, for example, that it is not necessary to switch from SIS to LMS just to check whether all the students are enrolled or to add a new teacher on a course. The teaching staff can as much as check student grades from within the CMS without ever entering the LMS and going to the grading module.

One of the most important things when thinking about the E-Campus is a similar user interface. It is not possible to change each system in the E-Campus so that they all look and feel the same, but it is possible to display their most important data in one place, merged with all the data that is available from other sources. Using this approach makes it possible to create unified user interfaces. For example, administrating teachers on a course in different LMS's can be done using the unified user interface. All these interfaces look and work in the same way, but they are all connected to different databases and LMS's, using different protocols. In E-Campus, the user doesn't need to think what kind of LMS, database or operating system they are using. The most important thing for the user is to be able to use the LMS for learning or teaching, to be able to access all the important information fast, and see all the important data in one place and in a way that is the most appropriate for a certain type of data.

This is the goal of E-Campus and when achieved it provides all users with a new and different way of looking not only at the Faculty but also at the way of studying.

Conclusions

The most important parts of the system are already available on the market. It is possible to select between various ready-made Learning management systems, Student information systems, Content management systems and all other systems that are ready for learning. But only selecting, buying and installing them will not make users really use them or enjoy doing it.

Users will use a system that enables them to achieve a certain goal faster and more easily. It is easier for students to simply click on a few links and access the E-library, than to physically walk to the library. But if they need to fill in a dozen forms just to be able to access the E-library for the same book, they will just go to get the "real" copy instead.

The same principles apply to teaching staff. If it is easy to send an e-mail to students that office hours will be held at noon next Monday, they will have no need to use any other media channel. But when E-Campus enables them to simply pick the date and time of office hours on a Web calendar that already contains all their other tasks, and afterwards sends all the necessary formal e-mails, notifies SIS about the time and posts a note on the public Web server, they will definitely use this kind of infrastructure instead.

E-Campus is not about forcing the user to use the technology just because it lowers the cost of printing or because it is a new trend. It is about being able to do things more efficiently.

In order for E-Campus to work this way, it needs good IT foundations and state-of-the-art integration layer. E-Campus does not only send information between different systems, but also knows how to interpret, handle and report it. It is able to expand by using the results of various projects and ideas, and to incorporate them into a continuously growing, yet simple to manage system.

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E-LEARNING EXPERIENCE AT THE DEPARTMENT OF CONSTRUCTION ECONOMICS AND PROPERTY MANAGEMENT OF VILNIUS GEDIMINAS TECHNICAL UNIVERSITY, LITHUANIA

Natalija Lepkova, Silva Rimkuviene, Vilnius Gediminas Technical University, Lithuania

1. Introduction

Distance learning has evolved over the past two centuries from correspondence courses to educational radio, one- and two-way teleconferencing, educational television, video conferencing to computer assisted/Web-based interactive learning opportunities. Yet, with all the technological changes that have evolved in distance learning, there have been few changes in the reason why distance learning exists. Distance learning is intended to offer useful learning opportunities to people at a time and location convenient to them [1].

Distance learning is a process of teaching-learning in which the learner is physically separated from the teacher. The geographical distances involved may be relatively small, or very large. Most definitions accept that there may be a degree of physical interaction between teacher and learner, but in comparison with the normal classroom experience the actual amount of face-to-face contact is usually much reduced or even non-existent. Because of this, the teacher develops a range of learning materials to impact knowledge, skills and attitudes to the learner. The presence of such technical media (print, audio, video, computer-based) is a distinguishing feature of distance education. Students study these materials, generally alone, at times and in places of their own choosing. There are arrangements to test their knowledge, skills and attitudes through assignments that are sent to a tutor for marking, or marked by computer [2].

The systems model for distance education is shown in Figure 1.

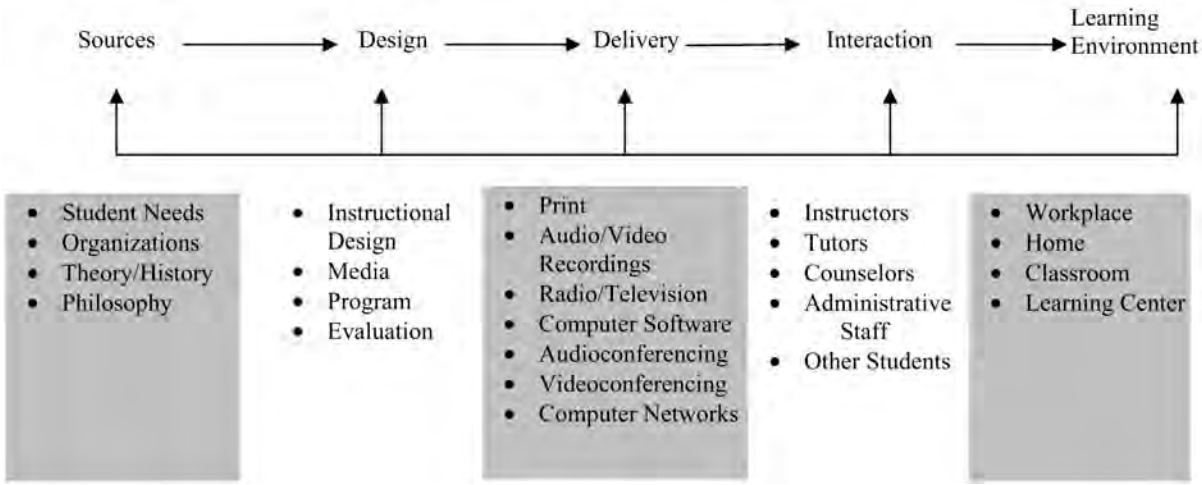

Figure 1. A systems model for distance education [3]

In the period from 1991 to 2003 new technologies were developing at an enormous rate. As a result of introduction of such new modern technologies, distance learning has also undergone some rapid improvements, various distance learning media (WebCT, Learning Space, BlackBoard, etc.) have come into existence, computing capabilities have risen up thousandfold and students are now given an unprecedented opportunity of completing their studies without travelling to their universities [4].

The newest document "eEurope 2005. An information society for all" stresses that in 2005 Europe must have:

- Modern public services with direct access (online):
  - e-government,
  - services of e-learning,
  - e-healthcare,
  - dynamic e-business environment;
- Universal access to broadband internet at a competitive price;
- Safe information infrastructure.

E-learning is a new challenge of lifelong education in the globalised market [5, 6].

2. Development of distance learning at Vilnius Gediminas Technical University

The distance learning courses at the Department of Construction Economics and Property Management of the Faculty of Civil Engineering of VGTU were introduced in September of 1999. 27 students from all over Lithuania were accepted onto the Real Estate Valuation program. Most of them were people working in the real estate sector. Over the period of four years this study program has been renamed once (in 2001 its name was changed to "Real Estate Valuation and Management") and its content and scope have also been subjected to changes. Since 2003 the Real Estate Valuation and Management program contains two major subjects: Real Estate Management and Internet Technologies and Real Estate Business. Since 2000 students can enrol in Construction Management distance learning course selecting Construction Economics and Management as a major subject [7].

All program materials are available as printed program notes which are enhanced, where appropriate, to take advantage of modern teaching techniques and delivery mechanisms. In particular, the following media are used in specific modules: electronic format of the textbooks, video, computer software, computer learning systems, computer conferencing, computer networks, 'face-to-face' contact. The choice of media is often relatively easy to make because for much of the time, local constraints, questions of accessibility and of cost virtually dictate the media through which learners will have to work. Accessibility is vitally important to any learners who have to use self-instructional materials.

Study materials are prepared with reference to Great Britain, Germany, the USA and other countries' experience [8].

The present paper analyses the problems of the learning process, the social, economic, moral issues related to the labour market integration of trained professionals.

At the present time the distance learning division of the Department of Construction Economics and Property Management has 220 graduate students from Lithuania.

3. Questionnaire-based survey

In order to clarify a number of issues related to the study process (first and foremost the student motivation, issues related to the quality of study materials, reaction of social environment, etc.) a survey research was conducted.

125 respondents were selected from those who have already completed their distance study programs and those who are still studying. The respondents were asked to answer the questionnaire which contained the following main parts:

1. Social aspects of studies;
2. Analysis of the study materials.

As can be seen from Figure 2, even though students enrolled on distance learning course are people belonging to different age groups, the majority of them (roughly 45%) are young men and women under the age of 25. Sometimes people 37 years of age and over also decide to enroll in a study program and they account for 25% of respondents.

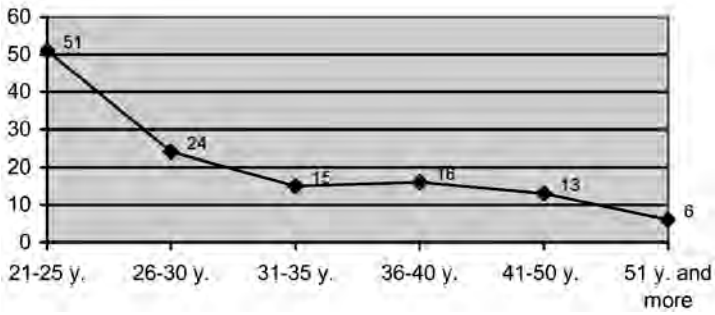

Figure 2. Distribution of respondents by age groups

The distribution of respondents by type of employment is shown in Figure 3.

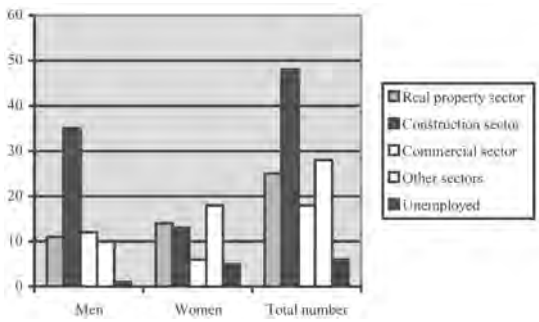

Figure 3. Distribution of respondents by type of employment

As can be seen in Figure 3, the overwhelming majority of respondents are employed. Only 6 of them (mostly women looking after their small children) are temporarily out of work. The greatest number of respondents (especially men) work in the construction sector. One fifth of those polled work in the real estate sector.

Student motivation and the purpose of studies form a very important part of the questionnaire. When answering these questions the respondents were permitted to indicate all motives which they considered important.

As can be seen in Figure 4, the overwhelming majority of those polled indicated that the most important advantage of distance studies is the opportunity to study and continue working at the same time, since this for them this was the only way to pursue studies. About half of respondents said they wanted to acquire an additional profession, improve their skills and get a better job in the future.

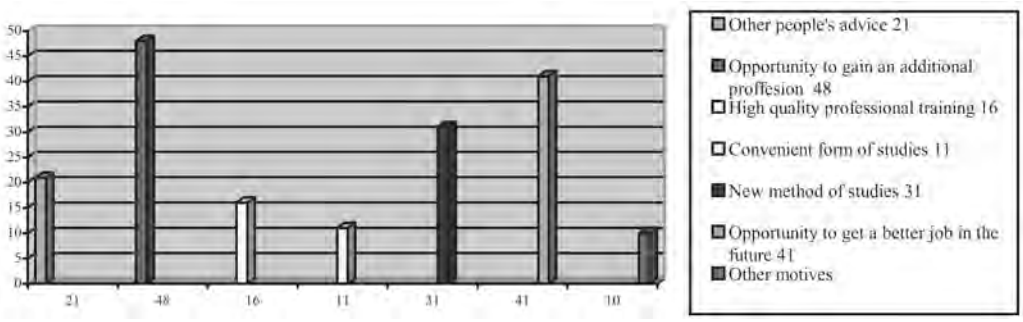

Figure 4. Distribution of respondents' by motives of studies

Majority of those polled indicated that their decision to choose this form of studies was determined mostly by the desire to get acquainted with the modern information technologies, save time, get regular access to most up-to-date information and fast communication. There are also other important reasons: flexible choice of academic subjects, good teachers and good level of professional training. Distance learning is attractive to the respondents also because it is a new and progressive form of studies.

As can be seen from this analysis, the Internet is considered the most efficient source of information. It was indicated by as many as 43% per cent of those polled. The second most popular source is other people's advice, the third – information published in newspapers, etc. (Figure 5).

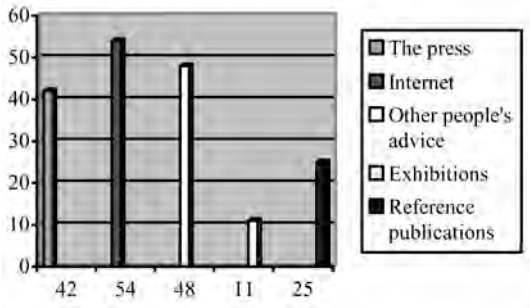

Figure 5. Respondents' opinions about the reliability of sources of information

We have reached the part dealing with very important economic problems. The questionnaire asked the respondents to answer these question: "Who pays for your studies?" As can be seen in Figure 6, the overwhelming majority (62 %) of those polled pay the tuition fee themselves, some of them get support from their families and 12 respondents indicated that it is their employers who pay their tuition fees. Interestingly, 5 persons have decided to take out the student loans.

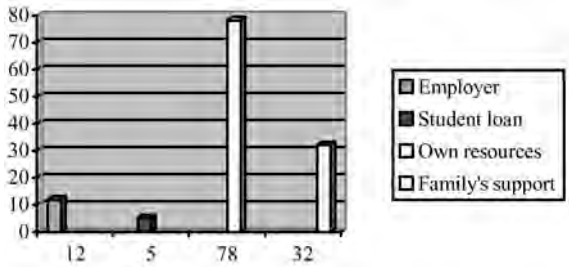

Figure 6. Distribution of respondents by the source of financing

The second part of the abovementioned questionnaire contained questions about the quality of study materials. It is worth noting that only second year students and those who have already completed the program of studies were asked to answer the questions of this part of the questionnaire. This group of respondents consisted of 98 persons (78.4%). Those polled had to indicate the advantages and disadvantages of study materials and, in addition to that, they had to assess the quality on a rating scale (Figure 7).

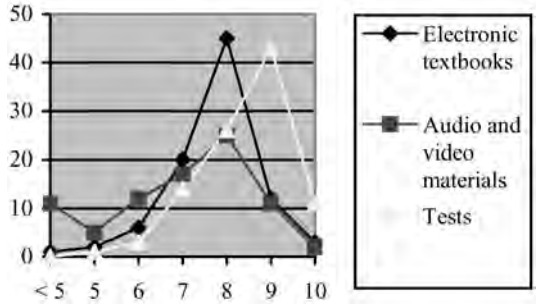

Figure 7. Respondents' opinions as to the quality of the study materials

A considerable part of those polled (31%) think that there is a lack of interactivity in electronic textbooks. Some other shortcomings have also been mentioned by the respondents, one of them being the lack of links and graphic information. On the whole, however, the level of electronic textbooks is considered quite high (average rating: 8 out of 10).

Most of the problems were found in the video and audio materials. As many as 40% of those polled think that this material is not comprehensive enough and video images are sometimes of poor quality.

The tests received the highest score. As many as 11 respondents gave them 10 points. With very few exceptions, they contained no faults.

While distance learning is getting more and more popular, testing problems become the topical. Since 2004 year the new developed intelligent testing systems in distance learning is applied. The system allows assessment of knowledge not only by the correct/incorrect answer, but also takes into account the time taken for a student to answer a question and the doubts appeared as well as the complex parameters.

Conclusions

Distance studies at VGTU are very popular – over the period of 6 years the number of students has risen 8,2 times.

People under the age of 25 account for 41% of the student body; 25% of the students, however, are over the age of 36. The overwhelming majority (95.2 %) of those enrolled are employed.

The main sources of information on distance studies are the press, the Internet, friends' recommendations, advertising materials and exhibitions.

The students gave the highest score to the tests. Electronic textbooks received the second highest score. Those polled indicated that they found some faults in video and sound materials.

These are the main advantages of distance learning: convenient form of studies; an opportunity to get acquainted with new information technologies; saving of time; fast communication; flexible choice of academic subjects; good professional training.

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GLOBALISATION – AN OPPORTUNITY FOR THE 'UNEDUCATED' TO BECOME 'LEARNED' OR FURTHER 'EXCLUDED'?

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1. Introduction

In as much as online and distance learning may be seen as a strategy for dealing with globalisation, in terms of the flexibility it offers, it can also be seen as a product of, or simply a manifestation of globalisation. Given that much flexibility is facilitated not alone by organisational changes but also in a large part by advances in communications technologies, this in turn enables the development of innovative learning practices. These advances allow (or indeed drive) educators to seek out niche markets for their products (Perraton, 2000, p. 166), the result being that "distance education makes it possible for students anywhere who have Internet and Web connections to enrol in online courses" (Darkwa and Mazuboko, 2000). However, as not all students or indeed potential students around the globe have access to these advanced communications technologies, the extent to which globalisation includes or serves to exacerbate exclusion must be considered.

2. Globalisation and the Exacerbation of Inequality

In her writings Hoogvelt suggests that globalisation "has brought qualitative changes in all cross-border transactions" (Hoogvelt, 2001, p. 121). These changes are characterised by time space compression, a phenomenon enabled by advances in communications technology, of these primarily the 'internet' which has "brought about the ascendancy of 'real time' over 'physical time'". Hoogvelt suggests that "in this global, real time, economy, even more people, segments, areas and regions of the world economy are systematically becoming excluded from it" (p. 121). Hoogvelt's view therefore is that globalisation is producing exclusion and inequality of opportunity, with those regions of the world that are more developed being included in the 'new economy', and those that are less well developed becoming increasingly marginalized. She explains this in terms of the deepening rather than the widening of capitalist integration – world capitalism which was traditionally characterised by the expansion of trade and investment across the globe is now characterised by a deepening of activity only in particular regions of the globe, i.e. those that are already well developed (Hoogvelt, 2001). Even though Hoogvelt sees online and distance education as having the potential to address the unequal outcomes of globalising processes, not all writers would agree. Others see flexible modes of education more as a product of globalisation, attainable primarily through advances in communications technologies, a product which simply reinforces the effects of globalisation as opposed to offering solutions to the problems of exclusion and inequality created by globalising processes.

3. Communications Technologies

3.1 ICTs and The Information Age

Castells (1996, 1997, 1998) has written extensively about the emergence of new global social systems resulting from global transformations. According to Castells these transformations have lead to the birth of a new form of capitalism (Stalder, 1998). In Castells' view, "technology is society and society cannot be understood or represented without its technological tools" (1996, p. 5). In this way social changes and technological changes are intimately related (Stalder, 1998). This new informational mode of development is seen as a "flexible, pervasive, integrated and reflexive, rather than additive evolution" (Stalder, 1998). As the new economy is seen as both informational and global, it serves the purpose of restructuring economic activity, resulting in a 'space of flows', made up of technology, places and people (Stalder, 1998).

So, while changes in the modes of educational delivery can be understood in terms of the changing nature of communications technologies, the 'space of flows' increases the potential for exclusion – places defined by nodes and hubs – virtual spaces linking actual locations and controlled by what Stalder refers to as the 'managerial elite'. Thus, while we may think of 'globalisation' as meaning the growing interconnectedness of the contemporary world, in reality it is only certain parts of this world that are becoming more interconnected, with 'slices' of the population being included (for example the 'managerial elite') and other more substantial 'slices' being excluded.

3.2 Technological Determinism?

Kellner (1999), on the other hand, suggests that rather than taking a view of globalisation as being driven by technology, it is more accurate to see the contemporary organisation of society as a "synthesis of capital and technology" or "technocapitalist" which "points to both the increasingly important role of technology and [the] enduring primacy of capitalist relations of production", therefore attempting to avoid notions of either 'technological' or 'economic' determinism.

Thus, Kellner's view of globalisation is a concept that generates contradictions between capitalism and democracy "a strange amalgam of both homogenizing forces of sameness and uniformity, and heterogeneity, difference, and hybridity, and of democratising and anti-democratising tendencies" (p. 7). Kellner identifies globalisation both as a driving force of capitalism ("globalisation from above") and as the opening up of opportunities for empowerment by "those groups and individuals who were previously left out of the democratic dialogue and terrain of political struggle", ("globalisation from below") (p. 8). He draws on examples of individuals who have fought campaigns successfully using only Web based technology. For example, Jody Williams, who won the 1997 Nobel Prize for her campaign to ban land mines described e-mail as "her most potent weapon" (Kellner, 1999, p. 14).

Globalisation then may be seen to be a homogenising force and yet at the same time something that allows also for diversity. But just how is this need for diversity impacting on educational provision.

4. Educational Provision in the Information Age

4.1 New Modes of Educational Delivery

With pressures mounting to maintain numbers, and to find alternative sources of income, many institutions have responded by recruiting students internationally as well as by working with local industries to provide suitable work based learning solutions. Haughey (2000) suggests that many organisations are now keen to develop learning cultures within their organisations. She gives UK Rover Group as an example. In 1981 Rover who wanted to improve production standards and encourage team working, entered into a partnership arrangement with the Manufacturing Faculty at Warwick University, and jointly the business and the educational provider developed master's degree programmes in manufacturing systems (Haughey, 2000, p. 26). The Company has since further developed its open learning packages and today offers video conferencing centres which are open to all workers who wish to pursue educational opportunities.

While flexible learning is enabling large corporations to increase their competitiveness, we must ask the extent to which current trends towards flexible learning may impact either positively or negatively on educational access, inequality and exclusion in different parts of the world.

5. Access, Inequality, Exclusion

5.1 Exclusion – Division within Societies

We speak of "feeding excellent courses to learners anywhere in the world, but who are these learners, and where in the world are they likely to be"? (Spronk, 2001) Spronk goes on to suggest that these 'excellent courses' are probably best suited to those learners who are already well-educated, who are proficient in reading and writing (English usually and to a high academic level), have access to computing hardware and software, have Internet connection, are computer literate, and have money.

> Given these requirements, we are in fact talking about a very thin slice of the world's population who are eligible to be learners in the world of Web education.
>
> (Spronk, 2001)

Spronk's study of marginalisation and exclusion examines issues relating to women's lived experiences. Her interest is in the opportunities for education open to women. In fact, in many countries across the globe potential learners are most likely to be predominantly male. Her source is the UNDP (United Nations Development Programme) Human Development Report 1999, which shows that in that year 38 percent of Internet users in the US were women, in Brazil the figure was 25 percent, in Japan and South Africa 17 percent, in China 7 percent, and in the Arab States just 4 percent (Spronk, 2001).

Other differences can also be drawn say between those with disability and the rest of the population. See Bolger (2005), who discusses some of the difficulties regarding Internet access by potential learners with disabilities. However, it is also important to note that organisations such as the WAI (Web Accessibility Initiative) are positive in that they promote 'good citizenship' amongst creators and users of Web materials.

5.2 Globalisation and the Developing World

In addition to differences within regions globalisation also produces differences between regions. And these differences are particularly marked in relation to educational delivery in the developing world.

While there is a widespread perception that education is becoming an international activity (Perraton, 2000, p. 153), different levels of participation in distance education are also apparent across the globe. For example when we talk of educational change as linked to globalisation, we think of flexible learning, the new partnerships between educational providers and businesses, and the potential for economic well being derived from such arrangements.

Perraton (2000, p. 168) however likens the situation in the developing world to "old-fashioned trade in advanced goods from rich countries to poor", rather than being related in any significant way to the processes of globalisation as we have come to know them.

As well as calling into question who the real beneficiaries of such initiatives might be, we must also ask whether the imposition of learning materials from different learning contexts are at all useful to developing countries.

5.3 Language as a Barrier to Learning

As Mayor & Swann (2002) point out English is spoken worldwide with "official status in over 60 countries" (p. 112). They also suggest that English is 'beneficial' as it is used internationally across several domains including commerce, science and technology (p. 113). So while English may be the most obvious choice then for course presentation, how might this lead to inequality and exclusion?

> The global spread of English (in which education through English necessarily plays a part) may be considered an 'imperialist' project, promoting the English language itself as well as 'western' educational values and practices.
>
> (Mayor & Swann, 2002, p. 113)

If this is the case then English may threaten other local languages. But that is not all. As "languages are viewed by socio-linguistics as symbolic practices that derive their meanings from layers of collective experience within a culture" (p. 115), the implication is that, not alone is English as a language potentially problematic but also the fact that English may promote certain values and cultures means that it imposes those values on other cultures, thereby threatening both minority languages and different cultures.

Mayor & Swann also suggest that because of the language/culture link, "for speakers in different global contexts, the same word may be differently meaningful" (p. 115). Global educational contexts therefore will be potentially problematic for, not alone speakers of other languages, but also speakers of English

emerging from different local cultural contexts. For example, studies by Goodfellow *et al*. (2001) found that assignment scores on the Open University's (UK) online MA programme, were lower for the 'linguistically and culturally 'other' group' than for students who were native English speakers.

6. Conclusion

Globalisation has changed the way that countries and regions around the world do business. Some see it as having eroded national boundaries, others see it as providing opportunities for greater levels of diversity. Seen as resulting in new forms of capitalist integration it has implications not alone in terms of greater potential for economic enhancement, but has also influenced social and cultural change.

Many of these changes are attributable to advances in information and communications technologies. Technology has accelerated time space compression, with the 'space of flows' now dictating the way in which much of the world does business. This includes distance education, which has responded by developing flexible learning opportunities, often in partnership with business.

Many challenges remain however. As globalisation fuels economic growth and prosperity around the globe, only a small minority reap the benefits. In terms of educational provision it has been suggested that those who are already 'educated' are the ones most likely to benefit. As work based flexible learning continues to grow, only those who are employed will benefit. And in terms of location, for those in the developing world the opportunities will probably either be nonexistent or simply the transference of learning materials from a different learning context, which in the long term will not be beneficial within local contexts. Exclusion may also be exacerbated for those within regional boundaries, for example women, or those with special needs.

In whatever way globalisation is viewed it will continue to be a force for change throughout the world, a force that will continue to impact on the way the world's 'uneducated' becomes 'learned' or 'excluded'.

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INNOVATIVE LEARNING FOR SOCIAL INCLUSION: EQUALITY AND DIVERSITY TRAINING DEVELOPED BY THE OPEN LEARNING CENTRE (GALWAY, IRELAND)

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Background

Throughout Europe, common themes have emerged in industrial development and employment practice in recent years. The impact of globalization, new technology and new forms of work organization are common issues for all countries. These developments have had immediate effects on how societies are structured and how competence development is viewed. The overall trend in European policy formulation has been to stress the need for new and dynamic forms of work organisation and structure as well as improved levels of competitiveness.

For contemporary industry, issues of diversity and equality have become pressing ones for a number of connected reasons. In this, industry reflects the demographic, social and cultural changes of the wider socio-economic environment. It also reflects the powerful challenges and struggles in the organization, structure and control of work and labour conditions that have emerged with globalization.

The current context of equality and diversity is concerned with the composition of the workforce in terms of multiple elements of identity – such as race, religion, gender, language or nationality. The nature of the modern labour market displays increased complexity and diversity linked to issues like:

- Migration
- Regional marginalization
- Disability
- Increased participation rates for women
- Changing nature of work (due to technological advances and improvement)
- Implications of legislation and human relations practice.

Diversity is no longer a peripheral issue but a central component of best practice in Human Resource Management and leadership skills. It is also a critical issue for effective management training and learning. The development of dedicated education and training courses on the topic has not been extensively developed in Europe. The development of a course in open learning format *(Equality and Diversity in the Workplace)* by the National University of Ireland, Galway, addresses this need. It also provides an accredited program for the first time in Ireland that develops the skills of trainers, managers and facilitators of learning.

Responding to Need

Human Resource Management specialists, in both Europe and the United States, have identified common themes for the management of diversity. These include:

- Best practice in the human resources development
- Maximization of the potential of new and existing labour market participants
- Reduction of social and economic cost in dealing with diversity
- Conformity to national or transnational legislative requirements
- Tapping into the creativity latent in diverse and non-standard work groups
- Innovative responses to inclusion, design and differentiated market sectors.

Managing diversity can be seen, at a minimum, as a tool to enable employers to adapt to challenges posed by differentiated workforces. In a wider context, managing diversity may be seen as a powerful resource to benefit from the change processes and to tap into levels of creativity and potential.

In European terms, management of diversity has been centrally linked to the enforcement of principles of equality among citizens and the prohibition of discrimination. While legislation varies significantly between all Member States, in most there remains a gap between the legal prohibition of discrimination and the actual outcomes for traditionally disadvantaged groups. In a globalized environment work is no longer a uniform progression of production and consumption. It is also an unfolding of a profound restructuring of all social, cultural, personal and ethnic relationships.

More progressive employers also recognize the crucial role the enterprise can play in providing leadership and learning. In highly competitive commercial environments, employers who promote learning and creativity have a greater chance to anticipate market changes, be flexible and respond to new opportunities. Employers who fail to use the creativity of the human capital on their doorstep will be likely to experience little growth in times of change.

Diversity, in Irish employment contexts, has been most effectively understood when positively linked with:

- Learning
- Creativity
- Problem resolution
- Change management
- Improved communications.

This has meant that the voyage of discovery around equality and diversity issues has become centrally linked to the *strategic learning needs* of employees. The learning of the organization is tied directly to the learning needs of each and every employee. That means a pro-active stance on the recruitment and retention of non-traditional workers and the removal of barriers to access.

Employers who see only cost implications in the recruitment of non-traditional workers or application of equality of opportunity mechanisms can, at the least, miss out on the extraordinary potential of thinking and acting in different ways.

Modern enterprises focus on a number of key issues which include the need for:

- Flexibility
- Cost-effectiveness
- Creativity
- Adaptability

Traditional responses to managing diversity and the inclusion of differing social groups have encompassed two aspects. On the negative side such an approach is seen as:

- Combating prejudice
- Reducing conflict
- Overcoming poor communications
- Containing time and cost implications
- Lacking relevance.

On the positive side such an approach can:

- Improve employee relations
- Locate new sources of talent
- Improve communications

- Develop flexible working
- Achieve legislative compliance
- Improve corporate image
- Develop better access to new export markets.

Structuring the Learning

Valued and meaningful work offers a sure and concrete way to assert the equality of all in producing wealth. The challenge posed was to enable employers to use *training and education* to bring their workforces into a deeper understanding of the potential offered by equality and diversity.

This addresses some of the disadvantages associated with social exclusion:

- Potential for conflict
- Difficulties arising from poor communications
- Prejudice
- Lack of trust
- Increased management and supervisory costs.

The National University of Ireland, Galway, developed a *Foundation Diploma in Training and Education (Equality and Diversity in the Workplace)* in 2003. This emerged out of dialogue developed by the university with employers, State agencies, training agencies and the community and voluntary sector. It was funded by the European Social Fund's Equal program. This also allowed the incorporation of transnational perspectives with the collaboration of partners in Finland and France.

From the outset it was decided that open learning would be the most suitable delivery vehicle. NUI Galway has extensive expertise in the field of open learning and has pioneered its application in work-based learning situations with employers and training environments throughout Ireland.

Established by NUI Galway in 1990, the Open Learning Centre has developed a wide range of accredited courses in training and education. These courses and programs now encompass a range from foundation level diplomas up to degree and postgraduate levels. The approach is innovative in responding to learner needs in a variety of employment and community settings.

A key focus has been on developing accessible learning environments and allowing students to develop independent learning skills. Open learning methodologies have been employed to develop the knowledge and skills of training professionals in line with best practice and European standards and competences.

Open Learning Centre programs benefit from established partnerships with FAS (the Irish national Training and Employment Authority) trade unions and other national partner organizations. Courses are aimed primarily at vocational trainers, educational consultants, human resource specialists and learning facilitators working in a variety of commercial and community contexts.

Open learning materials are developed by the Centre and allow students to learn at their own pace. Students also attend workshops and receive support from a range of professional tutors and academic staff. Activities and assignments are combined with original research projects.

The aim of the *Foundation Diploma* is to facilitate employment-based specialists to deliver training in their workplaces to address equality and diversity issues.

- The program introduces concepts of equality and diversity and their value in the workplace.
- Equality legislation is examined.
- Barriers and issues that prevent equality in the workplace are highlighted.
- Initiatives and case studies that promote best practice are examined and evaluated.

- Steps involved in developing policy are considered.
- Policy is related to competitiveness and innovation in meeting economic change.

On completion of the Course students have:

- Deeper understanding of equality and diversity issues and their relevance and application in the workplace
- Comprehensive knowledge of policies, procedures and legislation
- Understanding of difference, stereotyping and prejudice
- Understanding of diversity at work
- Skills to design and develop toolkits for work based equality interventions.

Participants on the Foundation Diploma benefit by:

- Updating and extending their knowledge and skills in equality training
- Improving their understanding of equality and diversity and relevant legislation
- Providing guidance on the development and implementation of equality policies and procedures
- Identifying measures and initiatives that promote inclusiveness
- Achieving a formal qualification in equality and diversity management.

Innovative Outcomes

The developed course was designed to provide a cohort of trained and accredited facilitators who could implement real change in their places of employment. It was also designed to permit wider accessibility to students through the use of open learning methodologies. Workshops were held in locations throughout Ireland. Case studies and models of best practice were tracked by academic staff and used to enrich the learning experience of participants as well as the learning networks that emerged from the course.

By 2005, 120 students had successfully competed the Foundation Diploma in Ireland. The course has now been mainstreamed as part of the education and training modules offered by NUI Galway. A strong network of enterprise-based specialists promoting inclusiveness and change has emerged. This has continued to produce learning initiatives in Ireland around diversity pioneered by the NUI Galway.

These learning initiatives encompass:

- Awareness programs
- Joint employer/trade union actions to combat discrimination
- Training supports for equality measures
- Access to further education and development avenues
- Coordination of State and private initiatives
- Measures targeted at SMEs (where real blockages remain)
- Applied forums around equality specific legislation.

The course has also attracted participants from partner organizations in France and Finland. Workshops were developed for employers in Helsinki (December 2004) and Paris (June 2005). The course has been delivered to community agencies in Kosovo.

To meet the challenges of legislation, employment equality best practice and the needs of a diverse and changing workforce organizations need to have trained and competent specialist staff. To provide organizations with the means to train their trainers and HR specialists requires a recognized quality program. Such training needs to be accredited and to provide a linkage to further development for those undertaking the program.

Equality and diversity are common concerns for employers and such a course also provides a valuable network of specialists employed in a variety of setting both public and private. Open learning methodologies mean that difficulties may exist in fostering awareness around attitudes. Nonetheless the method has enable a difficult and challenging subject to be delivered in a way that is meaningful, relevant and promotes enduring change.

It has also established a platform for NUI Galway to develop its expertise and research focus around social inclusion perspectives. This will ensure that future strategic development continues to combine innovative delivery methodologies with relevant learning materials that are academically reinforced and quality driven.

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INTERNET USE BY STUDENTS IN AN ATTEMPT TO SEEK HELP IN DEALING WITH SCHOOL VIOLENCE

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Internet as a Source of Help

During recent years many forms of online counselling have been established on the Internet. Different organizations including public institutions, governmental and non-governmental agencies, health insurance companies, for-profit and non-profit organizations are offering their services to the general public and to anyone in need of almost any type of assistance. Most of the counselling forums provide static information offering the help seekers various information ranging from basic to advanced knowledge about a phenomena, self guided and preliminary diagnosis, information regarding possible and different types of treatment, and detailed information on how to receive personal and professional treatment when needed (Grunwald & Busse, 2003). Other forums are dynamic information services in which help seekers can receive personal assistance based on their particular needs and requests. This means, for example, that the help seekers can turn to experts or share their needs, thoughts or experiences with a group via email, chat room or Internet forums and receive personal and immediate assistance or guidance.

Together with the growing possibilities for online assistance, studies suggest that many Internet users approach the Internet in order to seek assistance and receive counselling (Brozekowski & Rickert, 2001; Gould, Munfakh, Lubell, Kleinman, & Parker, 2002). In addition to the study of the Internet itself as a source for help, studies conducted in order to reveal the reasons for the growing use in online counselling also contribute to the knowledge of social scientists regarding the general reluctance of people to seek help (e.g. Israelshvili, 1999; Newman, 2000; Oliver, Reed, Katz & Haugh, 1999) and pointed to the main characteristics of the Internet as a meaningful and popular domain for help seekers. Thus, and maybe most important, the Internet provides people with the opportunity for keeping their anonymity and privacy while receiving assistance (Gould *et al.,* 2002). It also allows independence of time and place so that help-seekers do not have to be fixed firmly to certain agents, time or location, there are very low or even no costs at all for the help-seekers and there is great variety of help providers, information and rapidity of exchange of information (Grunwald & Busse, 2003).

Studies conducted in order to measure the contribution of Internet as a source for help, pointed to its possible positive effects on the help-seeker ranging from immediate relief and lower amount of stress to positive effects on the course of illness, the healing process and the long term effects such as improvement of resilience (e.g. Yager, 2001; Razeghi *et al*., 1998). However, despite the benefit that Internet users may have by using the Internet as a source of help, there is not enough research on both the extent of Internet use as a means to seek help and on the different problems that people approach to the Internet when they need help. The propose of this study was to revel the prevalence of Internet use by students in their attempt to seek help in dealing with school violence.

School Violence

School violence is one of the most serious social problems that has emerged in recent years. Violence occurs in almost all schools and the exposure to school violence has both immediate and long-term physical, emotional, and pedagogical effects on all students, school staff and the society as a whole (Elliott, Hamburg, & Williams, 1998). The 2001/2002 World Health Organization's Health Behaviour in School-aged Children Study (World Health Organization, 2004), conducted in around 40 countries worldwide, reveals the severity of school violence today. Thus, for example, it appears that around 34% of all students are being bullied in school grounds. The mean proportions for victimization by age are 38% in 11 year-olds, 36% in 13 year-olds and 27% in 15 year-olds (it is important to notice that the rates vary significantly by country and region: 14%-63% in 11-year-olds, 17%-69% in 13-year-olds and

12%-61% in 15-year-olds). In addition, on average, 39% of all students report on involvement in at least one physical fight during the school year (the mean percentages for the three age groups are 42%, 40% and 34% respectively).

In addition to the measure of violence, studies point to both immediate and long-term negative consequences for all involved in school violence: bullies, victims, perpetrators, observers, teachers, and the school as a whole (Kochenderfer-Ladd & Ladd, 2001). Violence has detrimental effects on school outcomes as well as on social and emotional development. It is associated with a number of negative psychological outcomes, including anxiety and depression (e.g. Perry, Kuse, & Perry, 1988; Craig, 1998; Bond, Carlin, Thomas, Rubin, & Patton, 2001), poor perceptions of self-worth and competence (e.g. Slee & Rigby, 1993; Neary & Joseph, 1994), feelings of helplessness, hopelessness, and self-pity (Borg, 1998; Carney; 2000; Hazler, 1997). There is evidence that victims sometimes even have feelings of anger and vengefulness that lead them to entertain fantasies of revenge (Hazler, 1996) and to act out aggressively against their school peers (Elliot *et al.*, 1998). In addition, victims, compared to their non-victim peers, experience higher levels of school avoidance, dissatisfaction with school and peer rejection (Khatri, Kupersmidt & Patterson, 2000; Kochenderfer & Ladd, 1996; Neary & Joseph, 1994; Pellegrini, Bartini & Brooks, 1999).

In order to reduce school violence various numbers of prevention programs are usually implemented. However, it is clear that although teachers are aware of the problem of school violence, they do not have accurate information regarding the perpetrators, the victims and where violence takes place in schools (Astor, Meyer, & Behre, 1999; Zeira, Astor, & Benbenishty, 2003; Zeira, Astor, & Benbenishty, 2004). In addition, most of the attempts to reduce violence deal with the perpetrators while the victims receive only marginal attention. It appears that many students do not report on violence or seek any kind of help in order to deal with the violence or its consequences. A third of all students' even state that they will never report on school violence or seek help in order to deal with the problem (Borg, 1998; MacDonald, 1997).

Aim of the Present Study

The main aim of the present study was to reveal the prevalent use of Internet by students as a source of help in the event of school violence. Specifically, students' willingness to seek help in six different forms of school violence was measured in comparison to the type of school violence and students characteristics including gender and religion.

Method

Sample

The research sample consisted of 170 sixth grade 12 year old students (Mean=11.6; SD= 0.40) from six different elementary schools in Israel. All students were studying at state-run schools, 81 of them from religious schools and 89 from secular schools. Eighty-five of the students were males and 79 females (6 did not respond to the question).

Measures

A self-report questionnaire administrated to the participants in their classrooms assessed demographic characteristics and their willingness to seek help on the Internet in the event of school violence.

Demographic Questionnaire

The demographic questionnaire elicited information regarding the participants' age, gender, religion, and other socio-demographic and school-based information.

Help-Seeking Utilization Questionnaire

A six-item questionnaire was used in order to measure students' willingness to seek help on the Internet in the event of school violence. In each of the questions a short description of a violent situation was

described and students were asked to state their willingness to seek help by using the Internet in such a situation on a Likert scale ranging from 1 (not at all) to 5 (very much). The six different vignettes described the following school violence forms: verbal violence (calling of names), relational violence (excommunication), physical violence (hitting and punching), sexual violence (sexual harassment), blackmail and the use of a weapon (knife). The six forms of school violence were chosen based on a list of violent events described by the World Health Organization's Health Behaviour in School-aged Children Study (World Health Organization, 2004).

Procedure

A research assistant who explained the aims of the study and the questionnaires administered the research questionnaires to the participants in their school classroom. In accordance with the Israeli educational system, anonymity of the questionnaire respondents was ensured.

Results

Students' willingness to seek help on the Internet for the six different forms of school violence is presented in Figure 1. A MANOVA analysis with repeated measures was computed in order to reveal possible differences in the students willingness to seek help for each of the school violence forms and yielded significant differences [$F(5,152)=9.83$; $p<0.001$]. A series of contrast tests between the different forms of school violence revealed that students are willing to seek help on the Internet in the event of blackmail and the use of a weapon more than for the event of sexual and physical violence and in those two more than for relational and verbal violence.

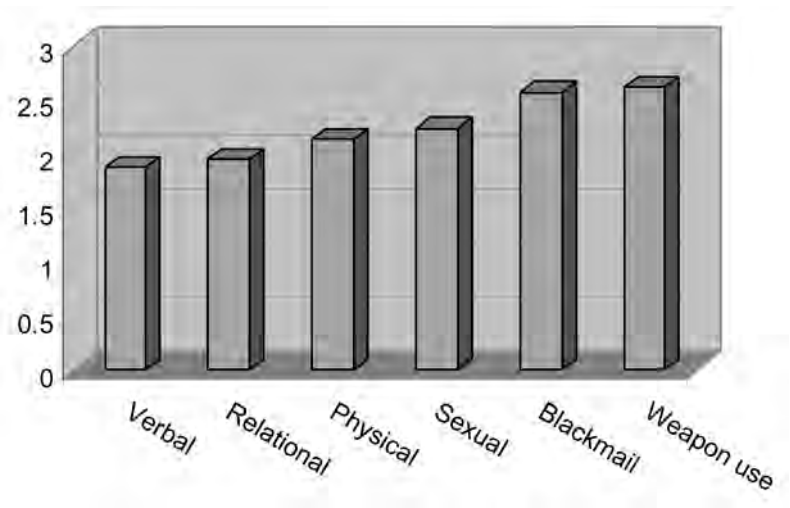

Figure 1. The willingness to seek help on the Internet for various forms of school violence

Other findings suggested differences between religious and secular students [$F(5,152)=4.08$; $P<0.001$] in their willingness to use the Internet as a means for help seeking while no differences were found between males and females. Differences between religious and secular participants were found in all six forms of violence (see Table 1) suggesting that secular students were more willing to seek help on the Internet than religious students.

Table 1: Religious and secular student's willingness to seek help on the Internet for different forms of school violence

	Group				
	Secular		Religious		
Form of Violence	Mean	SD	Mean	SD	F
Blackmail	3.14	0.16	2.04	0.15	23.55**
Physical	2.55	0.15	1.79	0.14	13.27**
Relational	2.37	0.14	1.64	0.13	14.04**
Sexual	2.64	0.15	1.89	0.14	18.28**
Verbal	2.25	0.12	1.57	0.12	14.92**
Weapon use	3.06	0.16	2.19	0.16	14.04**

** $p<0.01$

Discussion

The aim of the study was to reveal the willingness of elementary school students to seek help on the Internet for various types of school violence. Studies suggest that in general, students do not willingly seek help in the event of school violence (Borg, 1998; MacDonald, 1997) and when they do seek help they usually prefer informal rather than formal assistance with no harm to their wish to keep their confidentiality (Newman, Murray, & Lussier, 2001). Therefore, the underlying perception of this study was that the Internet might be a useful and powerful tool in order to assist students to seek help and to deal with school violence.

The findings of the present study reveal the differential use that students do in their use of the Internet as a source for help in the event of school violence. Although school violence is sometimes seen as one realm, it appears that different forms of violence receive different attention by students and their help seeking behaviour. However, it seems that the pattern of help seeking behaviour within the different forms of school violence is similar to the general notion regarding the positive relationship between the severity of the problem and help seeking behaviour (Newman, 2000). Students are more willing to seek help on the Internet for more severe school violence attacks then for others. From that point of view the Internet should be seen only as an additional way of assistance and not as a platform that can replace other sources of help. Studies will have to reveal how Internet use as a source of help can be expanded to include all forms of violence, to add to the possibilities that students have when they need help, and foster their help seeking behaviour.

One of the interesting findings of this study is that no differences were found between boys and girls in their willingness to seek help on the Internet for the different forms of violence. While the research literature on help seeking behaviour consistently reports that males are less likely than females to seek help (Borg, 1998; Rigby, 1997) the current study adds additional support to only a few other studies (e.g. Gould *et al.,* 2002) suggesting that the gender differences in help seeking behaviour does not expanded to the medium of Internet. Based on these results the Internet should be seen as a potential prevention strategy for boys and for using this medium for both enhancing male students to seek help in the event of school violence and for the formation and implementation of new prevention programs designed to provide boys with such support.

Finally, the present study revealed that religious students are less willing to seek help on the Internet than secular students. This finding may be explained by a possible suspicion that may be held by religious students for the medium of Internet (Armfield, & Holbert, 2003). Thus, studies dealing with the relationship between religiosity and help seeking behaviour usually point to the notion that religious people (such as Christians, Moslems, Jews and Hindus) usually seek more help than non-religious people and that this pattern may be explained by the strong social relationships that exits between members of religious groups (Loewenthal, Cinnivella, Edoka, & Murphy, 2001). Future studies will therefore have to study the differences between the way that religious and secular student use the Internet as a source of help and of ways that the Internet can be used as part of the social relationships between members of religious groups.

In conclusion, the findings of the present study reveal that students' willingness to seek help on the Internet for different forms of school violence differ based on the form of violence and their religiosity but not in regard to their gender. Findings which reveal both some of the strength and the weaknesses of the Internet as a medium for prevention and support. Further research is necessary in order to examine the contribution of other personal characteristics and of the Internet as a source for help and of ways to enhance such positive and important use.

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TEACHERS FOR ROMA PUPILS THROUGH DISTANCE LEARNING

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1. Introduction

A major purpose, which envisages the Education Reform in Romania, consists in the education of children from disadvantaged categories, such as the Roma ethnics.

Considering the elimination of illiterate people and school abandonment within Roma minority, the Romanian government and the Ministry of National Education established some programs and educational and social initiatives especially for this target group.

Sociological studies show the growth of educational activity within Roma communities when educators/teachers share the same ethnic identity.

Within this framework, to Minority's Department of Ministry of National Education request at the University of Bucharest a university study program was created and implemented, shaped as college, which is meant to train teachers for primary schools from Roma communities. As an option, during their study program, a set of lectures of Roma language, folklore, costumes and distinctive traditions are available for students.

The program is offered through distance learning by the Distance Learning Department of University of Bucharest and started in 2000-2001.

2. Program's Presentation

2.1 Legal Basis

Considered as an alternative frame of education for people who cannot participate at daily university lectures, distance education has been introduced in 1995 in Romania by the Education Law (Law 84/1995). Subsequent arrangements established the legal basis for its proceedings. The National Council for Academic Assessment and Accreditation set up a special commission for distance education with the task to create standards for the infrastructure and the academic and administrative personnel. These standards have to be carried out by an institution (university, faculty or department) in order to implement a training program with a university degree. In Romania, distance education functions with fees, while national budget supports only full-time studies. Following the assessment process, the Distance Learning Department of the University of Bucharest was granted the authorization to implement the training program for primary school teachers with Roma language skills.

2.2 Eligible Candidates

According to Romanian Education Law, a university level program (faculty, college) is accessible only to students who graduated high school and obtained the graduation diploma.

Roma ethnics or other people who work or wish to work as teachers within the above-mentioned communities are eligible.

The admission process takes into consideration the average mark of high school graduation exam and also a test of justification, which requires to all candidates to present their reasons, generally, for working as teachers, and particularly, their desire to collaborate with Roma communities. The accepted candidates are enrolled as students at the University of Bucharest, where they pay annual study fees.

2.3 Curricula

Teacher's training is taking place for 6 to 8 study semesters, transferable credits system is enforced and it finishes with a graduation exam.

The curricula includes basic and special subjects, as well as compulsory and optional themes, within the fields of Pedagogy, Psychology, Native language and communication, the Basics of Mathematics, History, Geography, Basics of Natural Science and Environment, etc. Students can also study Roma language, folklore, history and Roma traditions.

The graduation examination consists of two exams:

- A general revision of common and specialty knowledge and
- The presentation of a written paper done by the student during the last year of study and revised by a professor.

The graduates receive a degree issued by the University of Bucharest which is accredited by the Ministry of National Education. This degree allows them to participate the annual contests for a primary school teacher position.

2.4 Implementing the Project

2.4.1 Delivery Modes

In order to implement this project we have established a combined mode of delivery, interchanging individual study with face-to-face tutorial meetings.

In the beginning of each semester, every student receives informative materials concerning the schedule of activities, as well as study-support materials (books, CDs, audio tapes) and a username that ensures their access to the Department's Virtual Campus. In this way, students have access to communication services (forum, chat, e-mail) with the educational institution such as administrative office, library, tutors and other classmates. At the beginning of their first year of study, students receive the Guide of Distance Learning Student and information concerning the Portal's use.

A manager, who communicates permanently with the students, supervises each virtual class. Homework, projects and sessions of continuous assessment are transmitted through the Portal. Students may also receive help from their professors to solve their homework and a permanent feedback, which is helpful for their self-assessment. This way they estimate their study level, communicate with other peer sand with professors and the feeling of loneliness is held off.

Tutorial meetings are organized monthly and a review of the already studied material is done but there are also difficult subjects approached and solutions for homework are offered. Also, final year reviewing sessions are organized to help students to prepare for the graduation exam.

Final assessments, which require marks, are held only within the traditional system, meaning written or spoken tests. The final result takes into consideration homework, individual project and partial evaluation. This way the student is encouraged to learn continuously throughout the entire semester.

2.4.2 Support Materials

Regardless the delivery mode, the support materials (printed, CDs or online) have been elaborated by the University of Bucharest professors, actually the only institution from Romania, where a department of Roma studies and language functions.

In certain circumstances special materials have been written in order to fulfill students' needs. Professors from the Faculty of Psychology and Education Sciences, the University of Bucharest, elaborated the psycho-pedagogy courses. They represent an experimented team in training teachers.

The Department of Distance Education, CREDIS of the University of Bucharest has a special section that produces the support materials and consists of publishing house, printing office, writing CDs office and a team that create online materials.

On the Department's Portal, there is a section called "Educational Materials" to which every student has access. Some support materials are sent either by post office, Portal or during the face-to-face tutorial meetings at the beginning of each semester.

2.4.3 Management

A team of a general manager and assistant-managers runs the Program. This team supervises and organizes the entire activity related the educational process (organizes tutorials, plans examinations) and the administrative affairs (secretary office, library, distribution of materials service).

The general manager interacts permanently with the Roma Counselor from the Ministry of National Education whose task is to create and to maintain the contact with the County Schooling Offices.

2.4.4 The Recruitment of Candidates

Most of the candidates are already working in the educational system, especially within the rural areas where there are a lot of villages with Roma population. The County Schooling Offices direct these people to the University of Bucharest where after completing their studies they become qualified personnel for primary school teaching. Students come from all regions of the country and this exhaustive spreading could not help the process of creating local study centres. In some circumstances, where there is no Internet connection available, the students receive free access to the Teaching Staff House from each county capital city.

2.4.5 Some Statistical Data

The program for basic training of the teachers from the Roma communities started in 2000-2001 with a number of 62 students. Among them only 43 (69,3%) graduated their studies and the final examination, which allowed them to receive the university degree.

Up to the moment, 58 students have graduated while 160 people are still our students in different study years. In this year, 37 of them are completing their final study year, following to graduate in June 2006.

2.4.6 Observations

A major constraint in the implementation of this project resides in the study fees. Generally, the candidates come from economical disadvantaged regions and they cannot afford to pay their own educational training. To this problem a solution was found through funds received from projects with Phare, UNESCO and some Non-governmental Organizations (NGOs).

Also, the costs of transportation, accommodation and meals during tutorial meetings, exams or final year reviewing have been a serious problem, but special projects solved this category of expenses.

3. Conclusions

The program for basic training of the teachers for the Roma children started in 2000-2001 is still running at the Department of Distance Education, CREDIS at the University of Bucharest. Those who have already graduated can participate contests in order to become qualified teachers in primary schools. These teachers have a special contribution to Roma children education and their future training as equal chance citizens for inclusion in the job market.

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NOMADICITY AND MOBILITY WIMAX NETWORK IN DISTANCE LEARNING

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Introduction

Achieving widespread access by all citizens to new Information Society services and applications is one of the goals of the EU (COM, 2003). Information Society demands new interactive mobile technologies. These provide challenges and opportunities for education. Because of the wide implementation of new technologies, learners could be able to use their mobile device from anywhere and participate to the courses anytime. At the beginning of 21st century, the spread of mobile communication technologies will create effective and nomadic information environments. Although mobile technologies are powerful today, their usage in learning is very limited.

Nowadays, the latest trend is convergence between wireless communication and handheld devices. Convergence of computing and communication and the mobility and ubiquity of mobile devices open new possibilities with regard to computer usage and information access (Milrad, 2005).

Nomadicity

Emerging mobile technologies naturally influence nomadic lifestyles. In the Information Society, nomadicity represents a new virtual lifestyle. This means a new paradigm in the use of mobile technologies. Nomadicity is moving of nomadic people from one place to another. Besides, it is the trend of people movement in a time period rather than settling down in one location.

The conception of nomads could be defined as "digital nomad" and "urban nomad". While "digital nomad" travels virtually via her or his wireless computing devices, "urban nomad" moves really from one metropolis to another with her or his portable equipment that she or he can use ubiquitously (Weber, 2005).

In the information society, most of the people are nomads in computing and communication areas. We have mostly communication problems while traveling or walking. When users change environment and they switch on the portable device, face to disconnectedness and noisy connections. Nomadicity provides continuity of service across different sessions and, possibly, different locations (IEEE P1484.1/D9, 2001-11-30).

Nomadic computing is the usage of mobile computing devices from anywhere. While traveling and walking, it is being able to use mobile computing device. Users are able to access the Internet uninterruptedly. Nomadic access is the continuity of service across separate communication sessions and geographic locations (IEEE P1484.2.4/D8, 2001-11-25).

In the age of pervasive computing, small intelligent devices deploy ubiquitously. Pervasive or ubiquitous computing (such as WAP, Bluetooth and 3G mobile phones) serves new types of computing services. These services will establish a nomadic information environment. It is driven by *knowledge intensity, globalization and virtualization* (Lyytinen & Yoo, 2001).

> "A nomadic information environment is a heterogeneous assemblage of interconnected technological and organizational elements, which enables physical and social mobility of computing and communication services between organizational actors both within and across organizational borders." (Lyytinen & Yoo, 2001)

Mobility

> "…in the colloquial understanding, mobility does not mean to be 'on the move' but to 'be flexible' and 'readily available'. In this way, the meaning of 'being mobile' approaches the semantics of the Latin expression – 'mobilis' means not only 'agile', but also 'pliable', and 'mobilitas' means 'speed' as well as 'agility' and 'unsteadiness'." (Weber, 2005)

The term of mobility could be defined by several meanings, such as flexibility, freedom and individuality. Wide deployment of the ubiquitous wireless networks has been guided to access information by mobile devices. As a result of convergence of computing and communication, mobile phones and terminals have transformed into powerful multimedia units. In addition, it provides "virtual mobility" for users and educational world.

> "The exponential growth of mobile technology in recent years, increasing availability of high-bandwidth network infrastructures, advances in wireless technologies and popularity of handheld devices, have opened up new accessibility opportunities for education. The true potential of e-learning as "anytime, anywhere" has finally started to be realized with the advent of mobile learning (m-learning)." (Kinshuk, 2003)

Wide range of mobile devices and wireless technologies has started to support educational environments. Nowadays, mobile devices have wireless capabilities. The process of adding mobility and interactivity to mobile technologies has gained "virtual mobility" forms.

These new forms of virtual mobility could be compared with physical and virtual mobility for students (Bosch, 2005).

Physical Mobility (PM)

- on-site: physical travel & stay in a country abroad
- for limited period
- takes substantial amount of time/creates additional cost
- student experiences face-to-face activities and meetings, teaching and the everyday life of the country
- social, cultural and educational enrichment

Virtual Mobility (VM)

- from home, university or work place/no physical stay abroad
- no restrictions in length of time spent on studying
- time and cost effective
- no face-to-face activities
- access to courses and study schemes in foreign country; communication with teachers and fellow students abroad via ICT
- educational and intercultural competences

Several definitions are being used to refer mobile learning. Mobile learning is using mobile and wireless technologies during the learning process in nomadicity and mobility. Handheld or mobile devices are one of the support technologies in learning environments.

Convergence between new learning and new technology could be compared with each other (Sharples, Taylor & Vavoula, 2005).

New Learning	**New Technology**
Personalised	Personal
Learner centred	User centred
Situated	Mobile
Collaborative	Networked
Ubiquitous	Ubiquitous
Lifelong	Durable

Mobile learning has brought a valuable challenge to education sector. Education sector has gained benefits such as:

- 24/7 accessibility
- mobility
- expandability
- rapidity
- ubiquity

Ultimately, effective mobile learning programs will require new digital communication skills, new pedagogies and new practices (Wagner, 2005).

WiMAX (World Interoperability for Microwave Access)

> "In developed regions, the deployment of broadband services in remote areas is lagging behind that in (sub)urban areas. In emerging countries, low penetration of the traditional fixed telephone service and the low quality of the copper pairs is hindering large scale broadband deployment and fostering a demand for alternative wireless technologies." (Renaudeau, Bottle & Steyaert, 2005)

According to "Digital Divide Forum Report":

> "For some access technologies, limited reach prevents their use for many rural customers. This is known as the "last mile" bottleneck, referring to the costs of giving direct access to the end-user. Technological innovation is succeeding in providing access technologies with increased reaches, for example new forms of ADSL and Wi-Max." (COM, 2005)

Digital divide concerns the access to computing and communication. In digital world there is a gap among individuals, regions and countries. Unequal access causes significant differences between rural and urban areas. During the World Summit on the Information Society (WSIS) in Geneva in December 2003, it was defined as the unequal access to Information and Communication Technology (ICTs). WiMAX is a new powerful broadband wireless technology. It aims to provide a universal ubiquitous, equitable and affordable access (Cayla, Cohen & Guigon, 2005).

WiMAX (Worldwide Interoperability for Microwave Access) is the IEEE 802.16 standards-based wireless technology. It has brougt MAN (Metropolitan Area Network) broadband (high speed) wireless connectivity. WiMAX transmits data between computers via radio signals.

The WiMAX networks will be able to support fixed, nomadic, portable and mobile wireless broadband connectivity on the same network (Cayla, Cohen & Guigon, 2005). WiMAX concerns two different technologies as 802.16-2004 (called 802.16REVd) fixed wireless and 802.16e mobile.

According to O'Donovan (2006-2007), Mobilized WiMAX specifications are:

- 802.16e for mobility/portability
- Full Mobil Roaming
- Mobilized applications and services deployed
- University network interoperability standards established
- Federal services & Security established e.g. PAPI, EduRoam (O'Donovan).

2006-2007 will be nomadic phase of WiMAX 802.16e. 802.16e could be enabled broadband connection by walking speed in Metropolitan Area Network (MAN) as portable and mobile operation. Also this phase could be called mobilized period. Users will be able to connect by their portable notebooks to nomadic networks.

WiMAX will provide a cost-effective – a last mile – alternative to DSL and cable modem access. DSL is expensive wired broadband connection. Because of the access restriction (maximum 5 Km from central to user), DSL service can not be given many urban and rural regions. Also, many older cable networks have similar restrictions. Most of them have not been equipped by a return channel.

> "WiMAX has many interesting features that make it a compelling technology. Unlike existing fixed wireless standards, it does not rely on *line-of-sight* to a base station to provide connectivity. WiMAX has been optimized for non-line-of-sight *(NLOS)* applications and so can address a much wider market. It can be used as a high capacity, point-to-point link with *line-of-sight* between two locations, but it better suits access services for dispersed users from a single base station (Evaluating WiMAX, 2005). Line of sight is commonly used to refer to telecommunication links that rely on a line of sight between the transmitting antenna and the receiving antenna. *NLOS*, acronym for *near-line-of-sight* or *non-line-of-sight*, is a term used to describe radio transmission across a path that is partially obstructed, usually by a physical object in the Fresnel zone." (Wikipedia, 2006)

WiMAX systems cover up to 50 km with speed of 70 Mbps under LOS conditions and 8 km under NLOS conditions. In order to reach worldwide application, WiMAX could be used with licensed and unlicensed frequency band. WiMAX will be mobilized VoIP by convergence of internet, telephone, and multimedia communications. Also, WiMAX is supported by computer and telecom industry.

> "A WiMAX system will consist of a WiMAX tower (similar in concept to a cell-phone tower) linked to a base station and WiMAX receivers and antenna which would be built into individual laptops phones or PDAs. A WiMAX tower station can connect directly to the internet using a high bandwidth wired connection and can also connect to other WiMAX towers by microwave link (known as the *backhaul* connection). In this way, WiMAX systems could provide nationwide coverage on an interconnected basis." (Eccles, 2005)

Nowadays, 3G services have ability of data transfer. Data usage has been growing exponentially. Service providers do not have enough frequency spectrums for voice and data on the communication systems. Because of these restrictions, WiMAX could be given as a complementary data service by existing 3G services as well as a last mile alternative to DSL.

Embedded 802.16e chipsets will be installed in laptops and in mobile devices and Portable Internet will become a reality. WiMAX will provide high speed data services and users will be connected directly to the Internet from anywhere within a metropolitan area. Finally, Seamless Broadband Access will be realized in 2008.

Conclusion

One of the goals of the EU is to provide widespread, cost-effective and seamless broadband access service for citizens. Existing interactive broadband wired and wireless technologies as DSL and 3G are not responding to users. DSL is expensive solution for rural areas and 3G data transfer capacity is very limited. WiMAX (Worldwide Interoperability for Microwave Access) is a standard-based technology that provides wireless high speed broadband Internet connection from anywhere and anytime in metropolitan areas. There is no limitation on time and location to access WiMAX network. WiMAX enables nomadic and mobile wireless broadband connectivity on unwired digital campuses.

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THE E-LEARNING EXPERIENCE IN ISRAELI HIGHER EDUCATION: CURRENT STATUS AND CHALLENGES FOR THE FUTURE

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Introduction

Israeli universities and colleges, similar to many higher education institutions worldwide, have begun to incorporate e-learning strategies into their on-campus teaching. For our purposes e-learning is defined as interactive teaching-learning in which at least part of the teaching-learning process is done online (by means of text/audio/video) with semi-permanent separation (place and/or time) of teacher and learner during planned learning events.

E-learning is not just an alternative to campus-based education but more a part of it. The use of classroom setting is integrated with the use of e-learning strategies. We suggest three types of reciprocal relations between e-learning strategies and classroom activities within a single course[1]:

Type of course	Proportion of e-learning	Description
Web enhanced	1-29%	Course with minor e-learning activities. The instructor might use it to post the syllabus, announcements and assignments. Typically, keeps the traditional face-to-face meetings.
Blended	30-79%	Course that is a blend of e-learning and face-to-face activities. Substantial proportion of content is delivered online, typically uses online discussions, typically has some face-to-face meetings.
Fully online	80+%	A course where the majority of the course is delivered online. Typically have no required face-to face meetings.

The main objective of this paper is to describe the current status of e-learning implementation within Israeli higher education and to examine its challenges in the next decade from the national perspective. The main statistical data sources are: Central Bureau of Statistics and reports of an Inter-University Center for E-learning (MEITAL). Another valuable resource is the accumulated experience of the authors of this chapter who represent both national academic decision makers and practitioners' views.

E-learning in Israeli Higher Education: Background and Current Status

In October 1999, The Planning and Budgeting Committee of the Council for Higher Education published the first competitive Call For Proposal (CFP) directed at all higher education institutions, to advocate integrating information and communication technologies (ICT) (Council for Higher Education, 1999). The CFP created a challenge for the higher education system – to develop and implement a master plan for the improvement of the learning and teaching processes via the use of advanced learning technologies. This top-down strategy aimed at achieving its goals by implementation of the following:

1 Adapted from Allen & Seaman, 2003.

- A macro-level institutional approach to implementing information technology in each higher education institution.
- Establishment of support centers for all faculty volunteering to implement information technology tools in their lectures/seminars and other activities on a stable and ongoing basis, as well as for students.
- Encouraging collaboration between higher education institutions.

In addition, the CFP emphasized the importance of additional requirements by which the proposals would be evaluated: *transferability* – the potential of the proposed projects to be transferred to an array of disciplines and other fields of study; *scalability* – the potential of applying any of the proposed experiments on a large scale; and *sustainability* – the ability to continue any given project at the end of the special budgeting by the Council for Higher Education (Guri-Rosenblit, 2002).

As a direct result of the CFP, an intensive activity, leading to successful implementation of learning technologies, began in all Israeli universities as well as in a few of the colleges. By the end of the project (summer 2003), over 90,000 students, (45% of all students in higher education institutes), took at least one web-based course[2]. The number of students at the leading institutes (6 universities and two colleges) is described in Figure 1.

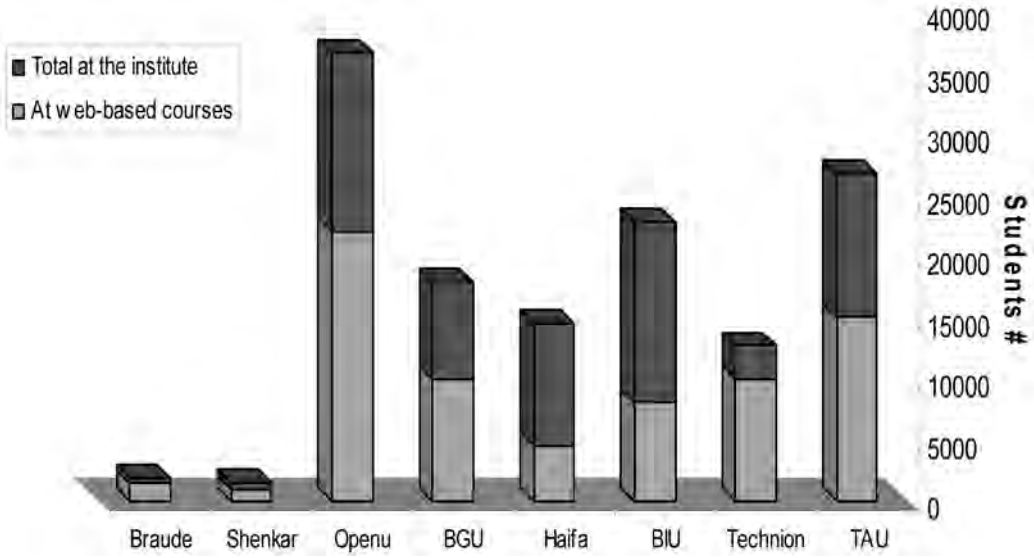

Figure 1. Number of students at the leading institutions[3] that took at least one web-based course

Another direct result of the CFP was the establishment of an Inter-University Center for e-Learning (MEITAL), in the framework of the Israeli Inter-University Computation Center (IUCC). MEITAL assists Israeli institutions of higher education – universities and academic colleges – in advancing the use of e-learning technologies by creating joint activities through work groups.

Upon analysis of three years of intensive activity of the project it is possible to see the following:

- Most courses were web-enhanced type – only in a limited number of the new courses was there a significant use of advanced e-learning technology that permitted flexibility in time and place of learning.
- Faculties need support and guidance. During the initial stages of the process, the faculty needed to become acquainted with the added-value of the new mode of teaching. Though, Israeli faculties identify positive aspects of their online teaching experience, there still exists a large segment of the professorate which remains resistant to out-of-classroom instruction. Hence,

[2] These range from web-enhanced courses to fully online courses.

[3] The institutions selected are: Tel-Aviv University (TAU), Technion – Israel Institute of Technology, Bar-Ilan University (BIU), Haifa University, Ben-Gurion University of the Negev (BGU), The Open University of Israel (OPNEU), Shenkar College of Engineering & Design and Ort Braude College of Engineering

faculties need to expand their understanding of technology and online pedagogy. For this to happen there will be a need to broaden the systematic support given (Kurtz *et al.,* 2004).

- More cooperation is needed – cooperation between the faculty who teach similar courses, both inside and outside the institutions, is limited. Only after the initial stage did faculties begin to examine the advantages of cooperation contributing both to a higher academic level and to a more efficient use of resources.

Organizations worldwide[4] have given considerable thought to e-learning being cost-effective, yet Israeli institutions of higher education have not paid significant attention to economic and organizational factors in e-learning that can lead to possible savings in teaching costs. The importance of such factors increase with the current economic climate of annual budget cuts in higher education.

Therefore, in August 2004, the Council for Higher Education published a second competitive CFP integrating ICT into the curriculum. The CFP was open to all higher education institutions (Council for Higher Education, 2004). The second CFP is much more focused, emphasizing these major cost-effectiveness goals:

- Advancing the use of learning technologies to achieve cost savings as well as quality enhancements.
- Encouraging shared knowledge between institutions by integrating within their academic courses online learning materials that were developed by other institutions.

The second CFP, described above, commenced while the writing of this paper was in progress and we do not have any official data.

Challenges for Future E-learning in Israeli Higher Education

Based on the current status, we can conclude that e-learning is more than a marginal activity at the Israeli higher education system. Also, the evidence demonstrates that Israeli higher education policies are moving towards the acceptance of the integration of e-learning within traditional campus-based curriculum. What are the e-learning challenges that Israel will have to face? In this section we discuss possible trends for the future of e-learning implementation, addressing it from the broader national perspective.

The Israeli Council for Higher Education, as the primary governmental body that oversees higher education in Israel, is responsible for overseeing the quality management of higher education. Expecting a continued and expanded deployment of ICT in higher education and knowing the impact and costs of technology, the Council will need to periodically address the national policy, or absence of one, on technology in higher education.

Several observable trends in higher education and in e-learning are assumed to continue into the next decade. We look at four such trends and examine for each its implications on the need for national level policy and action.

1. The *technological* trend. Innovations in the application of ICT will continue (Bonk, 2004), and with them the need to study, experiment and control the way they are applied to education. As in the first two calls for proposals, when new technologies emerge, there is sometimes a need to support their introduction in order to overcome the natural resistance to change. Moreover, because the Council is committed to enhancing and controlling the quality

[4] The most significant innovation was established by the *PEW* foundation. The Pew Course Redesign Project is a large-scale initiative that demonstrates how colleges and universities can redesign their instructional approaches using technology to achieve cost savings as well as quality enhancements. (http://www.center.rpi.edu/PewHome.html). The *Sloan Consortium (Sloan-C)* promotes the cost-effectiveness issue as one of its five main themes (http://www.sloan-c.org/effective/SortByCostE.asp). Also, *Educause* deals with issues of Return on Investments in Learning technologies (http://www.educause.edu/Browse/645?PARENT_ID=174).

of education, it will most probably continue to monitor the direct and indirect consequences of e-learning. For this reason, at the very least, the Council of Higher Education will need to establish a mechanism, through MEITAL, closely monitoring e-learning operations and achievements.

2. The *economic* trend. Economic pressures will prevail for the foreseeable future, driving the entire system of higher education to find ways to adapt in the application of any new method or technology. In particular, e-learning will be applied in a cost-effective manner. More and more institutions will seek ways of cutting costs through efficient applications based on advanced technologies. Furthermore, because Israeli universities and many of the colleges are supported by and report to the Planning and Budgeting Committee of the Council, they will be expected to demonstrate efficient use of technologies in their institutional budgets. Efficient use of technology may also become a condition of support for institutional and inter-institutional initiatives. For all these reasons, ICT in education will be taken into consideration in many of the Council's interventions.
3. *Increasing competitiveness of the educational market*. Unlike the past decade, universities and colleges have begun to compete aggressively for students. E-learning seems to be an attractive element of teaching to many students, such as working adults, life-long learners and remote or traveling learners. From a national perspective, this competition is welcome, and so far, has been encouraged with generous support to the colleges that have been the driving force in opening up the market. However, the Council will need to pay attention to the impact of technology on quality. Tied to this is the globalization of education. Not only will we see more and more international ventures such as local satellites of foreign universities that rely heavily on various forms of e-learning, but we should also expect cost-effective international collaborations in building and delivering courses. Such collaborations can cross borders and oceans with ICT. As in many other areas of economic collaboration, there may be a need for national assistance or coordination to guide and enable Israeli institutions to compete internationally.
4. The *social-demographic* trend. The main cities and central geographical parts of Israel have succeeded in attracting higher quality educational systems than the periphery. The Council is determined to encourage a flow of knowledge from the center to the periphery and sees ICT as one component, although certainly not the main one, in promoting such a flow of knowledge. The effective incorporation of ICT in initiatives of knowledge transfer will therefore play an important role in future national policy making.

Final Thoughts

In the span of six years, 1999-2005, the use of e-learning in academic courses attained new levels of acceptance. In this paper we examined the current status of e-learning implementation in Israel Higher Education. Based on the present achievements and obstacles, we highlighted the major challenges and offered broad suggestions for the next decade at the national level.

Many public academic institutions worldwide are facing similar constraints: a growing demand by an increasingly varied student body (both new and continuing learners, needing to accommodate their studies with busy working and family life or living in remote areas), constantly decreasing budgets and the need for an answer to the changing educational, professional and occupational needs of the 21st century – for both students and faculty.

E-learning can offer assistance in meeting these contradictory challenges, but its integration into higher education institutions is economically, pedagogically and institutionally challenging. Implementing e-learning in Israeli higher education institutions through a top-down approach, while not preventing individual initiatives, provides ongoing guidance to a large-scale process of innovation and keeps it within the framework of the national and academic system's long-term goals.

The character of Israeli academic curriculum is changing and changes continuously. Effective ways to plan, manage and evaluate this change are key determinants for the future shape of Israeli higher education. We hope that our work will assist decision makers and practitioners in Israel and worldwide through this complex process.

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SUPPORTING E-LEARNING DEVELOPMENT PROCESSES: CREATING A CONTEXT FOR TEACHER COMPETENCE DEVELOPMENT IN LITHUANIA

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Introduction

During the development of Lithuanian Distance Education and eLearning Network (LieDM), the infrastructure of LieDM was established. However, the development of human resources of the network including teachers and trainers form Lithuanian education institutions is not sufficient. Resent research shows (Commission Report, 2003) that the needs of teachers and trainers are still focused on diversification of learning content. The needs reflect the changing roles of teachers in the consequence of development of learning context itself.

Following rapid changes in European labour market, new requirements for teachers and trainers are announced every day, related with methodology applied to guide and support learners in learning process, as well as with new pedagogical trends in preparation of learning content. e-Learning methodology and advanced techniques inspire for innovative, more flexible and individualised solutions meeting individual learners' needs. Thus teachers and trainers become the target group for education and pedagogy specialists cooperating with specialists in application of information and communication technologies (ICT) and creating favourable context for teacher competence development.

The national study of e-learning situation in the country (Tereseviciene *et al.,* 2004) showed that it is necessary to increase the quantity and quality of e-learning deliverers. The facts state that due to insufficient knowledge and competences of teachers and trainers in the area if e-learning, there is still lack of efficient organisation of distance studies in the country within the given infrastructure. There is the need to improve cooperation in sharing existing resources and updating the learning material to the users' needs (Salmon, 2003). The lack of learning content prepared according to the new didactical and pedagogical paradigms (Tereseviciene *et al.,* 2004) causes low number of e-learners and absence of monitoring system in the country.

Aims and Objectives

The development of e-competences among e-learning deliverers is directly influenced by the development of the context in which they work. New knowledge and definition of competence evaluation process is required, as well as new assessment method of learning groups and learning process. In order to raise qualifications of teachers and trainers, we need to establish proper contextual situation first, where a teacher encounters self-assessment possibilities, learning content, to raise individual competences, and tools for realisation of e-learning ideas.

Method

To create the contextual situation favourable for teachers and trainers, the contextual items need to be defined and developed. The study was performed during the implementation of European Social Fund project "Lithuanian Distance Education System Operability Integral Development" (Contract No. ESF/2004/2.4.0-K02-VS-01/SUT-219) implemented by Kaunas University of Technology. The aim of the study was to find out the needs of e-learning deliverers in Lithuania. On the basis of the research results, the contextual items influencing the teacher training were determined in LieDM. The results of the research also defined the objectives of national and international projects dedicated to the development of teacher training context.

Contextual Development of e-Learning

The common trend of expanding and changing teachers' roles was documented in different research outcomes all over Europe (S. Cornelius, Salmon, and others). Resent research in training quality undertaken by CEDEFOP (Cedefop, 2005) proved that "the professional development of VET teachers and trainers is too important to be left to individual teachers' motivation and personal incentives. It is not only the individual teacher who has to become more 'professional', but the entire organisation. *Organisational change and competence development have to go hand in hand*" (Cedefop, 2005).

Regarding institutional teacher support, we may think about *individual institutions* and their internal support systems that create motivating and encouraging conditions for teachers and trainers to design e-learning, as well as *national institutions* and *networks* who gather enthusiasts and e-learning promoters (e-learning networks, associations and communities all over Europe).

Contextual support for teachers and trainers is important, first of all, in guidance and efficient use of resources. Research performed by CEDEFOP (Cedefop, 2005) concludes that "…even when teachers are enthusiastic about innovative teacher training programmes, these programmes place a burden on their time. Where time and human resources are scarce teachers give priority to their short-term work priorities rather than to long-term training goals".

In the contextual situation described above, the role of modern teachers is not only to teach, but also to guide students in their educational choices. For this reason, the teachers and trainers should be provided with their *competence assessment models* and *tools,* and later on, they should be trained to use the same methods and tools to assist their learners to use competence assessment tools for learners' path development.

Development of Lithuanian Context – Results of the Research

The factors for e-learning application in learning process were clarified during the study performed during the implementation of European Social Fund project "Lithuanian Distance Education System Operability Integral Development" (Contract No. ESF/2004/2.4.0-K02-VS-01/SUT-219). The research was performed in 2005, and it covered 182 teachers all over the country.

First, the reasons were identified why teachers and trainers apply e-learning in their practice. The following answers were given by the respondents (Figure 1):

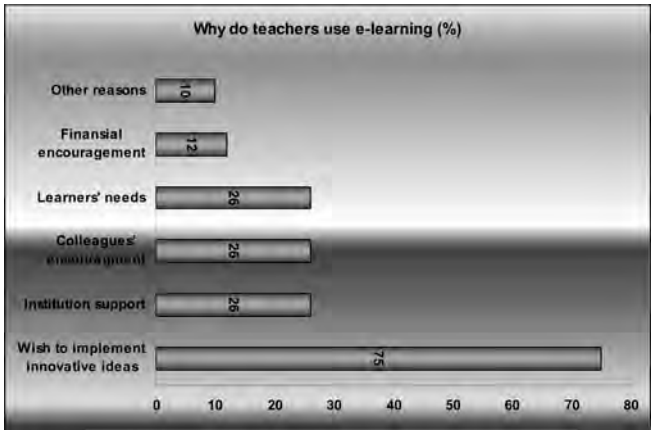

Figure 1. The reasons why teachers start using e-learning

The majority of teachers responded that they start using e-learning in order to implement innovative ideas. The other reasons, like institution support, fulfilling the learners' needs and colleagues' encouragement were distributed on equal proportions among respondents' answers.

Then the research focused on the analysis of the areas in which teachers and trainers' need additional training. The majority of the respondents answered that they need knowledge and skills on how to design and deliver e-learning (Figure 2):

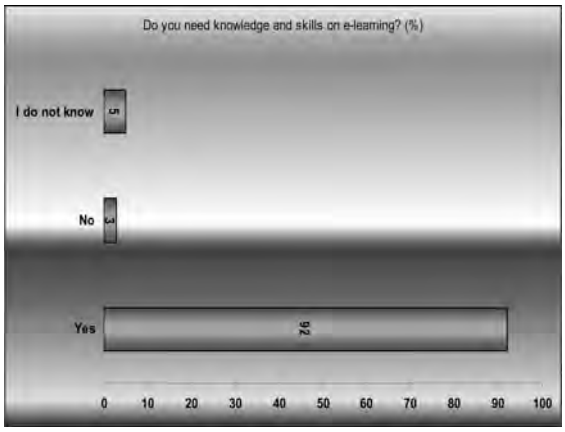

Figure 2. Teachers need training on e-learning

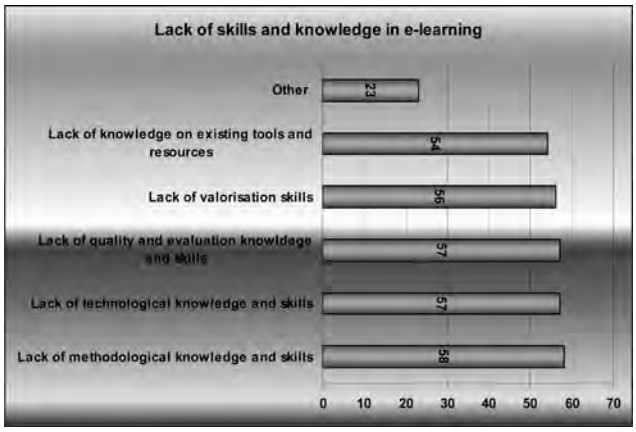

Figure 3. Areas of training for teachers and trainers

As the survey showed, teachers need training and knowledge on how to modernize and make the study processes more effective and how to implement innovative learning methods and tools. Insufficient attention has been paid to training Lithuanian academics in how to use ICT better, e.g. application of different learning environments, modelling programmes, etc. Such training has been implemented, but there are still very limited resources allocated for this purpose.

Moreover, the majority of the respondents indicated that they are not sure about the competences and skills they have, as there are no tools to implement self-assessment before, during or after the training sessions. Another shortcoming should be mentioned. There is no state-level e-learning research activity or analytical system established in Lithuania (e.g. quality assurance, monitoring methods and tools) in order to evaluate e-learning course effectiveness, satisfaction of learner's needs, etc. (Tereseviciene *et al.,* 2004). This also results in lack of dissemination of information not only in the area of research, but also learning possibilities for teachers and trainers.

The study identified different areas necessary to be improved to develop the proper context for teachers and trainers, to provide them with the possibility to deliver e-learning. The main contextual items include the following:

- high quality training material, serving as best example for teachers and trainers, should be developed and dynamically updated with the new content and learning situations,
- validation of competences should be ensured by providing possibilities for teachers to implement e-learning scenarios by themselves to proof professional skills and competences,
- quality assurance system should contain criteria consistent with the European e-learning quality assurance procedures, in order to ensure European cooperation and further accreditation of learning outcomes,
- monitoring system should be developed to use resources efficiently,
- teacher and trainer qualifications and competences should be agreed upon in order to keep in line with rapidly changing labour market development trends.

Also the tools for teachers and trainers to perform assessment of their own competences should be designed. Such contextual items would create necessary conditions for teacher and trainer competence development in the country.

Integral Development of Lithuanian Distance Education System Operability

European initiatives financed by the European Social Fund were welcomed by education institutions in Lithuania. A project of national importance dedicated to develop LieDM network activities, called "Lithuanian Distance Education System Operability Integral Development" (Contract No. ESF/2004/2.4.0-K02-VS-01/SUT-219), was launched by Kaunas University of Technology, in 2005.

The main goal of the project is to create the conditions for Lithuanian scientific and education institutions to implement distance studies in all Lithuanian regions by decreasing the divide between the

cities and rural areas covering all social classes and ensuring lifelong learning while creating the dynamic information society.

Among the first activities in the project, the survey mentioned earlier in the paper was performed all over the country. The conclusions of the survey influenced further steps and objectives of other project activities which include:

- development of competences among participants of LieDM network that would enable them to create quality content, to use innovative learning methods and forms, and to organise efficient distance learning processes,
- creation of distance education quality assurance model,
- and development of information dissemination system providing information on distance learning services and lifelong learning possibilities, and other activities.

The project is in progress, but some of the results are already developed and Lithuania. Teachers and trainers can already benefit, for example, from the tools developed for learners' assessment strategy development and the model for evaluation of learners' knowledge. The theoretical material is provided for teachers and trainers on how to use the tools and to plan assessment strategies in e-learning courses. The theoretical background provides examples, explanations and suggestions on how to develop the evaluation process in the course (Figure 4):

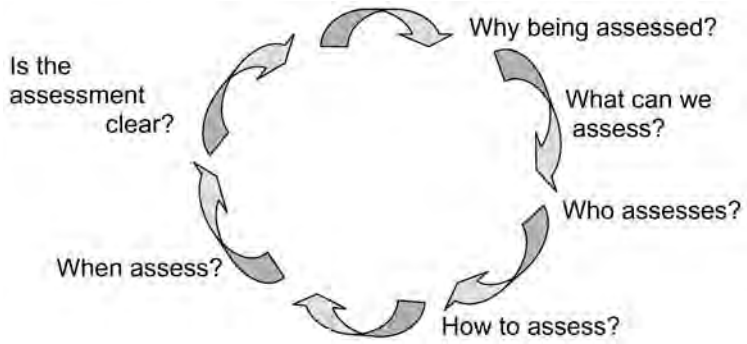

Figure 4. Assessment strategy planning

Teachers can use the model for their learners, as well as for improving the assessment performance in their courses (http://www.liedm.lt/liedm2.4).

The tools developed form a part of the context that directly influence teacher training in the country. The model will be tested by teachers and trainers who will be designing 60 pilot courses all over the country, funded by the project.

All the methods and tools developed so far are being integrated into LieDM portal. After completion of the project, LieDM will have the analytical monitoring and follow up system, as well as efficient and integrated research tools allowing Lithuanian teachers and trainers to follow the latest information on available resources, on existing offer and demand of e-learning in Lithuania, and on the latest research in the subject areas.

European Context for Competence Development

Whatever the national products and activities are, they should be in parallel with European initiatives and strategies, because European partnership could ensure the quality and applicability of the products in broader scale. Therefore, this would minimise the financial investment, and efforts to develop such products would become more efficient in all aspects.

The report on implementation of Lisbon strategy (Maastricht Communiqué, 2004), as well as Maastricht Communique (Maastricht Communiqué, 2004), indicate that teachers and trainers should be supported in their essential role as innovators and facilitators. To achieve Lisbon goals, learning environments and contexts should be improved and developed to enhance and implement pedagogical approaches encouraging individual and self-organised learning, and to use the potential of technologies and e-learning to improve training quality.

EU Leonardo da Vinci project called EVETE – "Empowerment of Vocational Education and Training by Improving the E-Learning Competences of Teachers and Trainers" (LT/05/B/F/PP-171010) – was approved and started in October, 2005, by European partnership, having representatives' institutions from Belgium, Germany, Greece, Finland, Hungary, Italy, Lithuania and Sweden. Partners working for many years in the area of teacher and trainer support and competence development areas started joint activities to develop the contextual tools and training courses based on individualisation and diversification of learning content divided into small learning units. The project's innovative pedagogical approach should be followed by its managerial innovative outputs, when the results and the Curriculum units will be shared and delivered in all partner institutions with a joint certificate issued to the project target group.

EVETE project responds to European priorities, to research results, and it aims at providing teachers and trainers at education institutions with understanding and competence in diversification of training based on individual expectations and abilities to manage training content. To reach project objectives, the following activities are performed in the project:

- analysis of national teacher training strategies in partner countries,
- methodological and technological recommendations for curriculum development,
- curriculum for teacher and trainer competence development,
- development of tools for teacher competence assessment,
- Course Service Package for managing project products and organizing learning process.

Creation of European training culture and virtual community through course service package (http://www.evete.org) will represent a new form of communication and cooperation. Cooperation in recognition of teacher and trainer competences will be an interesting example of teacher competence validation process and cooperation of education institutions all over Europe.

Conclusions

Thus it can be firmly stated that the contextual development of teacher competences include not only training and learning programs, but also resources and favourable context with integrated tools responding to teachers and their learners' needs. To create this context, European quality and product access should be ensured. The contextual items should include:

- high quality training material for teachers and trainers;
- validation of competences by providing possibilities for teachers to implement e-learning scenarios themselves,
- quality assurance system,
- monitoring system for existing e-learning research and resources,
- definitions of teacher and trainer qualifications and competences in e-learning units.

Improved context would influence smooth teacher performance, meet teacher and trainer needs during the learning process, and finally, would bring benefit for the learners in the form of satisfaction with individual-focused learning process.

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E-LEARNING POSSIBILITIES ON NATIONAL AND INSTITUTIONAL SCALE IN LITHUANIA

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Global Context on Education Using ICT

Many countries are putting efforts to effect changes in the teaching/learning process and here ICT provides a set of powerful tools that may help in transforming the present isolated, teacher-centred and text-bound classrooms into learner-focused, interactive knowledge environments. To accomplish this goal it is necessary to change a traditional attitude to the learning process and understand how the new digital technologies can create new learning environments that help students to construct their own knowledge. More and more educational authorities and educators believe that new views of the learning process based on ICT may play an important role in bringing educational systems into alignment with the knowledge-based society.

Transformation to knowledge based economy and related changes are producing dramatic shifts in the political, economic and social structures of many countries around the world. Information oriented economy established new job possibilities, many of which did not even exist ten years ago. New ICT applications replaced the need for many types of unskilled or low-skilled workers.

The advantages to learners and employers using distance learning elements are also important features from the perspective of governments. Traditionally, governments have introduced distance education provision in order to:

- Increase access to learning and training opportunity;
- Provide increased opportunities for updating, retraining and personal enrichment;
- Improve cost-effectiveness of educational resources;
- Support the quality and variety of existing educational structures;
- Enhance and consolidate capacity.

These trends pose new requirements to educational systems that have to absorb changes quickly to be able to prepare students with the knowledge and skills needed to thrive in a new and dynamic environment of continuous technological change. Hence, the aim of this article is to present two examples of new distance learning techniques implementation in the design studies and in the network of international distance education at Kaunas University of Technology.

The Present Position of Distance Education in Lithuania

There is a widespread consensus in the Government and among non-governmental institutions in the educational sector that DE and training have enormous potential to tackle the new challenges. Significant policy groundwork has been laid for the development of an advanced and comprehensive distance learning system.

On the 4th of July, 2003, the Seimas of the Republic of Lithuania approved the document “Regulations of National Strategy of Education 2003-2012”. Lithuanian education development strategy for 2003-2012 defines the priorities for Lithuanian educational policy, its aims and tasks; it describes the means, timing and resources necessary to develop an effective, coherent education system accessible to everyone, and which is to be seen as a resource for the country’s cultural and economical power and a guarantee of its national safety.

It is important to note that while ODL at the moment is one of the priorities of the education system in many countries, in this document, one of the main underlined missions of this strategy is to help a person to gain professional qualifications that correspond with the level of modern technologies, culture and personal development, and to create conditions for lifelong learning; to constantly supply the means for the people to acquire new competences and qualifications to advance their careers and to achieve their lifelong goals.

LieDM network consists of the following number of units: 3 video conference studios, 7 video conference mini studios, 2 regional distance education centres, 18 distance education classrooms, 6 distance education internet access classrooms with 340 computerized work places, and a professional video, audio and multimedia production studio (Figure 1).

Figure 1. Distance Education network development phases in Lithuania

At present, access to broadband connectivity and ICT equipment is provided by educational institutions while, in the future, increasing numbers of individual learners will have home internet access. However, in order to ensure equal learning opportunities for all members of society, problems of the digital divide between city and region, as well as among different educational sectors, will have to be addressed. The principle of combined public and private provision will be fundamental to encouraging access for all.

On the geographical point of view LieDM network covers almost all Lithuania. But it is better developed in the largest cities of Lithuania, because there are a big number of universities, institutes, colleges as well as students and lectures. LieDM network is being created on the base of Academic and Research Network of Lithuania LITNET.

The Strategy and Objectives for the Development of DE Network

During the implementation Phare project, the Study "National Distance Education Network in Lithuania" and the Strategy "Development of DE network in Lithuania" were prepared. The goal of the Strategy was to prepare the guidelines for the development of DE network up to the year 2012. The Strategy Report includes a set of recommendations indicating actions for education leaders, teachers, learners, employers, and commercial suppliers to support the increasing and widening contributions of DE to Lithuanian society in the years ahead. The set of recommendations covers the following issues:

- development of DE infrastructure while emphasizing regional aspects, evaluating human resources and accumulated experience;
- development of a legal basis for DE;
- creation of quality assurance systems;
- activities of DE centres seeking self-sustainability and cost-effectiveness of the Lithuanian DE network;
- development of DE technologies;

- strengthening administrative skills, qualification improvement and support for DE network staff and DE professionals;
- creation of student consultation and methodological support system;
- broadening the possibilities of applying libraries, full text document data bases and e-publishing in DE;
- cooperation possibilities with national and international DE institutions and networks;
- initiatives and means to attract required funds for Strategy implementation;
- dissemination of DE among education service providers and final users through mass media;
- monitoring of Strategy implementation.

Inter-cooperation of Universities and Colleges Based on e-Learning Strategy

Developing e-learning courses it is important to form the "pool" of best specialists. Meantime such specialists are usually working at different educational institutions of different level. The example of such "pool" formation can be the cooperation between Faculty of Design and Technologies at Kaunas University of Technology and J.Vienozinskis Art Faculty students at Kaunas College. The innovation of e-course "Drawing Rudiments" lies in the idea that drawing as a subject of classic study is delivered with the help of modern technologies.

The aim of the course is to be able to portray in a drawing various forms existing in environment, to develop drawing skills, and to gain knowledge about main tools of artistic expression. Having taken the course and acquired basic drawing skills, the person will have knowledge of drawing techniques; he or she will be able to use basic geometric figures to create particular constructive objects; will be able to apply essential principles of design and fundamental laws of perspective. The person will also know the influence of chiaroscuro on the volumetric form; will know the material expression in a drawing and will comprehend the meaning of geometric forms in nature. The course provides an opportunity to develop artistic skills and knowledge for anybody studying drawing and for students of various artistic subjects. This is very important and relevant for those who aim at gaining experience in artistic expression and creation.

It is important to note that great attention in the course is paid for practical tasks (drawings) performed by the students. For this purpose, work reviews are organized, and the results are shown when the aim of studies is achieved and the students get qualitative and consistent knowledge of the topics. The course is arranged by using modern technologies (Macromedia Flash program); however, it is not related to application of computer graphics. The learner carries out all practical tasks freehand and only such pieces of work (drawings) are assessed and analyzed. Scanned or computer-made works are not adequate to freehand works, and they neither are evaluated, nor can be the matter of discussion.

E-materials of the course provide opportunities for deeper studies of theoretical background and cover the bigger part of classes. This is relevant for all learners but especially for part-time students who lose the quality of theoretical knowledge of drawing elements due to intensive studies. The electronic form of presentation of materials allows to place many illustrations (animated including) which assist during learning.

Graduates with tertiary and specialised education (future company workers) are expected to be not only good specialists in their field but also they could develop ideas creatively. Distant teaching course "Drawing Rudiments" is a new method in drawing studies. Modern technologies are incorporated to teach classical subjects, such as drawing. Macromedia Flash programme provides opportunities to convey fundamental principles of drawing studies in virtual environment; e.g. design of geometric figures, the concept of proportion, perspective construction, light and shade design. These materials are very useful for self-study. When studying on one's own, the student may analyse and understand the technique of basic object drawing at length.

International Innovative Distance Studies

Nordic Centre of Innovative Studies and Advanced Training in Textiles (*granted as Nordplus Neighbour project by the Nordic Council of Ministers*) is aimed to create the network based on new and modern educational approaches and ICT, which will continuously afford and assure the transfer of advanced and up-to-date knowledge for textile and clothing sectors concerning the production and properties of new generation garments together with the knowledge of modern and innovative garment development and fashion retailing strategies. Thus, the overall benefit of the network is:

- advanced knowledge and up-to-date know-how in textiles and clothing sectors;
- raised quality of studies through distance training;
- reduction of costs for education and transfer of knowledge.

The activities of Nordic Centre of Innovative Studies and Advanced Training in Textiles are planned to cover such priorities as: education and careers; distance learning; virtual college and university courses. Four universities will be integrated in the work of the Nordic Centre: two from Nordic states and two from Baltic States: Kaunas University of Technology, Faculty of Design and Technologies; University College of Borås, Swedish School of Textiles; Tampere University of Technology, Institute of Fibre Materials Science; and Riga Technical University, Institute of Textile Technologies and Design.

The background to create such centre was the fact that textile and clothing sector in Europe is facing extreme challenges. The movement of production to low wage countries has already dramatically reduced the number of employees in Nordic countries. Companies which have focused on new garment development strategies and production of special and technical products still look optimistically towards the future. It must be noted that Baltic countries stared to face the signs of this phenomenon, also.

Nordic and Baltic states were considered to be the countries with well-developed textile industry. Thus, the universities of these countries traditionally have big experience of education and training in textile and clothing. Still each of the university besides traditional courses has its own priorities on which education and research activities are focused, as it has to serve particularly to national industry and commerce. As the turn of industry nowadays is very fast, it requires up-to date knowledge, which can be obtained through advanced learning courses, but the universities as separate institutions have too limited resources to perform training and develop study courses of significant global importance.

Thus, the need to merge the experience of the Universities is obvious. Besides, the transfer of knowledge must be fast and effective and this can be done by incorporating ICT technologies in the education process. Only well trained employees with advanced education in textiles and clothing could better contribute to the competitiveness of their enterprises making the best basis for textile and clothing industries to survive in rapidly changing European market.

The Methodology of Distance Learning

One of the aims of Nordic Centre of Innovative Studies and Advanced Training in Textiles is to perfect educational methodologies in textiles and to fully incorporate the use of information technologies. Each of the participating university has a good basis for distance learning, i.e. distance learning centres with well-equipped halls for video conferencing, e.g. Kaunas Distance Education Centre (*http://distance.ktu.lt*); Distance Learning Centre of Riga Technical University (*www.internet-uni.lv*). Furthermore, it was decided that WebCT will be the webplatform for distance learning, as it allows easy incorporation of all varieties of training materials in order to provide better, modern and more efficient and flexible study methods and programs.

The courses will last 14 weeks (2 hours of lessons each week). For the quality evaluation of produced courses an international group of 20 students (5 students from each participating country) will be formed. It is planned that the group will meet with the lectures for two days at the beginning of each study year for the introductory seminar to get all the relevant information concerning the courses and its evaluation methodics. The idea to form such a group was that it would be good to get the assessment of the obtained courses from students with different knowledge in textiles and clothing, different experience in using communicational technologies and having different English language practices.

The courses will be evaluated on the basis of special questionnaire that will be prepared and given at the end of each course. The improvements in the courses will be made taking into account the obtained remarks. The aim is to get a view on the needs, requirements and expectations of the end-user in respect to the content of the course, its novelty and actuality for the industry, as well as the design of the interactive training product. ICT used in these courses will be also evaluated, emphasising on the effect of their integration in standard training packages. The overall evaluation after each course will be given by the experts in distance learning.

It must be noted that in both presented examples Interactive Video Presentation and Lecturing System (ViPS) is applied. ViPS is web browser based software which allows delivering live video presentations and lectures via internet with possibilities (Figure 2, 3):

- to demonstrate slides and internet resources to participants,
- to interact with participants asking Yes/No questions, organizing testing and surveys,
- to receive questions from participants and to organize these questions into FAQ database,
- to record live events and to edit recorded presentations by adding or deleting slides as well as changing slides demonstration timing.

Many of the students nowadays have an internet at home or workplace and this is the way how they are able to participate in lectures or watch the records of them. During the presentation they are able to see the slides as well as to see and hear the lecturer. After the presentation they are able to see the record of this presentation in the same way as they would have participated on the real time. The difference is that they are not able to ask the teacher or presenter and answer to his questions. However, they can see the record discussions, which were during the presentation between the teacher and other students.

Figure 2. Student view window in the ViPS system

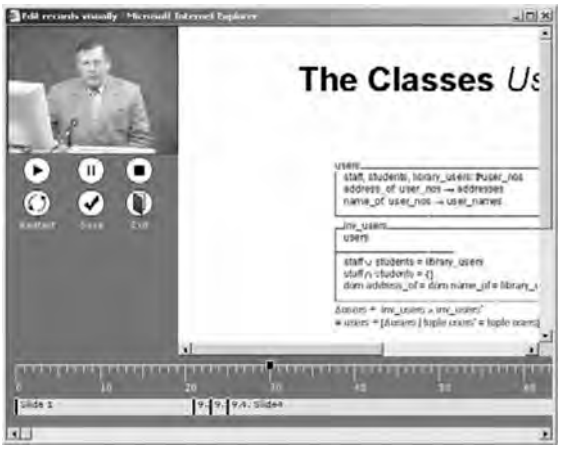

Figure 3. Presentation editing window in the ViPS system

The lecturer during his presentation sees much the same window as a student just with few more control buttons and except himself. He is able to ask students any questions or enter the answers to received ones. After the presentation or lecture, teacher is able to see the record and make some corrections. He is able to change the slides and appearance time of them, to enter or correct the slides' titles and other operations.

Conclusions

The primary target groups to which e-learning courses will be addressed are universities and colleges, training centres and textile and clothing industrial companies. The courses obtained by students will be the background for their future career, while the employees with advanced education in this sphere would be able to contribute to the competitiveness of their enterprises making the best basis for textile and clothing industries to survive in rapidly changing European market. The outcomes of the projects will be:

- interactive training package of the courses covering the areas of innovative product development strategies and production of smart textiles and high-tech clothing;

- report on strengths and weaknesses of used ICT;
- high quality of education and transfer of knowledge at reduced costs.

Thus, with the outcomes of the presented international network the need to merge the experience of the Universities will be realised. Besides, the transfer of knowledge incorporating ICT technologies will become faster and more effective and will allow reducing training costs. Hereby Nordic Centre of Innovative Studies and Advanced Training in Textiles will significantly contribute to the education of future employees with advanced know-how in textiles and clothing sectors.

Users of courses will benefit not only from getting modern and efficient knowledge in textiles and clothing, but also from breaking the language barriers (courses will be given in English) in the sense of specialised terminology. The latter, with the approach of global manufacturing becomes especially actual, because right and good understanding between industrial partners makes their cooperation more effective.

Aknowledgement

The project Nordic Centre of Innovative Studies and Advanced Training in Textiles was granted by the Nordic Council of Ministers, the International Scholarship Section of the Research Council of Norway as the Nordplus Neighbour 2004-2005 and 2005-2006 project.

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TAKING HIGHER EDUCATION INTO THE FUTURE : A PERSPECTIVE FOR TEACHING AND LEARNING BIOTECHNOLOGY IN THE MALAYSIAN CONTEXT

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Abstract

Biotechnology is a relatively new field in Malaysia. Much emphasis have been placed by the Malaysian Government to promote this field. Being at its infancy, there is a lack of teaching resource and available expertise to spearhead the development of Biotechnology education in Malaysia, especially among the private educational sector, hence there is a need to develop a web based resource grid nationally. Also, in the process of learning Biotechnology, it could be best supported with computer mediated technology. This paper addresses two key issues, i.e : the lack of teaching resources in Biotechnology in Malaysia, hence the need for an information and communications technology (ICT) infrastructure to form a backbone to aid the teaching and learning of Biotechnology and the need for computer mediated technology to address the lack of interaction and participation among Malaysian students.

Historical perspective

Biotechnology is a new field with growing importance in Malaysia. Biotechnology touches every aspect of our lives as it covers a broad spectrum of areas such as medical biotechnology, vaccines, food biotechnology, agriculture, cloning, genetic engineering, environmental and pollution control, forensic and the list goes on. Biotechnology is a creative science which harnesses the creative and cognitive aspects of a science student.

The Government of Malaysia has placed much emphasis on the development and growth of Biotechnology in Malaysia through the recently drawn up National Biotechnology Agenda. The Ninth Malaysia Plan has also places great emphasis on Biotechnology. Awareness programmes have been initiated at the school level to generate interest in Biotechology. The main problem with Biotechnology education in Malaysia is the lack of awareness, the lack of experienced teaching staff and the lack of partipation among Malaysian student to foster collaboration in learning Biotechnology, making teaching and learning this subject area a difficult task. The lack of collaboration among Malaysian students poses problems for educators to develop the creative and innovative aspect of a Biotechnology student.

This paper addresses two key issues, i.e: the lack of teaching resources in Biotechnology in Malaysia, hence the need for an information and communications technology (ICT) infrastructure to form a backbone to aid the teaching and learning of Biotechnology and the need for computer mediated technology to address the lack of interaction and participation among Malaysian students.

ICT infrastructure to promote collaboration among educators in the field of Biotechnology

Biotechnology is at it's infancy in Malaysia. Many educators involved in the teaching of Biotechnology are relatively new to the area although well qualified. Research in this area is also primarily confined to research centers and public universities.

Educational programmes in Malaysia exist as two broad categories. Category one encompasses programmes which are franchised from overseas partners, hence do not involve the need for local expertise. Educators involved in this category deliver programmes and courses which have been developed by foreign partners who also provide the quality assurance framework for these programmes.

Category two encompasses programmes which are "home-grown" i.e. these programmes are locally developed, have local content and the quality assurance is governed by the Malaysian National Accreditation Board. The aim of the Malaysian Ministry of Education is to promote programmes which are "home-grown". This situation puts focus on the issue of content and resource availability in Malaysia. Hence, the need for a web based ICT grid to be set up for the purpose of developing and sharing resources in Biotechnology.

This grid should be developed as an interactive website which enables educators in Malaysia to upload their teaching resources, assignments, projects, classroom notes and other teaching aids for the purpose of sharing information with other educators in the field. Information sharing involves a forum for developing, sharing, floating new ideas, developing arguments and building a learning community [1]. It should incorporate features such as realtime conferencing, e-mailing and archiving. This grid should act as an online teaching and resource platform where all these material would be available. Besides sharing of resources, this grid would allow for the sharing of best practices in the teaching of Biotechnology. With time, this grid would compensate and overcome the problem of lack of teaching resources in this field.

In designing the look and feel for the grid, important aspects which should be considered are ease of navigation, good instructional design capabilities, the ability to use "embedded" multimedia capabilities, the availability of tools which are able to provide a graphical overview of the teaching material, availability for archiving material so that it could be downloaded and viewed "off-line" and the ability to upload material or "custom-made" interactive software or simulation packages. A teacher with specific needs can tailor the materials accordingly or expand materials integrated from other sources. The grid should also have a reasonable upload and download time.

The grid could allow for several teaching models as described by Lin *et al.* [2]

- Single teacher offering pedagogy model
- Group pedagogy model (co-operation or collaborative)
- Cluster pedagogy model
- United pedagogy model

Due to the asynchronous nature of this medium, team teaching and team development of resources become easier, economical and practical. Input from educators with subject expertise based in other institutions and even from industry (which is a plus factor as we try to develop courses which are industry-driven) at diverse geographical locations is made possible. Educators can build knowledge building communities through the grid. This model means that available expertise would be able to drive the development of "home-grown" Biotechnology programmes and courses. It also ensures consistency in the material developed, in accordance with the norms and standards required by the industry and the Malaysian Quality Assurance Framework, in-line with global standards. This model also ensures that expertise and assistance is available to institutions which are less equipped, thus ensuring that students get material which are of similar standard and are consistent with global standards. Sharing of instructional technologies is also made possible with this model.

Networking, collaboration in research and joint publication of academic papers of a certain quality is greatly enhanced. This transparency and collaborative process would take Biotechnology Education in Malaysia from where it is now to new heights.

For this model to work in Malaysia, it requires tremendous support from various groups.

(i) Policy Makers
It is vital for this key group to support the initiative as policies and funding are derived from the top.

(ii) Educators
Fear of redundancy, resistance to change and in some cases, unfounded fear of the technology itself often causes the educators to "shy" away from adopting new methods of teaching and computer technologies. Hence, support and "buy-in" from this group is essential. There should also be a reduced work load for this group of educators to enable them to find the time

to develop as instructional technology savvy individuals. Results obtained from Liu *et al*. [3] have indicated that instructors still need to have their roles transformed pedagogically, socially and technologically if they were to establish a more engaging and fruitful environment for online learning.

(iii) IT Professionals
Many technologies have failed because policy makers and educators have failed to appreciate the importance of having the support of the IT professionals. It is also vital for the IT professionals to ensure that whatever software purchased to be "user-friendly" for course designers, tutors and students.

Computer mediated learning in Malaysia

Throughout the history of human communication, advances in technology have powered paradigm shifts in education [4]. But always, as new technology enables shifts at the level of delivery, old technologies are augmented, not totally replaced. Technology can be used, along with pedagogical, curricular and assessment reforms, to support the process of knowledge creation in which students and teachers set their own goals, plan their own learning activities, build on each other's ideas to create new knowledge and monitor their current level of understanding in preparation for life-long learning [5].

Over the past decade, we have seen the computer-mediated teaching environmernt shift from specialized laboratory environments in such disciplines as modern languages, music and geosciences towards more generally available learning situations in our own classrooms, independent of disciplines. [6]

Globally, Practice Centred Learning and Student Centred Instruction has taken centre stage whereby, instead of the teacher instilling the knowledge onto the students, the students are now seen as active learners; able to construct their own knowledge with the facilitation of the teacher. Adult educators such as Sherry [7] affirm a teaching and learning model that stresses student centred instruction. Ultimately, it will demand changing the traditional role of teachers from information transmitters to guides who arrange meaningful learner centred experiences [8]. This tutorial guidance known as Problem Based Learning (PBL) is now widely used in the teaching of the health sciences and medicine. PBL coupled with computer mediated technology could develop as an avenue to motivate students to become active knowledge seekers and educators to become active and involved facilitators.

On-campus university teaching makes excessive use of lectures and other didactic approaches to teaching [9]. Laszlo and Castro [10] mentioned that the lecture is the best way to transfer information from the notes of the teacher to the notes of the student without it passing through the students' mind whereas Laurillard [11] points out that lectures are not interactive or adaptive and do not allow students time for reflection.

In Malaysia, the tendency to provide education to all results in larger enrolments and hence larger class size. Students are enrolled with various backgrounds and language abilities, while meeting the minimum grade for entry. The other problem with this is students prefer to work and study in isolation rather than in groups and sharing of information, especially in the initial tertiary years are quite uncommon. This added to the fact that Malaysian students are generally "shy" and passive and do not participate or engage in discussions in the classroom or lectures make the traditional lectures an non-effective method of instruction or learning.

This is where computer mediated technology would play an increasingly important role in the Malaysian context, to support traditional learning. For Malaysian students who are less participatory, the computer offers ways of transforming teaching into a more interactive and personalized process. The materials that are set up can offer an avenue for student centred discussions. Materials can be posted, even set up as interactive documents, which can promote collaboration, active learning, thinking and writing skills crucial to the learning of Biotechnology.

There is a higher level of mutual support in students where computer mediated learning is concerned. This in turn instills self-confidence in students. The faceless nature of computer mediated learning seems to encourage the introvert learner to contribute, making it a good model for the passive Malaysian student, hence benefiting the student and improving learning outcomes.

As Malaysia is actively promoting the commercialization of Biotechnology, students can now engage in imaginary episodes of creating biotechnology products, engage in the dynamics of creative biotechnology and simulate aspects of commercialization, enterprise and asset management through computer mediated technology.

If students are exposed to programming, some might be able to create their own applications for the purpose of "user-friendly" and efficient IT savvy biotechnology applications. While the usage of this is at its infancy, I strongly believe that the incorporation of computer mediated technology in the teaching and learning of Biotechnology in Malaysia is a must if Malaysia were to produce well-skilled biotechnologist.

While many institutions in Malaysia utilize some sort of "electronic learning management system" to promote computer mediated learning or to create a semi e-learning environment, it is hardly a proper or real model for e-learning. Many course management systems provide only a network of static hypertext pages with static syllabus and material.

There are problems to the implementation of this technology. Many institutions are inadequately or semi equipped with the resources and skills necessary to develop the potential of computer mediated technology to the fullest. A well trained and experienced instructional designer is required for educators to fully understand and develop computer based material. Ongoing structured training is a must and flexibility for communication and collaboration between student groups have to be initiated.

In order for students to obtain the most benefit from this learning methodology, there must be a paradigm shift where educators are concerned. Students must also be familiar with the WWW, having simple and cheap web access without hiccups, access to a modem and good connectivity. To address this, there is an effort by the Malaysian Ministry of Education to provide built-in loan for higher education which incorporates the purchase of notebooks to students in their final year of study. Though this is hardly adequate as students require this technology from the onset of their tertiary study, this is really a positive move in the right direction from the Ministry of Education Malaysia.

If the use of information technology and computer mediated learning were to be used in a large scale manner for the teaching and learning of Biotechnology in Malaysia, there must be a paradigm shift and change of mindset among policy holders, educators and students. There must be free-flow sharing of information across the web. There must be significant change in funding, infrastructure and organization and methods used in teaching and learning in Malaysia.

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THE DISAPPEARING ENTRY BARRIERS TO THE PROVISION OF DISTANCE EDUCATION

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Abstract

The availability of low-cost and high quality web based synchronous and asynchronous communications tools may be making it possible to easily deliver distance learning in a manner that resembles campus based higher education, and that also replicates the economic model of such education, with low fixed costs and higher variable costs. If so, this would indicate that the financial barriers to the development of distance learning are disappearing. This paper describes an approach to the development of distance learning used at Institute of Technology Sligo, that is based primarily on existing content and web based communication technologies, and that requires minimal financial investment. This paper also suggests certain implications for distance learning should this approach prove to be effective.

Comparing distance education and traditional higher education

Despite the fact that it is admitted that distance learning, based on e-learning and without the development of materials, can be quite cheaply developed, the costing of distance learning generally follows the principle that there are significant fixed costs involved (Rumble 2003). This seems to have led to the widespread belief that there are significant entry barriers to the development of distance education. Are these barriers being overestimated?

This view may be contrasted with the view that traditional higher education courses are dominated by the variable costs involved in the delivery of the courses (Rumble 2003). To some extent this contrast may be attributed to tradition. In public higher educational institutions it is difficult to change work practices and to exploit economies of scale by separating development of learning materials from the delivery. This, along with the financial burden of investing in such materials, has contributed to the continuance of such ancient work practices. This is vividly illustrated by the image of the young academic working late to get a lecture ready the night before giving it. Distance education, on the other hand, was never restricted by such traditions, and before the availability of more advanced communication technologies, could not make use of traditional teaching techniques. So, not being able to make it up as it went along, distance learning was able to grasp the more promising production model of capital investment in materials and the resulting reduced delivery costs and economies of scale.

Is distance learning becoming more like traditional higher education?

The availability of information and communication technologies has made distance learning more like traditional higher education and has also cast doubt on some of the assumptions underlying traditional cost and pedagogical models for distance learning. The availability of cheap web-based asynchronous communication has challenged the assumptions that isolated self-directed learning of traditional distance learning is adequate, and that delivery costs of distance learning can be kept low. This is, in essence, an admission that there are many pedagogic advantages in traditional higher education that had not previously been replicated in distance learning.

Can synchronous web-conferencing remove the final barrier?

Indeed the increased cost of delivery of technology-enhanced learning is considered to be a paradox of modern e-learning (Guri-Rosenblit, 2005). If the availability of cheap asynchronous communication has such potential to improve the quality of distance learning that it, and its related increased delivery costs, are considered necessary, it begs the questions: *"What is the advantage of having high fixed costs in distance learning courses?"*, and *"Is the traditional higher education pedagogic approach better anyway?"*

There has been a move away from the custom development of learning materials to the use of existing materials, such as textbooks, in the adoption of the 'wrap-around' model of learning (Mason, 1998). This may be an attempt to reduce fixed costs by using readily available acceptable content, when faced with extra delivery costs. However, even when suitable books are not available in traditional higher education courses, lecturers seldom create significant amounts of their own content. They give lectures.

The lecture has been a major part of traditional higher education. Recent research (Alberti, 2003) has indicated that video streaming of lectures can reduce the cost and improve the quality of distance learning. The recent significant increase in competition in synchronous web conferencing systems (desktop IP video-conferencing systems), which are easier to use and provide better service than video streaming, and the resulting drop in prices of these systems have accelerated this even further. Using this technology a lecturer may walk into a typical modern classroom, with computer and data projector, and, without any support, be broadcasting (and recording) a class on the Internet in less than five minutes. With a little extra hardware a lecturer may also write on the board. The recordings of these events are extremely useful for those who cannot attend live sessions and as revision resources. Could it be that the impending availability of low-cost, high performance, user-friendly synchronous and asynchronous communications systems could be the key to making distance-learning more easily available, by allowing courses to be delivered in a similar fashion to campus-based courses, thus removing the financial barriers to the development of courses, and even gradually leading to the integration of distance learning and traditional higher education?

Distance learning at the School of Engineering, Institute of Technology Sligo (ITS)

Institute of Technology Sligo (ITS) is a small higher education institute in the north-west of Ireland serving a relatively low population in its immediate region and with a full time student population of about 3500. One of the specialities of the Department of Mechanical and Electronic Engineering is Quality Management with courses at level 7, 8 and 9. Trends in recent years have shown a reduction in demand for full-time courses in the department. Trends have also shown an increase in demand for these courses from working adults, but the low population in the region does not seem to be able to support viable evening courses. Distance learning was considered to be the only way to get sufficient student numbers to make lifelong learning courses in Quality viable.

ITS recruited learners to a pilot course in September 2002, and on the basis of the good performance of the learners and their high levels of satisfaction, a level 8, top-up honours BSc in Quality Management and Technology was launched in September 2003 (before the end of the two-year pilot study). Since then several other top-up courses have been added in Quality (level 7 and 9) and Mechatronics (level 7).

Because of lack of funding for the development of the online versions of these courses, the following approach was taken:

- A "wrap around" model was used for the delivery of all modules (subjects) in the course. Lecturers were informed that there was no payment for the development of materials, that they should use the same textbooks as they use with full-time students, augmenting these with notes, useful websites, and self-directed study guidance.
- A virtual learning environment (VLE) was used to communicate with students, to make learning materials available, to facilitate learning activities and to facilitate submission of assignments.
- When necessary, learners were asked to attend the institute on an occasional basis, for work in laboratories, tutorials and lectures where self-directed learning was found not to be effective.
- A synchronous web-conferencing system was provided to allow lecturers to provide live and recorded lectures as they saw fit. This was not part of the original approach, but was added when it was found that self-directed learning, or occasional visits to the institute were not sufficient for learning mathematical topics. Other types of subjects have also subsequently adopted this facility.

- Staff training was minimal. In lieu of extensive training, a *continuous-improvement* approach was adopted. Lecturers agreed that each year they would analyse their performance in teaching online, discuss it as a group and make improvement suggestions for the next delivery of their subject. Lecturers were given some time off their existing teaching duties in the semester before they were due to deliver online in order to: (i) learn to use the technologies, (ii) be introduced to the concept and some examples of self-directed learning, and (iii) produce a learning strategy and schedule for their subject. They were provided with technical and pedagogical support before and during delivery.
- Lecturers were asked to redesign their subjects by reducing synchronous delivery and using self-directed learning activities, assignment and feedback. Apart from some minimal requirements, lecturers were free to facilitate learning of their subjects in whatever way they saw fit.

Preliminary results

ITS has been satisfied with the outcome of this initiative to-date. From the beginning of the pilot, it was agreed that, insofar as was possible, distance learners would sit the same examinations as full-time students on the same courses. As might be expected of mature learners who are situated in workplaces related to their course of studies, they achieved higher examination results. External examiners have expressed high levels of satisfaction with examination results and consider this initiative to be a positive development. In order to make sure that these better results were not totally due to the learners' situations and efforts, anonymous satisfaction surveys were carried out at the end of delivery of each subject. By and large, the results from these were good. A full analysis of these surveys has yet to be carried out. The drop-out rate for these courses is running at around 13% and all those leaving the course have reported work pressures as their reason for leaving.

Demand for these courses seems to be healthy. Starting with 5 learners on one course in 2002, ITS has increased the number of courses to 5 and the number of students to 100 in 2005, surpassing predictions in both of these. Demand for our online distance learning courses in September 2005 is running at about three times the demand for the equivalent full-time courses. Initially, recruitment was generated by advertisement via mail-shots, but as of 2006, enquiries and applications are arriving without advertising as the availability of the courses are being spread by word of mouth by existing learners.

Costs

The main costs in this initiative are teaching costs. Lecturers were allocated the same teaching hours as a full time group, for a class of 16 distance learners and an additional 1 teaching hour for every 16 above that. As stated above, no payments were made for the development of content. Management, staff support and student support for these courses was funded in the form of replacement teaching hours. As with both the above, technology infrastructure (synchronous and asynchronous delivery platforms) for the project was paid for out of income from fees. The project was allowed to run an effective overdraft until fees arrived. Textbooks were included in the course fees, but because of the high level of administration involved it is intended that learners source their own textbooks in future. Many of the costs were hidden. Lecturers were allocated time off from their teaching load for training. As e-learning was considered a priority for staff development in the Institute, the replacement teaching hours for lecturers and the cost of the trainer were absorbed into the existing staff development budget. Administration was carried out by the ITS Department of Lifelong Learning and not attributed to the project. Although marketing literature was paid for from the fees income, postage and clerical work on marketing came from elsewhere.

Income from fees for the academic year 2005-2006 is approximately €250,000. Infrastructure costs are approximately €15,000 and management and support costs around €20,000. Most of the remaining costs are for teaching hours. A more detailed analysis will be carried out by May 2006, including estimates of hidden costs, and it is expected that a surplus will have been generated. (This will be available at: www.itsligo.ie/staff/bmulligan/dlcosts)

Conclusions

From what we have learned from the initial operation of this service, the academic success of students, and our ability to recruit and retain students, we have come to the following conclusions:

Once infrastructure is in place, and lecturers have undergone minimal training, courses may be put online rapidly with virtually no development costs above administration. A similar approach to the delivery of our traditional courses may be taken, insofar as when a lecturer is asked to teach a subject online, and has agreed to certain restrictions and a commitment to the continuous improvement process, they are free to decide how they should best teach the subject.

The demand for the convenient online distance learning courses is large and will easily outstrip the demand for full-time courses. Using the development procedures outlined, we feel that our major problem will be in availability of teaching staff to cope with the demand.

The current ease of use of web based communication technologies, particularly synchronous conferencing systems, makes us believe that it may be possible to take a more *ad-hoc* approach to making existing subjects and courses available to part-time learners. Lecturers on subjects being delivered to existing full-time students may be able to allow access to distance learners (on a single subject certification basis) by increasing the amount of self-directed learning in their subject, broadcasting and recording the reduced number of face-to-face classes and using the virtual learning environment as the main method of directing and supporting student work. In fact we believe that it may be possible to do this for full courses, thus integrating campus-based and distance learning. This may have two beneficial side-effects: the reduction in the number of hours required to teach the distance learning course, and an improvement in the learning experience of the full-time students through the increased use of self-directed learning and exposure to more mature learners already working in the industry.

Plans for further work

The work described above is essentially a business initiative. It has not been carried out in a particularly scientific manner, either in terms of pedagogical effectiveness or analysis of costs. However the initial results look promising, and with this in mind the following is a list of work that we in ITS intend to carry out:

- Expansion of the number of courses available;
- More precise measurement of the pedagogical effectiveness of this approach;
- Verification and improvement of the effectiveness of the continuous improvement procedures;
- Proper cost analysis of this distance learning operation;
- Research and experimentation into ways of dealing with shortage of teaching staff;
- Research into the integration of full-time campus-based education and distance learning;
- Experimentation in *rapid-development* of some content and a cost analysis of this approach.

Implications for the development of distance learning

If the simple approach described here does indeed seem promising, it begs the question as to why it is not being adopted more aggressively. Although resistance to change is more readily identified in traditional higher education, the author has argued elsewhere (Mulligan, 2005) that there may also be a reluctance to change in distance learning designers, the more experienced coming from the tradition of producing text based content, and many of the more recent coming from interactive multi-media backgrounds. This may even be compounded by the heavy involvement of e-learning and educational research professionals that, rightly or wrongly, place a high value on thorough instructional design and planning.

Should the proposition that distance learning can now be developed and delivered using a similar cost-model to traditional higher education prove to be true, it would lead to the possibility of much faster growth in distance learning particularly in niche courses that have previously been considered not

to be viable. The 'long tail' business analysis is also applicable to niche areas of education. This maintains that the previously suppressed demand for specialist products due to geographic location will reach their true level if access can be facilitated over the Internet. Thus an increase of supply in niche courses may be matched by a surprising increase in demand.

Recent disappointment in the impact of interactive self-paced learning materials and the resulting move to add tutoring to such automated distance learning offerings may mean that the level of expected enrolments at which the above described model is competitive may be much higher than previously expected.

It could be noted also, that higher education is slowly moving towards the techniques employed by distance education, with the adoption of self-directed, resource-based learning, very often facilitated by web-based resources and guidance. This might indicate that the optimal techniques for both modes of learning are not all that different and that it might be extremely cost-effective to integrate both modes of learning, thus bring down costs further.

Such a flexible approach may move the balance of competitive advantage away from large providers and may counteract the widely held expectation that online distance learning will lead to the domination of large online *mega-universities*.

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MESSAGE FROM THE FLOOR

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Introduction

The main focus here will be on the online teacher, floating around in cyber space, trying to put the foot down somewhere. I will not in any way discuss negative or positive learning outcomes. What I hope to show is that online teaching calls for the same qualities in the successful teacher as "normal" teaching does, only more of it. I am also keen to remind school managers that good learning environments are also good environments for teachers. What we all get out of it very much depends on what we as teachers, and school managers, put into it.

We have a terminology problem here. We are familiar with the terms distance and online education and I will use them both. But I will also use the term "blended education", "online" and "distance" simply give the wrong connotations. I work as a teacher of English and Swedish in a context, Municipal Adult Education in Sweden, where we started out with downright distance and online activities, but harsh reality has moved us in the blended direction. An experience, I know, we share with many institutions and colleagues.

What follows will be a mixture of personal experience and a selective overview of recent reports in the field of blended learning and teaching, still in its infancy. You will notice a pedagogical tendency towards collaboration and constructivism.

Six key messages – important for learning and teaching

The fundamental processes of learning do not change (but society does, which I will come back to in my conclusions). We know unfortunately very little about how learning actually works, but we know a lot about good learning contexts, contexts where learners are active and motivated and where learning seems to take place. When you start reflecting on these contexts, you surprisingly find they also constitute good environments for the teacher – environments where the teachers are active and motivated and where teaching actually takes place.

Six major areas of personal interest follow below: safety and an allowing atmosphere, engagement with problems and challenges, a pedagogical basis, interactivity and responsiveness, the stimulation of rich environments and language. All important for the language learner. And for the language teacher.

A climate which values the teacher and creates safety and an allowing atmosphere

The teacher (or tutor, or moderator, take your pick) strikes the note and is the most important cog in the learning wheel. The basic, good teacher behaviour in a classroom: engagement, listening, being active, is obviously relevant in a blended context, too. The differences are that channel and perspective of time are different. As a teacher I have neither body language, nor voice, nor eyes to help me detect vibrations of satisfaction, happiness, anxiety, loneliness or plans to leave the course, all vital signals from a learner.

Rupert Wegerif of the Open University in the UK claims that "individual success or failure on the course depend on the extent to which students are able to cross a threshold from feeling like outsiders to feeling like insiders." Some learners are daunted by the quality and quantity of the contributions of others, they feel nervousness in posting messages. Some also feel discomfort while meeting a dominant group, versatile and sometimes over-keen and over-productive. Anybody had the same feeling in your staff room or at staff meetings? The question is relevant, new technology and new attitudes have sometimes led to the emergence of a rather self-confident elite, a closed group of computer literate besserwissers claiming to possess all answers to lifelong, life wide and globalised learning issues. What we need to do is to be vigilant and build a sense of community into what we do, online and at work.

And remember that all we have learnt about learning and pedagogy is still very valid, new technology does not change any basic concepts in our work.

Active teacher engagement with problems and challenges

We know that active engagement with problems and challenges fosters learning. It is tempting to transfer this idea to teaching: active engagement with problems and challenges fosters good teaching.

For me, going online was and is a challenge. New things to learn, new attitudes to be acquired, old attitudes to be scrapped. I believe I am on firm ground when it comes to pedagogy, technology is still very new to me. Many teachers of my generation do not belong to the computer literati, my more or less computerised wife calls my computing skills rudimentary. But I manage. The idea is to start small when you go online, e-mail is a good start.

The web is an important tool, it enables me to put my own pedagogical and personal marks on activities. We appreciate and encourage different strategies in individual learners and should therefore pay the same respect to individual teachers. I do not want to be locked up in somebody else's pedagogical or technological framework, I also develop by experimenting, reflecting, designing and redesigning. Challenges, remember?

Another challenge is the fact that a successful classroom teacher does not automatically become a successful online teacher. Personal charisma sometimes undergoes dramatic transformations in cyber space: new time aspect, new channel. This is not about technology, it is about culture, sociology and psychology.

The pedagogical (andragogical) basis

The absence of pedagogy becomes very obvious in an online environment where your basic ideas of pedagogy, or your lack of such ideas, are always displayed on the web for everybody to scrutinize. It is important for me as a teacher to remember that faced with new technology, I need to maintain and enhance the pedagogical principles I already know are effective in almost all forms of learning (Mayes, 2001). Barry Jackson and Kyriaki Anagnostopoulu (2001) furthermore maintain that "the main barriers and the main pathways to improving the quality of learning online lie not with the use of particular technologies but with the pedagogical assumptions and conceptions underlying their use".

The ongoing shift I notice is a drift towards constructionism and learning in social contexts, a collaborative context. The change is obvious, not so many years ago I set the frames in a traditional didactic mode, nowadays the learner managed mode forces me to back down. This is nothing I have planned, who wants to lose control. Let me quote Anne Gaskell and Roger Mills (2002) of the Open University when they argue: "…that the challenge facing teachers is not *whether* to give their online learners responsibility for their own learning, but *how much* responsibility they are going to *deny* or *facilitate* and *how* they are going to do it." Let me paraphrase: "…that the challenge facing *managers* is not whether to give their online *teachers* responsibility for their own *teaching*, but […] etc." This, I believe, is a crucial question which needs our attention.

Interactivity and responsiveness

There is no doubt that the social dimension, interactivity and responsiveness among learners and teachers, is important to the effectiveness of online or blended learning. Inherent in online communication is the imperative demand for quick responses. To use an understatement: there is a time issue here for the teacher. If one of my learners needs me late on a Friday evening (I always check my computer before I go to bed), I do not see the point in letting him or her wait until I "open" again on Monday morning. We know that one important reason for learners feeling left out of the course is to have access to the teacher and peers during office hours only (Wegerif, 1998).

Thus, the general freedom of time for learners affects the teacher's working hours in a negative way. Online or blended courses are no time-savers. The advantage and disadvantage with online education is that it is often not time bounded, but has a reputation for "eating time" to quote Gilly Salmon and her book 'E-Moderating'. A learner-controlled environment does not necessarily acknowledge office hours.

We all face major changes in our working hours. When the European Commission (2001) states that *The clear message is that traditional systems must be transformed to become much more open and flexible, so that learners can have individual learning pathways, suitable to their needs and interests, and thus genuinely take advantage of equal opportunities throughout their lives",* the Commission certainly changes things for me and my colleagues.

There is no such thing as a "normal" working day any more. This is a development not only affecting the education area, the traditional clear borders between work and free time are gradually disappearing in other sectors of society as well. A good example of societal changes affecting our context.

Stimulation of rich environments

Rich environments stimulate learning, we know that, but such environments are of course important to teachers as well. The possibilities for an online teacher of English are enormous. What I had to work with not that long ago was a textbook, a workbook and a cassette tape. Now a completely new world has opened, I have access to text, audio and video covering almost all fields of human activities.

The difference is enormous for me as a non-native teacher of English. It is no longer possible for me to know exactly which texts or material the learners plan to use. I need to be in good command of English myself and I need to have good general knowledge of the world around me, I never know what will turn up and in what area I must be able to take part in an exchange of ideas. My stimulation lies in the fact that modern technology gives me and my learners great opportunities to have a context where a collaborative way of learning/teaching creates course contents.

I try to underline here that a stimulating environment for learners is also a good environment for teachers. Online courses can (and should) be highly flexible content-wise. They are normally not dependent upon printed material developed months, even years ahead of the course with some future, average, anonymous learner in mind. Typical of an online course in English is that it is constantly changing, adapting to the learners' discussions and areas of interest. Learners' discourse also provides excellent learning opportunities for the teacher and a richness of perspectives which a course designer would find very difficult to provide in a pre-planned environment. I have learnt much more from my online learners than I ever learned in a traditional classroom.

Language

The virtual classroom is asynchronous. This means that in discussions, comments and exchange of ideas there is time for reflection, you are allowed some space in time to consider both ideas and language. This is good for online learners, but it also a source of satisfaction for the online, non-native teacher of English.

You could call it a win-win situation. The written language that is submitted to the course has been carefully monitored (sometimes by entire families) and I have ample time to hone my own contributions before I post them – even if some speed is required. This creates a reflective way of interacting and using language reflectively normally means language improvement – for the learner as well as for the teacher. I feel safer and more confident online than I ever did in the classroom. This opportunity to reflect must be one of the most important rationales for online, or blended, education.

Conclusions

Working online means accepting multiple roles: a pedagogical role, a social role, a managerial role and a technical role. Not very different from what you are supposed to do in the classroom, really. But using the computer as a tool means you will have to bridge a physical and mental distance which might be absent in the classroom. This is perfectly possible, but online you will need more of all your good qualities.

Sisko Mällinen at Lahti Polytechnic in Finland states that the whole concept of teaching is changing because society is changing, not because of new educational technologies as such. The most successful online teachers of the future might be those who can predict and act on signals coming not from the area

of education, but from the surrounding society, teachers who can create beneficial human interaction in a constantly changing, globalised world. It is imperative for the teachers of the future to be in touch with what is going on outside the institutions. If you see online learning as an isolated phenomenon concerning learning/teaching, you are in a danger zone.

It is no longer possible to hang on to the idea "I have been successful in the classroom for 25 years and I intend to go on as before". The world outside demands changes: lifelong and flexible learning, a shift in the locus of control from the institution to the learner: just for me – just in time. This in turns means that the whole concept of working hours and working environment for the teacher faces major upheaval. We are talking about a paradigm shift.

Have faith, there are signs indicating that teachers still make a difference. What we know about learning, how we monitor, update, advise, produce, assess, identify, prepare, refer, trouble shoot, explain, design, give feedback, manage, discuss, reassure, praise, support, interact, evaluate, facilitate, help, use humour, coordinate, counsel, explore, correct, enable, foster, challenge, summarize, implement, allow, respond, defuse problems, provoke, rage, organize, assist, meet, negotiate, show enthusiasm, diagnose and criticize remain just as important in the future. The only difference is that in online learning you need more of it. At all times of the day.

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E-COMPETENCE BASED GLOBALISED EMPLOYMENT

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Summary

In the present paper the authors highlight the main stages of development of telecommunication technology, which yielded to the fascinating E-world. The main components of the E-world are the E-learning, the E-culture and the E-democracy. Young persons educated on the basis of these three components may obtain E-competences necessary to be successful in the new globalised world. Highly specialised skills may be utilized only on the globalised market. The authors are dealing in details with case studies, how very specialised engineering skills can be utilized on the global labour market.

1. Introduction

1.1 Short history of the global information exchange (GIE)

The modern electronic information exchange has it's predecessors in the early 19th century, when mechanical telegraphs were widely used both in Europe and overseas. The speed of information exchange was increased considerably this time, but these systems could not be used on sea, as the visibility of the telegraph station, being the information source, was an inevitable condition of safe operation of such a system. Consequently the maximum distance between two telegraph stations could not be more than 20 kilometres, depending on the average meteorologic conditions. The first public electric telegraph message was sent in 1844 by means of the device invented by Samuel Morse. In 1866 the first telegraph cable connecting North America and the European continent was laid. In this time only a small part of the total quantity of information was transferred by electric means. Printed information and information by human communication did not finish taking their important place. In 1899 Marconi established commercial communication between England and France, then in 1901 he succeeded to send message across the Atlantic. Transmission of human voice by telephone was completed by Bell in 1874. Radio and cable transmissions were widely used in the WW1. Between the two WWs the concept of image transfer by television was elaborated in Germany and Netherlands, however the first regular broadcasting begun in 1936 in London. The wide range television broadcasting started in the late 1940s in the USA.

Connecting individual computers in a standardized network yielded the apparition of internet. The Internet and its technology continue to have a profound effect in promoting the sharing of information, making rapid transactions possible among businesses, and supporting global collaboration among individuals and organizations. In 1999, 205 countries and territories in the world had at least one connection to the Internet. The development of the World Wide Web is fuelling the rapid introduction of new business tools and activities that may by then have led to annual business transactions on the Internet worth hundreds of billions of pounds. Even such traditional communication means, such as toll free telephone and video calls are widely used with MSN or Skype technologies, billions of emails and short server messages are sent each hour. It can be stated, that information of all kinds is available for people in industrialized countries.

1.2 Human aspects of GIE

Transatlantic mobility of people in the 18-19 centuries yielded to the complete break of communication between family members or to communication with several months of delay. Today frequent displacements due to highly developed civil aviation transport and mainly the instantaneous information exchange due to internet technology has its considerable effects on human behaviour and society development as well. For those people who have access to this information highway, the world becomes more and more a "global village". The inhabitants of this "village" have common characteristics of behaviour, ranging from use of specialized internet-English to very personalized

habits as visiting websites in very special domains. This latter is one of the biggest advantages of the internet as people with range of interest focused on a very special field, can meet all over the world. Let we take an example of aerial photos, which are the centre of interest of not more than 10 persons in the country of authors (10 millions inhabitants). These persons can meet regularly on the net with each other, and they can develop international professional relations as well in a community which counts about 200 members. http://www.rcgroups.com/forums/forumdisplay.php?f=128

Sure that missing real human contact between group members has its disadvantages. Anonymity reduces the responsibility feeling of participants; however in the above professional community anonym communication is not a desired way of communication. In case of certain activities, badly supported by traditional society, the anonymity is one of the major advantages of the internet communication (see the popularity of sex forums).

Conclusion by MS Encarta [1] "The influence of the new communications media has increased the study of their effects. It is believed by some that the individual media tend to reinforce personal views rather than to convert people to other views, and by others that political conversion and influence, depending on who controls which medium of transmitting information, is prevalent. None the less, the changing communications media have proven to have long-term effects, which bring subtle but very important changes to views and perceptions of the audience."

1.3 Economy growth due to GIE

Modern communication technology is in close relation with economy. Commercial partners may contact each other in real-time mode, which is inevitable in case of certain commercial activities, for example air-ticket and reservation commerce. Due to the real-time reservation system introduced in the USA, the number of sold air tickets has been doubled between 1956 and 1958. There are many other fields in the economy showing the same phenomena currently. That's why in year 2004-2005 the so called technology type bonds arrive to an altitude of value never seen before.

GIE has its direct and indirect influence on the economy growth. It operates directly as products of new technology are more and more abundant on the market, and indirectly as commercial techniques are considerably accelerated by use of new communication methods. The typical information transfer devices were the facsimile in the 1980s, the email in the '90s and the SMS. Due to the highly sophisticated communication systems, the word economy become more and more globalised, the same products and services are available in all corners of the world. This phenomenon is strongly criticised by certain political movements, however the phenomena exists and no one can avoid it by simple political conviction.

2. E-learning, E-culture, E-democracy interactions

2.1 Global E-learning penetration

Global use of computer communication has transformed the field of higher educations. Some four years ago, when E-learning system of their school was planned, the authors did not think that in year 2006 no higher education institute may avoid to distribute teaching material by electronic way. In 2002, when we started our E-learning project [8] at Dennis Gabor College [6, 7], we had some strange ideas about use of E-learning technology. Dealing with distance education since the foundation of our college in 1992, first we thought that this modern technology will reduce our teaching costs. Finally we found this was false, as only a very slight reduction of paper support documentation has been detected since that time, and the production and maintenance of e-learning objects need a highly qualified permanent personnel with related overheads.

When surfing on the net, it can be concluded easily that all higher education institutions more or less are distributing their teaching material by electronic means. Not all of them are using a so called LCMS (Learning Content Management System), but HTML documents as minimum requirement, are available on each serious higher education instiution's site. The authors have personal experience with students enrolled in normal undergraduate courses, who prefer electronic teaching objects instead of traditional documents. In spite of this experience the authors are convinced that blended learning courses are more efficient than pure electronic courses.

2.1.1 Transition of educational technology from paper support documents to electronic technology at Dennis Gabor College (GDF)

The Dennis Gabor College is famous for its distance learning activity since its foundation in 1992 in Hungary and in the neighbouring countries. During the past decade there was a tremendous upwind in the field of educations technology. These changes are clearly reflected in the technology used by GDF. See the main stages of this development below:

- 1992: paper support and video cassette
- 1996: more and more documentation in electronic format distributed on flopy discs
- 1998: full range web support on Internet
- 2000: electronic documentation distributed on CD
- 2001: multimedia CDs
- 2002: early challenges in E-learning
- 2003: experimental E-learning (120 students), professional learning administration system
- 2004: full speed running of E-learning system (2400 students)

Today we are running a full scale blended learning education system. Our system has a major role in geographical areas where running of a local education centre with part time personnel needs too much financial effort from our part. In these cases we are assuring teaching materials in electronic format, for a reduced tuition fee. Even in these cases we assure personal communication between students and teachers in the neighbouring local centres.

2.2 Development of E-culture in a society

Industrial society preceding the information society is characterised by mass production of goods which yielded to a modern societal structure. Information exchange has an outstanding role in development of an industrial society (see chapter 1.1). Generally the transformation from industrial to information society is considered, when more employees are dealing with information technology than with direct production of goods. In an information society the creation, distribution and manipulation of information is becoming a significant economic and cultural activity. The USA is considered as the first country of the world, where such type of society has been formed in the 1970s. Information societies in Europe were formed a decade later. The knowledge economy is the information society's economic counterpart whereby wealth is created through the economic exploitation of knowledge. Due to these tremendous changes in the structure of society, human behaviours and habits are changing accordingly. After the workplaces households are invaded by personal computers in the 1980-90s. Personal computers connected on the internet become the primary source of information even in the private life. Exchange of music records and DVD movies by means of internet downloads is a current practice not only between youngsters, but elder ones are also interested in this activity. Online books and newspapers are also available on the net. It shall be noted that online newspapers are much more popular than online books, as most recent actualities are published in them, while unchanged information content of books is not so adapted to internet technology, especially when taking into consideration that the majority of lecturers (authors included) prefer to read printed documents than electronic ones.

Whether we like it or not, changes in society structure due to technology changes yielded to changes of cultural habits of people.

2.3 E-democracy

Unlimited access to information and anonymity (see chapter 1.2), created the basis of free electronic expression, which is not the E-democracy itself, as in a democracy all ones may debate for their own account, showing their own faces, without fearing of negative consequences. In general term electronic democracy, is the utilization of electronic communications technologies, such as the Internet, in enhancing democratic processes within a democratic republic or representative democracy. It is a political development still in its infancy, as well as the subject of much debate and activity within government, civic-oriented groups and societies around the world. [2]

The term is both descriptive and prescriptive. Typically, the kinds of enhancements sought by proponents of E-democracy are framed in terms of making processes more accessible, making citizen participation in public policy decision-making more expansive and direct so as to enable broader influence in policy outcomes (i.e., more heads involved could yield smarter policies), increasing transparency and accountability, and so on. One of the scopes of E-democracy includes electronic voting, but has a much wider span than this single aspect of the democratic process.

The authors, just as many other participants of the higher education scene, must face the phenomena of E-democracy. With introduction of our LCMS system [6], we imposed professional forums for our students and teachers. On these forums professional problems are discussed in highly respectful manner. On these forums the anonymity is out of consideration as all participants may be identified by their username. But when we are interested in real opinion of our students we have to refer to forums which are run by our students [4], independently from our supervision. Our activity is criticised strongly on these forums, but due to anonymity some of them must be treated with precautions.

3. Widely required E-competences

3.1 IT skills

It is rather difficult to define what IT skills mean. In our opinion it is the human behaviour when people consider computer as primary source of information, and they have the necessary skills to obtain this information, that is to say a good command of basic operation and application software is obtained. Nowadays society can be divided into two different categories, once to those who have access to information and second to those who have not. Unfortunately the gap between these two groups is more and more wide, children with poor social background have high chance to remain in same social category all over their life. It is expected that children coming from poor families without IT facilities, will never obtain the IT skills, consequently they will have much less chance on the labour market.

Authors have personal experience with children of age 14-15, with middle class origin, who obtained a very high level of IT skills, which skill is incomparable of those adults who started their carrier in IT some two decades ago. This skill does not mean deep professional knowledge in any subject; it means that these persons are using the computer as natural tool of communication, the same manner as they use a human language. This competence of communication and demanded high professional skills may successfully result that these persons find a very good job.

Apart from the families, primary and secondary schools have the responsibility to aid youngsters to obtain IT skills. In aiming to create the necessary environment in this type of public schools, centralised governmental measures are required. In most cases it is too late to acquire the missing knowledge, when a student enters to the higher education without IT skills.

3.2 Groupware working skills

However most application software support groupware working, sometimes it is very difficult to organise groupware working even with IT workers. People prefer the light group rules without strict hierarchy levels. Even in this case, special rights have to be established for various users who are working on the same documents. Given parts of the document are dedicated to well defined users, who have the necessary rights to deal with this part of the document.

Real groupware cooperation can be carried out by means of a specialised office software or with the incorporated groupware facilities of highly specialised other software. In case of this software, users are ranked in groups of various hierarchy levels. The head of the project is the project administrator, who has all the rights of reading, writing and modifying the documents in the project. Other users have the right only on their special fields. Even timing of the project is defined in a groupware application. In spite of having high professional skills, if someone has no groupware working skills or refuses it, he or she may have much less chance to succeed.

Groupware working needs certain IT skills, but certain skills are also needed to be a member of a working team, which is indispensable for the efficient cooperation.

3.3 Highly professional skills in very special fields

3.3.1 CAD applications with groupware technology

Mechanical design needs very high level professional skills. Even in case of a complex machine the design work is always carried out by a design team, which may count from ten to hundreds of engineers, according to the complexity of the problem. The high number of designers is not only due to the huge quantity of work, but due to the complexity of the problem, the solution of which requires very different competences. Take an example of the project of an airplane, which involves fluid mechanics, mechanical statics, strength analysis, structural design, electric design, and micro-electric design problems and so on. These specialists shall be organised in subgroups. Each subgroup is led and controlled by a dedicated leader. Subgroup members are entitled to create, edit, and revise the project part of their responsibility. Project administrator harmonizes the work among subgroups.

In the 20th century, mainly in the period before the massive use of computers, engineering design was made in big design offices with permanent personnel staff. Parallel to massive use of personal computers, more and more often engineers are engaged for a limited time project, and they exert their activity by distance working. General quality control of engineers is exerted by professional chambers. Membership of professional chambers provides enough guarantees for temporary employer in subject of competence of the employed engineer. Software industry in the first decade of the 21st century supports this type of employment, by producing lot of facilities within highly specialised CAD software.

Let we examine the development of CADKEY software family. While DOS based CADKEY software and Windows based CADKEY-98 were developed for use with standalone computers, the new line, such as CADKEY Workshop 21 and KeyCreator are created for cooperative use, widely supporting groupware features. When visiting the official webpage of the software supplier, a separate page is dedicated for temporary employment of engineers having good skills in CADKEY application and having ability to groupware working skills.

More opportunities are proposed in case of CAD software with higher world penetration which is the case of Solid Works. As many other software supplier, Solid Works proposes a discussion forum on its official website. Mainly technical problems are discussed on this page, but very good opportunities can be found in the User Groups. Solid Works proposes PDMWorks™ which is a project data management software that runs inside the SolidWorks environment or as a standalone application. PDMWorks controls projects with procedures for check out, check in, revision control, and other administrative tasks. PDMWorks has three components:

- **Vault**. The Vault is a directory (usually on a server) where documents are stored in project directories. The Vault administrator installs and maintains the Vault.
- **VaultAdmin**. The Vault administrator creates user accounts and projects, specifies revision and lifecycle schemes, and establishes global settings in the VaultAdmin.
- **Clients**. Users check documents in and out of the Vault, increment revision and lifecycle status, view information, and generate reports using the SolidWorks client or the Standalone client.

Finally it can be stated that highly sophisticated application software proposes well structured hierarchy, which helps the standalone user to be integrated in a group, which carries out complex engineering design. Having the necessary groupware competence and the required professional knowledge, engineers are much more flexible and by means of distance working facilities they can organise their employment more easily.

3.3.2 Case study of a R/D project within Dennis Gabor College

Preparing students for the self-management of their employment is a time and labour consuming task, which can not be applied for every student. In our opinion the best way of this training is to integrate students in a current research-development project of the institution, via the thesis. This was the case when we engaged a student in our RD project: Unmanned Aerial Vehicle (UAV) which is capable to make aerial photo and video recording by remote control. One of the authors was the project director;

the student and his helper from an other university were the participants of the project. Data exchange was organised via internet. Due to licensing problems, CADKEY-98 was used for the project instead of more appropriate WorkShop 21. However an almost real-time data exchange ensured the project could be finished in 6 months and now the UAV is under the first flight tests. We hope that in the next 6 months all expected technical features of the aircraft will be proven and the second stage of the development (GPS control) may be started. For the student the participation in the project resulted in a successful thesis, and acquiring practice in groupware working with sophisticated CAD software.

The authors are deeply convinced that their contribution to entrain students in groupware working positively influences the employment chances of them.

4. Security considerations

Certainly distance working has enormous advantage from the point of view of employer and employee both. When the employer knows personally the employee and he has full trust with employee, even in this case the security of the project shall be subject of evaluation. Professional chambers are unable to assure full guarantee for their members, and after 11th September all project administrators have to take into consideration this fact. There are some topics which shall be excluded by default from the E-employment circle:

- Defence and security type projects,
- Energy production of any type,
- Projects with biology, bacterial or virus treatments,
- Water supply projects,
- Food security projects,
- Any other project which may endanger multitude of human lives.

When employing engineers in key technological fields by distance working, human resource directors shall contact personally the candidates and carry out standard security checking. Even it is more important when candidates are from sensible parts of the world, or it is expected that foreign intelligence services want to gather information about high-tech products.

5. Expectations for the future

It is rather difficult to predict even the near future, say, the coming decade. However from the existing trends one can foresee that the global IT communications continue to grow exponentially. The communication technology will provide more effective and less expensive tools for both the personal and enterprise level communication. Consequently distance working as primary user of IT communication facilities shall grow accordingly. Software industry will produce highly sophisticated products with all necessary components for groupware use. Engineering work becomes more and more a standalone activity with temporary employment agreements.

6. Conclusions

- Massive use of local computers and internet in industrialised countries has considerably influenced the human behaviour which yielded to important changes within the society. Today, in any industrialized society, there is a wide gap between people who have access to information via IT facilities and those who have not.
- Youngsters coming from IT user families have already IT skills, which may be a decisive factor in their social integration.
- IT skills plus professional competences in any IT related profession may assure permanent chances on the international labour market, via distance working facilities.

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TRANSITION FROM TRADITIONAL DISTANCE LEARNING TO E-LEARNING AT THE BUDAPEST BUSINESS SCHOOL

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Introduction

Some of the problems discussed in this paper have already been referred to in our earlier contribution (Helsinki, 2004). This time we want to focus on new developments and the difficulties our school has encountered in its efforts to introduce e-learning methods which would ultimately replace at least some functions of traditional distance learning.

Distance Learning Programmes at the Budapest Business School (BBS)

Distance learning was first introduced at the College of Commerce, Catering and Tourism in 1996, followed the College of Finance and Accountancy in 1997, both independent institutions at the time, but since the year 2000, members of the BBS.

In the beginning, DL was an attempt at modernising former correspondence courses. Fortunately, European and government funds were available to adapt the teaching materials to the methodological requirements of DL; nevertheless, it took some time for the instructors to learn that DL was not a shortened variation of the full-time traditional programmes. Even the management of the school looked at this new form of education with a certain suspicion, and preferred to call it "experimental".

Today, fortunately, DL has become fully accepted by academics, students, and the general public alike. It turned out that it is generating funds that, with always diminishing government support, have become indispensable for maintaining the school. Thus, we have full, 8-semester DL degree programmes in two colleges of BBS.

Realising the importance of further modernising our DL programmes, BBS has been trying to introduce elements of e-learning in our programmes. We should mention three major projects using e-learning methods. These are as follows:

1. the courses launched by the DL Centre of the College of Commerce, Catering and Tourism, which covers core courses for full-time and DL students;
2. a government-funded 24-module DL programme for SMEs created by a team of academics from the three colleges constituting BBS;
3. a Leonardo project aimed to provide a comparative analysis of SMEs in eight European countries.

Last year we described these projects, which are still undergoing changes in the course of further development. This time we want to point out some problems and difficulties that we encountered during this process, then point out some of the strengths and opportunities of our e-learning projects.

Difficulties and Threats

The most important difficulties of transition from traditional DL to e-learning that we have encountered are these:

1. *Financing.* Although we can consider ourselves to have been fortunate in that our projects have been funded by various European and governmental organisations, there have always been problems of *how to allocate* resources, especially when working with several partners, in particular with foreign members of a consortium. The problems have always been solved, but reaching compromises took quite a lot of time and effort. We do not want to put the

blame on our partners; conflicting interests are the nature of financial deals. And who can say that European or national financial authorities are always easy to deal with. Nevertheless, those – like ourselves – who manage to be funded have little reason to complain, though writing applications for grants is not an easy job and winning them is even more difficult.

2. *Cooperation with partners.* Most of our partners are friends; otherwise we would not have chosen them. We appreciate their assistance and we always learn a lot from them. But there can be (and often there are) arguments and disputes between friends, too. Again, these have always been settled, but it costs a lot of time and trouble.
3. *Resistance of academics.* Very often, academics are not sufficiently motivated in participating in methodological innovation. They feel they are heavily overloaded with work and are reluctant to undertake extra tasks. Their reluctance is often accompanied by the unwillingness of administrators to assist the pioneers of new methods. Fortunately, in our school there have been rare instances of the latter, however, complaints by colleagues of being overburdened with work are not infrequent.
4. *Inadequate methodological preparedness.* This seems to be a major difficulty. There are a limited number of academics who are knowledgeable in their discipline and sufficiently versed in DL or e-learning methodology. It is very difficult to tell a renowned professor that his acclaimed book cannot simply be put on the net and by doing this be claimed to be an up-to-date teaching material. Actually, understanding and applying DL methods require that tutors make considerable and concerted efforts to prepare high-quality teaching materials. But academics are unlikely to admit their deficiencies in methodology, and it is almost impossible to convince them of the importance of participating in a methodological training course.
5. *Finding appropriate ICT experts.* It is much easier to get high tech computer equipment than to find people who can prepare good e-learning material. Obviously, one cannot expect an expert in, say, consolidated accounting to be equally well-versed in ICT technology. How do you combine the knowledge of the two people? In practice, you assign the accounting professor to write the material "for the screen" and ask an ICT expert to put the material on the website. Usually, however, things do not work out very well this way. The ICT expert does not find the material really adaptable, and the result will be, at best, an attempt to make a learning material more attractive to the reader, or, in the worst case, a book on a computer screen. We think that much closer cooperation between tutors and ICT experts would be necessary. Instead of working on the e-learning material separately, in succession, they should be working together, concurrently. The tutor should learn as much from the ICT expert as possible, and there could be no harm if the ICT expert had an inkling of what the teaching material was about.
6. *High expectations.* Very often, administrators, tutors, or students have totally unrealistic expectations of new teaching methods, and when outcomes fall short of them, the final result is bitter disappointment. We should be satisfied with modest progress, better achievement, slightly rising performance, especially in the beginning. We will not probably see any dramatic improvement when we first try a new material.
7. *Accessibility.* In Hungary, accessibility is still a point to be considered. Access to the internet is still quite costly; consequently you cannot take it for granted. Fortunately, it is increasingly easier, especially for young adults, to find access to the internet but cost is a limitation that has to be taken into consideration.
8. *Finding target groups.* As the name of our school suggests, our target groups are people connected with business. It is one of our strengths, since this is a fairly large and mobile group, eager to learn new things. At the same time, they are very busy, which would make them the best selection of prospective e-learning students. In spite of all that, we cannot take pride in the large number of enrolment in e-learning programmes.

Strengths and Opportunities

To look at the brighter side of our achievements, let us see some of our strengths.

1. The mere *size* of our school (about 20.000 students) gives us a competitive edge. In an increasingly competitive environment we have a considerable advantage by having a suitable infrastructure, adequate human resources, a well-organised DL centre, and – as a school with quite a long history – a fairly good reputation.
2. The fact that BBS is the result of a *merger of three* formerly independent *colleges* offers the school an additional benefit, still not fully exploited: the pooling of human resources. This is a slow and delicate process, but the establishment of new units within the school, such as, for example, the Lifelong Learning Centre will hopefully create new opportunities and possibilities.
3. The *government has been attaching great importance* to adult education. This is closely connected with the ever changing economic environment of the country, where certain occupations become obsolete and the need for others emerges simultaneously. The result is temporary structural unemployment, the remedy for which is retraining. We have a niche here which will provide us opportunities for a long time.
4. *Younger instructors* will probably feel more at ease with IC technology. This will greatly facilitate solving some of the problems that now still hamper the production of suitable e-learning programmes.
5. With seven campuses, BBS is an ideal organisation for *networking*, which makes it possible for the materials to be used in several places. It is true that e-learning is meant for individual learners at no particular site, but to have a physically existing centre for examinations and other administrative tasks is always an advantage.
6. Since our main *target group* for e-learning project has been SME *managers/owners*, we hope that we will have a steady market for our products.

Conclusion

Higher education all over Europe is occupied with the problems connected with the Bologna process. Higher education has always been a common European endeavour. We think that DL and e-learning are excellent tools to enlarge the scope of cooperation between higher educational institutions on this continent.

In Hungary, a new law on higher education has just been enacted. One directive of the law is that the number of contact hours in DL cannot exceed one third of those of full-time regular programmes. This clearly points to the necessity of finding new technologies for conveying the teaching materials to our students.

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THE FIELD STUDY AS AN EDUCATIONAL TECHNIQUE IN OPEN AND DISTANCE LEARNING

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Introduction

The main characteristic of Distance Learning is that the student is taught and learns without his tutor's physical presence in the classroom. The opportunity for a direct (face-to-face) communication between all members of the educational group [tutor-counselor (TC) and students] in Distance Learning is offered by the Tutorials/Contact Sessions (CS). Although these CSs are not compulsory, it is estimated that they are of high importance, since among other things, they help in clarifying difficult to understand points and they also help in the cognitive subject becoming more fully comprehensible by the student (Holmberg 1995).

For the discussion of the various issues at the CSs many different educational techniques within the framework of adult education such as teamwork, short lectures, debates, questions and answers, case studies, simulations, role play, etc., are used in combination. These are techniques raising the student's interest, facilitating his/her participation in the learning process and developing interaction between TC and students and between students themselves. They also create a learning and research environment, encourage the students to work in a group and to learn by acting (Kokkos 1998).

One of these educational techniques is the field study, which is the subject of this paper. To this day, no research has been carried out for the possibility of implementation of this technique in Distance Learning nor have any results of such implementation been studied. This paper comprising of three parts contains a general presentation of the field study as a teaching technique in the first part while in the second part the successive stages of development of this technique in Distance Learning are analyzed. Finally, in the third part the students' views of Hellenic Open University on this technique are presented.

The field study as an educational technique

Field study is one of the outdoor education methods (Hammerman 1980, McRae 1990, Priest 1993, Hammerman, Hammerman and Hammerman 2000), which, according to Watts (Papadimitriou 2002) are rooted in fields such as philosophy, epistemology and naturalism. Many educationists such as Pestalozzi, Froebel, Dewey, etc., have been influenced by these fields and applied many of the ideas expressed therein in their teaching practice. Since the end of the 19th century important educational movements have been developed in various countries focusing on the environment (the natural, in particular) as a learning field. Nowadays field study forms part of the curriculum of courses from a broad spectrum of sciences including geology, biology, archaeology, history as well as from various social sciences, while it is often implemented in formal tuition and adult education programs as part of the practical exercises undertaken by the students.

The field study relates to students' activities taking place in learning environments outside the traditional (conventional) classroom, such as office environments, historical areas, monuments and museums, national parks, zoos, wetlands, seaside, wild life areas, etc. It is based on the supposition that the most valuable experiences of the students are gained through images taken by the senses. It is connected with most educational techniques and it often forms part of a project. It allows students to participate in the design of the educational activity and to acquire in situ experience and knowledge through the research process (Kern and Carpenter 1984, Moles 1988). More particularly, it helps the students acquire new knowledge and skills and formulate interest attitudes towards the study subject; in other words, it contributes so as the changes through learning to take place on knowledge, skills and attitudes levels (Rogers 1996, Knapp 2000).

The work that the students undertake in the field can vary since they may be involved in the description of a place, the comparison of visual or other data, in some kind of research or a survey in general, in other words, things which cannot be achieved as effectively in the traditional classroom (Davidson 1981). However, many teachers consider the field study as a waste of time. They maintain that using less time in the traditional classroom, e.g. by means of a lecture supported by suitable audiovisual material, such as a film or slides, the students can achieve better results in the cognitive fields, not to mention that they do not have to move (Jacobson 1986). On the other hand, however, as it is evident from the results of many researches, the students learn particular subjects of various cognitive areas faster and more efficiently if they are found in an appropriate outdoor environment rather than in a traditional classroom (Mason 1980, Kern and Carpenter 1986).

Adopting the field study as a suitable educational method in distance education depends on the learning object, the aim and objectives of the learning process, the learning styles and the educational characteristics of the students, the competency of the TC, the learning environment, the time available and the particular moment, as well as the resources available. In any case, however, it is useful since it can relate to many of the conditions for effective learning in adult education such as the active participation and the activation of the students' existing schemata (Kokkos 1999). More specifically, in field study the students are offered ample opportunity for active participation since they are called upon either in groups or individually to plan, implement, apply, re-plan and evaluate certain activities relating to the theoretical background of their studies. The learning aimed at through field study is concerned both with consolidation of knowledge acquired and the acquisition or development of skills and attitudes.

Some distance education institutes organise field studies relating to their programs during the CSs or even on weekends. On environmental issues, for example, the students have the opportunity to observe and collect data from the study area, exchange their views with members of environmental organisations, representatives of the Local Authorities as well as the residents, thus ascertaining the differences in views (Filho 1998). Furthermore, the students' involvement in field studies could be achieved by enriching the activities suggested in the course books (and the assignments) with subjects for which field study is necessary (Blackmore 1998). In this way studying becomes more active and experience-related with emphasis on the local environment (Clover 1998).

Like all participatory techniques, the field study requires systematic and careful preparation on the part of the tutor. In order for the field study to be effective the tutor must take care so as the work to be well defined, the students' activities to be clear and well planned in advance and the output well prepared (Orion 1993, Priest 1993).

Process of application

As in traditional education (Orion 1993, Orion and Hofstein 1994), in distance learning, field study comprises of three stages: preparation, implementation and composition – presentation. In this section we are describing these stages with reference to the role of TC and of the students. This description refers to students who participate for the first time in field study. Alternatively, if they have already experience with this technique, it is expected that they take initiative in the organization as well as in the implementation stages of the field study.

Stage 1: Preparation

Preparation involves action on the part of the TC within and outside the CS. More specifically, the TC:

1. Outside the Contact Sessions

- Studies the course books and locates subjects suitable for field study.
- Studies the places of the students' areas of residence and explores all possible places for field study in those areas.
- Locates those areas within the town where the CS takes place, which are suitable for study.
- Creates an archive containing the name and place of the area, as well as what this area can offer in terms of learning together with any other useful information.

- Makes a preliminary visit to "the field study" in order to familiarize himself/herself with the study object should it be exploited by the entire group of the students or during the course of a CS.
- Prepares activities for the students together with a list of the required materials.
- Secures co-operations and selects the best time for implementation.
- Secures the relative permit/s (if necessary) for the visit and explores the best possible way of transportation together with the cost involved.

Moreover, the TC can inform the Coordinator of the Module as well as cooperate with other TCs. It should be noted that, depending on the object of the study, the TC could ask for the students' opinion on the fields suitable for study within their area of residence.

2. In the Contact Sessions

The TC explains the field study technique and sets the rules. More specifically, the TC organizes a preliminary discussion for the determination of:

- The subject of the field study;
- The aim and the goals of the field study;
- The place where the field study is to be carried out;
- The activities to be carried out (if group work is involved, every group must be assigned certain activities);
- The duration of the field study;
- The sources to be utilized;
- The final product.

Moreover the TC determines his role and encourages the students' active involvement. Finally, prior to the visit to the place to be studied, a relevant projection (either in the form of a film, CD-ROM, or slides) can take place within the CS. This is quite important since thus the students' interest can be raised and they could start processing the questions to be answered as a result of the observations to take place in the field (Falk and Balling 1980).

Stage 2: Work on the field

On the field, the students, either in groups or independently, are assigned certain activities. These activities can vary and their nature depends on their aims and objectives as well as the opportunities offered by each particular field. Activities on the field can include observation and comparison, mapping, sample taking, taking of photographs, etc.

Stage 3: Composition and presentation within the Contact Sessions

After the on-the-field work has been completed, processing of the data collected follows leading to composition (analysis and interpretation of the collected data). During this stage, the students could either carry out one or more activities included in their course books, or prepare a report containing the basic points of their research, draw up a brochure containing photographs, diagrams, sketches, plans, histograms, or they could merely exhibit the material they have collected by means of written texts, and so on. The electronic or otherwise communication between the students is considered important at this stage (Vassala 2003). The students for their assignments can use elements from the field study. The presentation of these assignments in the CS is considered exceptionally useful.

The research

In order to ascertain the students' views on field study, a small scale qualitative research was conducted with a group of 30 students attending the "Open and Distance Education" Module of the Postgraduate Program in Education offered by the Hellenic Open University.

This research was carried out during the 3rd Contact Session (12 February 2005). The students who participated in the survey were those present in the CS. They were 24 of whom 11 were males and 13 were females. Almost all of the students were teachers in Primary or Secondary Education. Most of them (23 students) had attended traditional adult education programs, while 10 of them had been involved in adult education as trainers. 15 students used field study once or twice a year as instruction technique for the teaching of conventional education subjects (mainly in Secondary Education and in adult education programs). Most of them had already gained some experience in distance education as students since they had already successfully completed their studies in other modules with the Hellenic Open University. However, none of these students had participated in activities involving field study.

Our research focused on the analysis of the contents of the students' answers and aimed at:

- Ascertaining their experience in field studies as trainees in conventional education;
- Ascertaining their views on the possibility of using this technique in distance education and their willingness to participate in such a process.

The results of this research in are as follows.

Field study in conventional education: the experience of the students

16 students had this experience mainly during practice, which followed their studies in conventional education, once or twice a year (in Secondary and Tertiary Education or in seminars carried out by Vocational Training Centers). Application of this technique was often not successful due to unsuccessful organization.

For example, one student reported: *"Lack of preparation and careful planning, the students did not visit the field as a group, no assignment or conclusions were presented." Two other students reported: "Lack of any substantial preparation and support from the teachers in charge resulting to lack of evaluation and control of the whole process. Merely looking at some places does not offer enough knowledge to cover the subjects of the training course.", "The poor planning and organizing of the field study resulted in a simple visit rather than a study visit."*

However, the students believe that field study has a lot to offer, if properly carried out: *"Field study is useful because it is an experiencing technique. It studies what is happening at the moment and the place it is happening. All senses are involved. The desired parameters are recorded, conclusions are extracted, and finally, with the composition process, we are able to get a final product."*

Field study in distance learning: the views of the students

The students were of the opinion that field study can be applied in distance learning in almost all Courses and modules. Especially in "Open and Distance Education" module, they believe that field studies could be carried out in organizations offering distance education, in warehouses where materials are collected and distributed, in the offices of the administrative staff, in places where educational material is produced.

It is worth mentioning that most students set conditions for the successful application of the technique. The most usual conditions they set relate to the careful planning and organization of the field study (selection of the most suitable field, the goals and stages of application explicitly determined, etc.) both on the part of the TC and on the students. The students believe that their place of residence as well as their various commitments must be seriously taken into consideration. The students are willing to participate in field studies as they consider them very useful, since as two of them pointed out *"the student gets out of the house and observes the theory becoming practice", "they are helpful in acquiring knowledge and skills as well as applying such knowledge in practice".*

The students' anxiety relating to the success of the attempt is however evident "yes, as long as I gain more and deeper knowledge on the subjects of the module I am studying", "the object of the field study should be within my priorities and interests".

However, there are cases in which the students would like to participate in field studies in order to understand the technique better with a view to applying it at their schools. *"...except the other I would like to learn the technique in order to apply it at my school, with my students."*

Insofar as the advantages of this technique are concerned, the students pointed out its substantial contribution in truly furthering their knowledge and in raising their interest on the subject they are studying through work in a real environment. They also stressed the contribution of the field study in the development of their various skills. One student said: *"Its basic advantage lies in the possibility it offers to the student to come in direct contact with the subject to be studied and in this way to get thoroughly acquainted with it in its real dimensions."*

Among the disadvantages mentioned are, the time consuming preparation it requires for its implementation and the difficulties in the students getting together due to the nature of distance education. More specifically, some students pointed out: *"getting the adult students together is a real problem, if we take into account their commitments and the various places they live in", "a time consuming process, which requires serious and careful preparation as well as careful selection of the field and the place, something which is often difficult", "it can put extra load on the student with extra obligations [...] the student might feel that a field study is unnecessary taking up his/her valuable time"*.

Conclusions

The field study is an educational technique, which makes the educational process more active, helps the students to work in real situations and to develop skills, competencies and positive attitudes through activation of their existing ones. Nevertheless implementation of this technique requires very good planning and enough time. For these reasons our students did not have a very good practice experience as teachers/trainers within the traditional education.

In distance education in particular, field study can be carried out with the students working in groups or individually with or without their tutor's presence. The students of the "Open and Distance Education" Module not only consider the technique important for all Modules but they are willing to participate in field studies despite the difficulties that may exist (time consuming preparation and implementation, physical presence, different places of residence and time available) as long as these studies are well prepared and organised not only by the TC but also by the students. Of course they stressed the importance of thorough preparation both on the part of the tutor and the part of the students in order for the theoretical background gained through the study of the relevant Module to be substantially furthered.

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LIBRARY SUPPORT FOR LIFELONG LEARNING: REMAINING CURRENT

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Introduction

Many adult workers find themselves playing catch-up to keep their knowledge base current and compete with newcomers entering the workforce. To retain a job, be promoted into a better job, change careers completely, or enrich their lives, an increasing number of adults are furthering their educations. According to the European Commission, "[Lifelong learning] promotes the development of knowledge and competences that will enable each citizen to adapt to the knowledge-based society and actively participate in all spheres of social and economic life, taking more control of his or her future". Lifelong learning is necessary to meet the demands of today's fast-paced, ever-changing workplaces requiring an increasing amount of knowledge and flexibility from employees (Friesen & Andersen, 2004, p. 680; Gaimster & Gray, 2004). Whether called information literacy as in universities and colleges, or lifelong learning when knowledge, skills and abilities are transferable to the workplace, the ability to think critically, identify and articulate information needs, analyze information sources, and synthesize information to solve problems are complex abilities upon which lifelong learning/information literacy is based (George, *et al.,* 2001, pp. 281, 285; Law, Lee, & Chow, 2002, p. 415).

As colleges and universities everywhere see a demographic change in the student population, are their academic libraries ready to support these new students? Can the library remain current with instruction and communication technologies to disseminate tutorials and other research assistance? What innovations are already being tried and what hurdles remain before us?

Background and Purpose of Study

Aurora University (AU) is a private, not-for-profit, comprehensive university in Illinois that has welcomed adult students for over 50 years. An evening program for soldiers returning from WWII was established in 1947, one of the nation's first at a liberal arts college. Continuing in that tradition, the university strives to meet the needs of a wide variety of returning adult students and offers lifelong learning in many forms. Nursing, recreation administration, social work, business, teacher certification courses and degree programs are offered evenings and weekends at off-campus locations, including students' workplaces, such as schools, hospitals and places of business. Other less formal courses in areas such as agriscience, writing skills, math remediation, problem solving, and coping with difficult people are also offered. The George Williams Campus in Williams Bay, Wisconsin has a strong focus on outdoor educational programs in an experiential setting.

In many cases, students enrolled in these courses never come to the main campus. Yet those students require library and other support services as much or more than traditional students (Mactague, 2001, p. 31). The challenges and opportunities in providing services to non-traditional students "[…] not only create opportunities for librarians to collaborate, experiment and learn from, but also to examine all the services we provide – not only for students away from campus, or at a distance, but for all faculty and residential students as well, increasingly more of whom use our libraries from their offices and homes" (Haynes, 2002). The university does not offer any fully online courses; however, a course management system (BlackBoard) is used to supplement face-to-face courses from a variety of programs. This has proven to be a valuable communication tool for off-campus students, but is it enough?

The purpose of this study is to perform a gap analysis to research best practices of library services to non-traditional students at other institutions, and compare those best practices against AU's current practice. Recommendations on bridging the gap, thereby improving service to AU's non-traditional students and positioning the library to better support current off-site, blended learning and technology-assisted courses and future on-line projects will be offered.

Review of the Literature

Goals of Library Support

While each educational institution views and organizes lifelong learning and distance education differently, according to its own academic mission, the goal of the institution's library system should be "to provide seamless (author's emphasis) library service to students and faculty, regardless of their location, to meet the specific needs of teaching/learning and research" (Haynes, 2002). More specifically, to ensure the lifelong learning skills of its students, the Queensland University of Technology, recognizes "the need for students to develop independent learning skills in order to work within the electronic learning environment". Therefore, an integrated student learning support program will include academic, information and technology literacy (McCarthy, 2001, p. 236).

Student Needs

"[…] Students are often reluctant to use the library services," preferring "…to use their local public libraries, finding them more comfortable places which tend to support lifelong learning" (Haynes, 2002). These are students who need to feel "connected" to the institution, to have a contact person who can help them navigate the institution's maze of information and requirements (Haynes, 2002; Mactague, 2001, p. 32). Librarians can help fill this role.

Non-traditional students' needs can be summarized as follows:

- The ability to work at their own pace, at their own time, and at their own place students (Mactague, 2001, p. 34; Zhang 2002, p. 356)
- The ability to maintain constant communication with faculty and fellow students (Mactague, 2001, pp. 31-32, 34; Zhang 2002, p. 356)
- The ability to learn according to their own learning style, for example, to take a nonlinear approach to the subject matter (Mactague, 2001, p. 25; McCarthy, 2001, p. 235)
- The ability to acquire a variety of information, communication, and technology literacy skills that will enable them to become independent learners (McCarthy, 2001, p. 223)
- The ability to obtain assistance with searching databases and the Internet, and with improving their study and writing skills (McCarthy, 2001, p. 235)

Best Practices

Standards and guidelines are set down by accreditation and library organizations, including the Association of College and Research Libraries, the North Central Association, the Council of Independent Colleges, the Western Association of Schools and Colleges, to name a few. Program accreditation bodies, such as those for nursing, and teacher certification also provide guidelines. However, none of these are prescriptive, providing a list of must-haves. Instead, terms such as "adequate" and "sufficient" are used, leaving institutions to interpret what is best for their own students.

Best practices as shown by a review of the literature published between 2000 and 2005 include:

- Maintaining strong institutional commitment to provide high quality infrastructure, support and training for faculty, staff and students (Mactague, 2001, p. 129; McCarthy, 2001, p. 223)
- Providing services 24/7 via various media, including toll-free phone, email, chat, and state-of-the-art video, visualization and virtual reality formats (Cervone & Brown, 2001, p. 148; Bailey-Hainer & Horton, 2005, p. 7)
- Providing an increasing number of materials available via various media, including e-books, electronic reserves, electronic document delivery, electronic catalogues, electronic abstracting & indexing, and full-text online journal articles, as well as the more traditional snail-mailing of materials (Cervone & Brown, 2001, p. 148; Haynes, 2002, McCarthy, 2001, pp. 223, 226)

- Providing guidance, such as online tutorials, on using the library, in formats supporting heterogeneous learning styles and competency levels (McCarthy, 2001, p. 225)
- Providing a single interface and linking solutions to integrate catalogues and databases and link them directly into online courses (Cervone & Brown, 2001, pp. 148-149; Bailey-Hainer & Horton, 2005, p. 7; McCarthy, 2001, pp. 223, 237)
- Providing liaison librarians who work with faculty and information technologists to develop an online presence for every unit taught, and offer seminars and one-on-one assistance to faculty in the use of their course management software (Cervone & Brown, 2001, pp. 148; McCarthy, 2001, pp. 229; Rieger, Horn & Revels, 2004, p. 208)
- Providing librarians with professional development opportunities, especially those that would equip them to assist with course development (McCarthy, 2001, pp. 230-2)
- Replacing microforms with digital media when possible (Cervone & Brown, 2001, p. 148)
- Building a database of digital images and archival materials (Cervone & Brown, 2001, p. 148)
- Awarding teaching grants to promote innovation in the development and delivery of library services (McCarthy, 2001, p. 229)

Methodology

After a review of current and best practices, a survey was developed and targeted at three specific populations that interact with non-traditional students and our current course management system (Gaimster & Gray, 2004). The categories and sample questions are as follows:

Open-ended questions for Information Services personnel and Provost:

- What was the university's philosophy behind the purchase of a course management system?
- Currently, what is the expected role of online "any time/anywhere" content delivered via a course management system?
- What use is foreseen for a course management system in the next five years?
- What would be the top five items on your wish list for library support of non-traditional students? These items could be materials, services, and personnel, anything you like.

Open-ended questions for faculty:

- How do you use the course management system in your course(s), that is, what is your approach to presenting your material?
- Do you expect students to write a research paper for your course(s), and if so, what resources do you expect them to consult?
- What would be the top five items on your wish list for library support for your non-traditional students? These items could be materials, services, and personnel, anything you like.

Question for Library, Learning Centre and Office of Adult and Graduate Studies personnel:

- What would be the top five items on your wish list for library support for your non-traditional students? These items could be materials, services, and personnel, anything you like.

Using the "wish list" approach we hoped to elicit open-ended responses and gather insight about the services participants would like to see if no restraints were placed on their desires. In other words, the respondents need not have all the answers, nor know how to achieve their wishes. That would be the librarians' jobs.

Results

Information Services Personnel and Provost

According to Information Services Department (IS) personnel, a course management system (CMS) began to be used when AU partnered with another university to offer online courses in business. When that relationship was dissolved, AU administrators decided that while the university would not "get into distance education," a CMS would be used to support classroom teaching, as it is a "good communication mechanism," especially for the "dissemination of limited resources," and an "organization tool," a way to pull resources and functions together and keep students within the course framework.

On the IS wish list is an open source CMS designed around solid learning theory, that allows new functions to be added, integrates with support functions such as email and grade reporting systems, delivers publishers' content packaging, i.e. content to support their textbooks such as quizzes, study guides, PowerPoint slides, and supports standard course management formats (SCORM). Their preferred CMS would offer a "toolkit approach" to content, allowing faculty to pick and choose from a menu of items to support coursework, and support ancillary pedagogy such as library use instruction, and collaborative group work (B. Sutton & D. Basener, personal communication, 22 Dec. '05).

Faculty, Library, Learning Centre and Office of Adult and Graduate Studies Personnel

One hundred twenty surveys were sent out and thirty responses were received, for a twenty-five percent return rate. The responses were categorized as follows: materials, services, delivery modes, tutorials/training, web-page design, and facilities. The most requested item overall fell in the materials category, and was an increased number of electronic journal databases in the content areas (N=12). In the services category, in-person library use orientations by librarians was requested seven times, and the availability of live librarians to assist students 24/7/365 was requested six times. In the tutorials/training category, an online tutorial on database use was requested six times. Facility improvement by providing study rooms for adults with children was requested four times, and putting the computers back in the former computer lab was requested four times. An Excel spreadsheet detailing the number of all requests is posted on http://www.aurora.edu/~nmactag.

A number of requests were for items specifically for non-traditional students. These requests included materials appropriate for non-traditional students, including a librarian to act as liaison to non-traditional students, professional development for faculty to help them better understand the needs of non-traditional students, FAQs, an online newsletter for non-traditional students, study rooms for adults with children and on-site child care. (The university did provide on-campus child care; that service was discontinued in 2000 to free up space for more classrooms.)

Other requests were for tutorials, training, and professional development opportunities. Professional development requests included support for scholarly writing, classroom technology use, and understanding non-traditional students' needs. Tutorials were requested covering topics such as how to use electronic databases, search the Web, and improve computer skills. The preferred delivery mode for tutorials was online.

As a shell in the course management system BlackBoard is created for every class, and the extent of its use is up to each faculty member, the number of faculty who actively and regularly employ BlackBoard is unknown. Three BlackBoard users responded telling the authors how they used BlackBoard. The most common use was to supply course information, including the syllabus and course calendar (N=3). Two used the online gradebook.

Discussion

While AU subscribes to over 10,000 e-journal titles, the most requested item overall was increasing electronic journal and book holdings, also found on the best practices list (Cervone & Brown, 2001, p. 148; Hayes, 2002; McCarthy, 2001, p. 223, 226). Not only are e-materials accessible remotely, but they also free up shelf space. In a zero-growth facility (built 40 years ago for 20 years' worth of growth)

these are important benefits, both to students and to staff. To supplement its e-journal holdings, Aurora University seeks vendors from whom to purchase to subscribe to subject area collections of e-books. The AU library is looking for subject area collections instead of individual titles, to take advantage of quantity discounts, facilitate cataloguing, and minimize the number of interfaces students must learn to navigate. Currently under investigation are Overdrive, EBL, ebrary, Naxos (music and spoken word), Rittenhouse, and netLibrary.

AU is partnering with fellow library consortium members to write a grant to develop a process model for selecting electronic resources in a variety of formats. Through its consortium of 65 Illinois academic libraries, AU is implementing federated searching and a link resolver to provide a single searching interface and hot linking to all full-text databases simultaneously, often called "one-stop shopping" (Cervone & Brown, 2001, pp. 148-149; Bailey-Hainer & Horton, 2005, p. 7; McCarthy, 2001, pp. 223, 237).

"One Stop Shopping" can be dangerous for students unsophisticated in choosing appropriate databases, and critically analysing results. However, giving students immediate gratification in the form of online journal articles and e-books may keep some away from Google-ing everything, thus providing more quality control than is found on the Internet. "One Stop Shopping" obligates the library to provide online tutorials, which was the most requested item in the tutorials/training category, and another on the list of best practices (McCarthy, 2001, p. 225). The AU library plans to develop multi-media online tutorials using the Camtasia software, which allows live screen capture with six tracks for voiceover, music, and highlighting of text. See http://www.carli.illinois.edu/I-Share/training/movies/eu-tutorials.html for examples of Camtasia tutorials.

The specific requests for information about and support for non-traditional students shows that some faculty and staff are aware of the unique needs of those students. Four requests were made for study rooms for adults with children. When Regis University in Denver remodelled its facility, acoustically quiet study rooms were designed allowing children to play in a room with a glass door and sidelights, floor-to-ceiling windows and child-sized furniture, while the parent studied in an adjoining Internet-equipped, well-lighted study room. Another approach would be to provide more help "at a distance". The services of a virtual librarian may eliminate the need to drive to campus with small children in tow. Purdue University offers a 24/7 chat, email and phone "Ask A Librarian" service, see http://www.asklib.lib.purdue.edu.

As evidenced by the receipt of only three comments about BlackBoard, the course management system appears to be an underutilized tool. BlackBoard, or another CMS would be a good means of connecting students to electronic materials, with faculty providing a link to an electronic textbook, and readings in e-books or e-journals (Cervone & Brown, 2001, p. 148; Haynes, 2002; McCarthy, 2001, pp. 223, 226). Computer skills tutorials and professional development opportunities were requested by faculty, and may serve to increase BlackBoard use (McCarthy, 2001, pp. 229; Rieger, Horn & Revels, 2004, p. 208). This would also be an appropriate location to post library FAQs.

The authors learned that some faculty and staff do not know the extent of library services and materials offered. The email format provided a good opportunity for the authors to respond individually to faculty and staff, outline or clarify the library's offerings, and generally connect with faculty (George & Frank, 2004). Perhaps a continuation of this informal, asynchronous discussion would be productive, and serve to keep faculty up-to-date on available technology as well as library services and materials.

From some faculty comments, especially the one about putting the computers back into the (former) computer lab, the authors knew that faculty were paying attention to students' complaints. Fortunately, the administration has agreed to replace the computers that were removed from the lab. Since this room is located in the library building, hands-on tutorials could be conducted here, while still meeting the needs of on-campus students.

One response noted that the College of Education, which has the largest number of off-campus cohort students, is considering developing fully online courses as electives. This information came as a surprise both to IS and to library staff and is an indication of a lack of communication on this topic. Since library support would be integral to any online program, library staff would like to be involved in planning for new online programs.

Finally, one respondent prefaced her remarks by saying, "I'm pretending money is no object…". Although we were hoping to elicit "wish lists" and "out of the box" thinking, this comment highlights the need for a realistic look at what is fiscally possible at our small university.

Conclusions and Recommendations

Today's librarians are highly educated professionals and information experts. As online and other forms of distance education are becoming mainstream at educational institutions and places of business, the librarian often becomes the technology as well as the literacy guide. Their work with sophisticated databases, online journals, and other media require expertise not mastered by other faculty. Many academic librarians are developing new tools to reach all learners (George & Frank, 2004).

Although Aurora University has years of experience educating non-traditional learners, it is just beginning to take advantage of the online environment, and it may be too early in the process to add too many high-tech tools too quickly. However, much can be said for developing a culture of information sharing. A low cost initial effort would be to employ Moore and Kearsley's (1996) systems approach, pulling a team together from survey respondents. Identifying faculty interested in online study tools, and creating a sense of buy-in is essential when developing and implementing any new programs.

While seven of the respondents (23%) noted that many items on their wish lists are already provided, the reinstatement of the full-time extended services librarian position (eliminated due to budget cuts in 2000) would allow a librarian to travel to off-campus cohorts' locations to provide face-to-face library use instruction sessions, liaise with and provide professional development for off-campus faculty, and develop interactive online tutorials and user manuals. Awarding teaching grants to librarians or faculty/librarian collaborators would promote innovation in the development of online tutorials (McCarthy, 2001, p. 229). Several low-tech solutions may also be feasible, even in a tight budget situation. Recommendations include an increased presence on the university website and the use of a Library Blog to encourage open, online discussion.

Future Research

- How can the "tool kit" or modular approach requested by the IS department be used system-wide to incorporate learning objects already developed by faculty, and allow the library to incorporate a package of essential research tips into every course shell on the CM?
- How can course management systems help position the university to offer completely online courses?

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WELCOME – WEBBASED E-LEARNING FOR SME AND CRAFTSMEN OF MODERN EUROPE

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Introduction

The eTen-supported WELCOME [1] project aims to create a European wide web-based e-learning platform service for SME and craftsmen, offering modules which will be certificated and acknowledged on a European basis. Since 6 February 2006 a set of 5 WELCOME courses, with technical contents adjusted to the needs of SME and craftsmen, are being tested in 5 target countries: Germany, Austria, Poland, Hungary and Lithuania. Particularly the technical platform-related aspects of the courses, the attitudes of the specific target groups towards e-learning and the quality of the course contents are being screened and evaluated. Based on the evaluation of these aspects, final adjustments to the courses will be made and a business plan for future deployment of the courses will be created.

This paper will start with a general introduction on the WELCOME project, followed by a more specific focus on the set-up and the format of the pilot runs. Finally, the evaluation model will be described.

Project Description

The BBZ Hellweg e. V. in Soest, Germany, is the project lead partner and coordinator of a consortium, composed of 9 experienced partners: bit media e-Learning solution GmbH & Co KG (bit media) in Austria, AGH – University of Science and Technology (AGH-UST) in Poland, Budapest Enterprise Agency (BEA) in Hungary, DIDAgroup S.p.A. (DIDA) in Italy, INGENATIC GmbH (INGENATIC) in Germany, Visaginas Business Competence Center Labour Resources Agency (LRA) in Lithuania, R. & S. KELLER GmbH (KELLER) in Germany, EuroPACE ivzw (EuroPACE) in Belgium. These experts from 7 different EU countries are dedicated to different tasks. Furthermore, additional certifying institutions are integrated in the project as subcontractors. The project started on 1st April 2005 and lasts for 18 months. It is promoted by the European Commission, DG Information Society and Media under the programme eTEN.

The WELCOME service addresses current and anticipated re-skilling needs of technically oriented SME, craftsmen and individuals. As a result of the growing technical complexity at the workplace (introduction of new machines and technologies) in SME a continuous need to upgrade the technical competencies of employees is emerging. However, on a European scale, no e-learning courses with technical contents adjusted to the specific needs of SME are available.

The WELCOME service will fill this supply gap and offers a combined set of five premium e-learning courses with technical topics specifically tailored to the needs of the target group. All courses are being adapted to local requirements. They all offer standardised placement tests for determining the course level appropriate to each person's prior education, allowing self-guided learning to be completed at the learner's own pace. The courses are adjusted to the characteristics and learning styles of adult learners, with plenty of interactive multimedia elements, highly practical and entirely up to date. Additionally all courses will include final examinations rewarding successful participants with a certificate, that aims to be accepted across the participating countries and at a later stage also throughout Europe.

While the ECDL course is already well established across Europe, offering final examinations, the consortium intends to transfer the successful "pass" course principles (Europe wide accepted curricula, certificates and high level course modules) to the other topics.

The following course topics are covered by WELCOME:

- ECDL: European Computer Driving Licence (software knowledge).
- EBDL: European Business Driving Licence (basic business knowledge).
- EICTP: European Information Communication Technologies Pass (computer hardware/network knowledge).
- EMP: European Mechatronics Pass (Mechatronics knowledge).
- ECNCP: European CNC Pass (Knowledge for using and programming CNC machines).

The overall aim of this market validation project is to test the feasibility of the deployment and to prepare the European roll out of the service. In accordance with this overall objective, the project is providing a detailed validation of the European e-learning market, with special reference to local market requirements and demands. The pilot-run-tested platform will feature curricula and courses, which are specifically tailored to meet the national requirements of the target groups in the addressed European countries. For all courses, certificates will be available and issued by appropriate national/European institutions being recognized at least in all participating countries, preferably even throughout Europe. Moreover, a detailed business and deployment plan will, based on the results of the pilot runs, pave the way for the initial market deployment phase. Finally, the target users, multipliers and the interested public will be familiarised with the advantages, possibilities and opportunities offered by the service.

Components of the Pilot Runs [2]

Entry Tests

Each course starts with an entry test for the learner. In the pilot run phase however, entry tests of the e-learning contents will differ from the final courses in their look, their feel and their functionality. The entry tests will not provide an automated learning path recommendation based on the test results. In other words, the entry tests will not automatically produce a needs-based individualized course curriculum for the learner. Rather it will show performance results which leave the choice of modules entirely up to user. This shortage to generate automated curriculums is due to the limited functionality SITOS platform. However, in this test phase, tutor guidance can relieve this deficiency. Making individual recommendations is part of the tutors task. He/she can access detailed tracking & learning data of each learner which makes the manual assignment of learning objects possible. As such they can help the individual learner to decide which lessons/courses are useful or necessary.

Learner Support Functions

User Guide

The content partners are providing a short instruction/user guide implemented in each course and each lesson where the learner can find information on how to use the lesson navigation, special features of lessons, etc.

Forums

For efficient collaboration and communication SITOS provides the discussion forum as a feature. In the WELCOME project these forums are assigned to different user groups. So tutors and learners can communicate on a selected topic in their own national language. User group functionality will see to it that learners see only the forum for their booked (assigned) courses in their respective language group.

Tutoring Services

The tutors give selected participants feedback on their exercises and tests and can keep an overview on the learners' progress.

There are also synchronous event-chats at defined timeslots as an opportunity for "social" exchange within a defined learner group. At the beginning, in the middle and at the end of a tutored phase all

learners have the possibility to meet in virtual room. In this room a tutor can give instructions if he wants or the group can discuss live about themes touching the course topic.

The tutors have the following qualifications:

- Subject matter expert: the tutor needs to make qualified responses to all subject matter issues and questions that come up from participants of the pilot run phase.
- Didactical qualification: the tutor should have a teaching background in the topical area in order to understand the needs of the pilot run target group and make adequate responses.
- Native language speaker: the content will be in English. To compensate for this it is paramount to have a native language support person and environment.
- Technology affinity: the tutor needs to be well versed in computer handling, e-learning methodologies, eTutoring, the platform.

Calendar

The calendar function of SITOS informs learners on tutor phases, the online time of tutors and dates for event-chats for all courses of their respective language.

FAQs

The FAQ functionality is used to list answers for generally (technical) questions in the national language of user.

Final Tests and Examinations

For the pilot run the platform offers no examinations but final tests on the e-learning content. Examinations can only occur at the end of the full curriculum development which comprises the whole project. As the pilot runs do not cover the package of courses to all the users, full examinations are not available yet.

Evaluation Model [3]

Introduction

In order to validate the pilots, evaluation activities are receiving a lot of weight in the WELCOME project. All results from the evaluation will be used for optimisation of the courses with respect to the envisaged implementation and deployment of the services. Furthermore, the gathered information should enable validation of the business objectives of the WELCOME service and lead to the further development of tailor specific business plan aspects (e.g. market analysis, user needs, design of the services, indications for adjustments to the training contents, price setting etc.). Not only “end users” but all actors and stakeholders will be targeted during the evaluation work package: test users, tutors, project partners, subcontractors.

Stakeholders

As the evaluation results will have a direct impact on the WELCOME partners, the subcontractors and the tutors, all conclusions and recommendations will be communicated to them. The partners will need the evaluation results in order to measure the success of the pilots, the potential scale a full service may have, the impact on the target test users and the potential return on investments. The subcontractors will need the evaluation results in order to give green light for certification of the course. The tutors will need the results to get an idea about the needs for support of the users.

Parameters

To obtain feedback on the optimisation of pilots and the business objectives, the pilots will be evaluated according to parameters, such as student attitudes on e-learning methodology for delivery of the course contents, course/program administration, method of course delivery, method of assessment, reliability of the technology, degree of student familiarity with the hardware/software, usefulness and quality of the course content, effectiveness of the support mechanisms (tutors, chat, forum, etc.), marketing potential of the courses, need for certification of the courses, speed of study, retention rate, drop-out and success rate, general appreciation of the whole concept.

These parameters will be analysed in general terms and, depending on the relevance for the final report, also categorised by country, course, tutored or non-tutored user guidance. Doing so, we may detect feasible national differences in completing the course, potential differences between the courses with regards to success rate or even dissimilarities between those who receive tutor help and those who do not.

Formative and Summative Evaluation Activities in WELCOME

The WELCOME pilot courses will be evaluated both from a formative and a summative point of view [4]. Formative evaluation is being enabled in this evaluation through monitoring activities, immediate learner feedback at the forums, support activities of the tutors (they are asked to maintain a logbook of requests and the answers they provided). Summative evaluation takes place at the end of a course or program with the purpose of redesigning a course or program. This type of evaluation includes attitudes towards the course/program as well as learning outcomes.

The summative evaluation of the WELCOME pilot runs would consist of three questionnaires (beginning, middle, end) for three target groups involved: the test users the stakeholders and the partners. It would also assess the administrative aspects of the program/course. Amongst others, the following questions will be asked: what are the strengths and weaknesses of the course? Would you recommend this course/program to your colleagues or other test users? What would you do differently? What would you add or eliminate? How relevant and useful was the content? What are some of the benefits that you gained during the course/program?

Summative evaluation will result in a final evaluation report which will be used as a basis to redesign the courses.

Data collection methods

- Monitoring: regular observation and logging of the online activities focussing on pedagogical issues (e.g., is the learner support sufficiently reactive/proactive; are tutors acting in a timely way), technical issues (e.g., is easy access to the course materials and support devices ensured for test users and tutors) as well as organisational issues (e.g., are problems sufficiently fast detected and corrected, is security maintained).
- Numerical measurements (through automated logs in the SITOS platform) that we can analyse for each country and for each module specifically. They will focus on the number of registered users, the frequency and duration of visits, the page hits, the content for each module that is most visited or less visited, the drop-out rate, the use of the support mechanisms (number of messages in the forums, number of users in each forum), the average response time of the tutors, the visits to the user guides.
- Discussion forums for ad-hoc and spontaneous feedback from users.
- Specific questionnaires customised to each target group of the evaluation (pilot users, tutors, partners, subcontractors) at specific times during the pilots (after registration and after the final test).

Conclusions

The eTen-supported WELCOME project aims to offer a European wide web-based e-learning platform service offering modules which will be certificated and acknowledged on a European basis. Five WELCOME courses are piloted since 6 February 2006. The evaluation of these pilots is based on summative and formative evaluation methods and includes data collection methods such as regular observation and logging of the online activities, numerical measurements (through automated logs in the SITOS platform), discussion forums and specific questionnaires for each target group of the evaluation: test users, tutors, partners and subcontractors.

The information resulting from the evaluation activities will enable the validation of the *pilots* in view of their optimization with respect to the implementation and deployment of the services that the project wants to install. Furthermore, the gathered information should enable validation of the *business objectives* of the WELCOME service and lead to the further development of tailor specific business plan aspects (e.g. market analysis, user needs, design of the services, indications for adjustments to the training contents, price setting, etc.).

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IS E-LEARNING A THREAT TO DISTANCE LEARNING? – A WORD OF CAUTION

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Introduction

This paper examines evidence gathered from students on the MBA in Construction and Real Estate course delivered by The College of Estate Management as a traditional Distance Learning programme. The paper considers the potential impact of the option to move the course towards an activity driven e-learning programme.

The paper initially considers the impact of the potential change on student study pattern. Secondly the paper takes a broader perspective and considers the potential impact on skill sets that may be lost if the delivery mode is changed.

The paper therefore attempts to address two key questions:

1. Does a shift towards 'e-learning' reduce the flexibility in study programme available in comparison to a traditional Distance Learning programme? Would Candidates on MBA welcome a move to e-learning?
2. Does a shift towards 'e-learning' change the key skill set candidates learns from a programme?

For clarity the author adopts the following definitions throughout this paper:

Distance Learning – a method of studying in which lectures are broadcast and lessons are conducted by correspondence – Oxford English Dictionary

e-Learning – is most frequently used to refer to computer-based training which incorporates technologies that support interactivity beyond that which would be provided by a single computer – Wikipedia, Encyclopaedia

Background to the College of Estate Management

The College was formed in 1919 and is the leading international body providing distance learning education and training to the property professions and construction industry. Its courses are designed to help students to:

- obtain a professional qualification;
- develop a post-qualification specialisation;
- undertake their work more effectively;
- develop lifelong learning skills;

Students from over 70 countries are currently registered on College courses.

Purpose

The College's main purpose is to provide education and training for students and members of the property and construction professions worldwide. To fulfil its purpose, the College offers a comprehensive range of courses by distance learning, e-supported learning and e-learning. To address the two questions raised in this paper the author has focused on the changes introduced and the changes under consideration to the MBA in Construction and Real Estate offered by the College and validated by the University of Reading.

MBA in Construction and Real Estate

The MBA in Construction and Real Estate was introduced by the College in 1998 and has produced some 800 plus graduates in a very specialist field. Many of the graduates progressing to become 'industry leaders', indeed one of the key objectives of the course is to 'produce graduates who are capable of operating at executive and chief executive level in major international and national companies and corporations'.

The course was constructed as a traditional Distance Learning programme consisting of directed private study assessed by assignments, examinations and dissertation. Candidates are expected to devote between 12 and 15 hours a week to their studies for 40 weeks of each year. The course consists of four 6-monthly semesters (Levels 1 and 2), and a research-based module and dissertation (Level 3) lasting nine months. Two subjects are studied and examined during each semester, making a total of nine modules plus a dissertation.

The driver of the course are the assignments. They are formative and contribute up to 50% of the sumative assessment of each level. On average the candidate has one assignment to submit per month of study. As two subjects are study concurrently, that enables formative feedback to be provided to the candidate before they start the next assignment in that subject area. It is recognised that the structure of the course does not provide total flexibility but within the month between assignments the candidate is free to study where and when is most suitable to their live style and commitments.

In 2001 the MBA in Construction and Real Estate was the first course at the College to utilise a Virtual Learning Environment (Blackboard) and moved towards what Mason (1998) defined as 'the Content and Support model'. The VLE was used as a bolt on, where candidates were able to post messages on general discussion boards and access information online, but it was not an integral part of the course. Candidates welcomed the additional access to tutors and an increase in this type support has been sought by candidates' year on year. Care was taken not to allow the introduction of the VLE to restrict the candidates flexibility in study.

'E-Learning/Learning Communities'

In 2003 the College introduced a new e-learning Post Graduate Masters conversation course for surveyors called the Graduate Development Programme (GDP). The aim of the GDP course was to 'change the VLE from being an additional extra on the course to become an integral part of the design, where central to the learning was that students engaged with learning activities, which frequently required students to discuss with their colleagues asynchronously' (McNeill & Fawkes 2005). I.e. developing 'learning communities' where discussion and debate are encouraged as part of the learning process. The course is divided into short 6 or 8 week modules that run independently of each other in timescale. They are driven by on-line tutors who supervise learning activities on-line. Many of the learning activities encourage and in some cases require candidates to debate and share ideas through the VLE. For this type of learning activity to be successful, candidates are required to participate within specific time frames sometimes as short as 5 days. An on-line learning activity that requires a debate or role-play between candidates will only be successful if students participate at or around the same time, otherwise the activity loses its momentum and purpose.

The GDP has been very successful in recruitment terms and the initial results of candidates on the programme are encouraging. This success has rightly raised the question if other courses offered by the College should move towards and embrace the e-learning strategy.

Does a shift towards 'e-learning' reduce the flexibility in study programme available in comparison to a traditional Distance Learning programme? Would candidates on MBA welcome a move to e-learning?

In an attempt to try and address these questions in relation to the MBA programme, MBA Level 1 candidate views were sort at a face to face workshop held in Reading in January 2006. (The views of level 2 and level 3 candidates will be sort at face-to-face workshops to be held in Reading and Hong Kong in March 2006).

A brief explanation of the concepts and process involved in e-learning were outlined to the group along with the outline of the course they were enrolled on. The feedback was unanimous:

- The candidates' perceived that the introduction of e-learning onto the MBA programme would restrict their flexibility in how, where and when they undertook their study programme.
- Any reduction in flexibility of study was not welcome.

Selected quotes included:

"The idea sounds very good – but I could not complete my course if I had to take part in activities at any given point in time – even if that were over a 5 to 10 day period."

"With my job & family – flexibility is key – any restriction on the time when I could study would be disastrous – the monthly limits are already stretched to the extreme."

"I travel a lot with my job – I do not know when or if I will be able to get on-line – I can only complete the course because I can carry the hard copy with me – added requirements to go on line would be impossible to fulfil on a regular basis."

"I work best by focusing on the issue – working very hard in concentrated periods of time – I would not want to be beholden to someone else's participation."

It became clear that what the candidates would value is more contact with tutors for direction – an improved Mason model.

When reflecting on the response it is important to recognise the recruitment background of the candidates. Entry to the course requires a good cognate first degree or equivalent professional qualification plus a minimum of 3 years post qualification experience. Most of the candidates already hold responsible positions within their organisations.

Does a shift towards 'e-learning' change the key skill set candidates learn from a programme?

As a follow up question to the above investigation into flexibility and widening the perception of course purpose 'does a shift towards 'e-learning' change the key skill set candidates learn from a programme?'

The traditional Distance Learning course is often criticised for placing the candidates in an isolated learning environment, with little or no support from peers or tutors. Whilst accepting that the move towards the Mason model diminishes the isolation to a degree, due to the nature of Distance Learning candidate operating in isolation have to make independent judgements regarding issues such as:

- What is the validity of the information being consumed;
- What are the boundaries to the knowledge they require;
- How is the information assimilated best implemented to achieve desired objectives.

Distance Learning candidates also have to:

- Self motivate;
- Retain responsibility for actions;
- Working in isolation forces the individual to form opinions as a result of independent research and removes the potential for relying on other peoples miss informed projections – including those of tutors.

It is interesting to note that in 'Management Theory' these are recognised skills required of 'Leaders' above 'Managers' (accepting that there is continual debate over differences between a Manager and a Leader:

- Bennis & Nanus (1985) managers are people who do things right – leaders are people who do the right thing;
- Kotter (1990, 1996) – managers develop plans-leaders create a vision & strategy – managers organise, control and problem solve – leaders seek to motivate;
- Mullins (2002) 'Getting others to follow willingly', or 'Getting others to do things willingly'.

Management Theory also accepts that 'Leadership' skills can be learnt and therefore the style of programme delivery in the case of the MBA is contributing to the overall objective of the course to 'produce graduates who are capable of operating at executive and chief executive level in major international and national companies and corporations'.

This reflection is not to undermine the relevance of e-learning programmes; it is designed to stimulate the debate about the selection of appropriate learning systems to meet the objectives of a course. It is to recognise the skill set established by the process of independent learning – generating independent thought – a vital tool in Leadership and this may be better 'learnt' by candidates undertaking a Distance learning course.

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KNOWLEDGE COOPERATION: A WAY FOR INTEGRATING LEARNING AND KNOWLEDGE PROCESSES

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Abstract

The aim of this paper is to introduce the concept of "knowledge cooperation" with its background in community-oriented knowledge management and to show how this new approach could be applied to support the integration of learning and knowledge processes (i.e. knowledge sharing, knowledge development, etc.) in business companies by means of so called "business learning communities".

Introduction

The rise of people networks, both within a company and outside its boundaries, as well as the accelerating development of information and communication technologies – especially a new generation of e-learning tools integrating advanced collaborative technologies (also known as 'social software') and implementing more and more a Web 2.0 approach to online interaction (O'Reilly, 2005, Bettoni, 2006) are both invigorating and challenging current business activities in general and innovation processes in particular. A major consequence of this trend will be the insight that contributing to employment and economic development requires the realisation of new learning spaces which, by organisational design, need to be tightly integrated with the rapidly evolving forms of networked, collaborative work practices (EU@Work, 2002-2006). Thus, the integration of learning and knowledge processes will become more and more an urgent strategic imperative in business companies.

In this broad context we have strong reasons to expect that online communities will increasingly be recognized as an essential integrative factor. A recent survey report on collaboration in enterprises shows that participation in online communities is growing, technology for online communities is continuing to improve and that retention of community participants is not a significant problem (Ambrozek & Cothrel, 2004). Unfortunately, despite these positive signs, one major obstacle remains: the discipline of creating and managing communities is widely perceived as poorly defined. In fact, many communities lack sustainability: either they fall apart soon after their initial launch or they adopt a short-term, opportunity driven behavior which allows them to survive in some way. In both cases however, they are not able to generate enough energy and synergies for engaging in long-term cooperations. Moreover their short-term thinking and opportunistic behavior leads to uncertainty and mistrust between the members and consequently to low quality of shared work results. This is where our concept of "knowledge cooperation" comes into play as an attempt to convert the promise of e-learning and collaborative technologies into the reality of active, dynamic, sustainable communities integrating learning and knowledge processes.

This article will first describe the new concept of "knowledge cooperation" (Bettoni, 2005) and then focus on how it could be applied to support knowledge sharing and learning through building so-called "business learning communities".

Why Knowledge Cooperation?

At the heart of the concept of knowledge cooperation lies a very different logic about how to deal with knowledge in a business environment. In the old industrial economy people had a clear focus on tasks and operated following the priority model of a task-oriented organization: "tasks first, knowledge second". Due to dramatic changes in economic life (globalization, acceleration, etc.), knowledge is becoming more and more the chief ingredient of what we buy and sell. As companies will become aware of this basic trend, they will find that they must embrace a new, more powerful priority model:

"knowledge first, tasks second". This strategy of putting tasks to the background and pulling knowledge to the foreground represents a radical rethinking of basic business strategies and consequently of their implementation through people, processes and technologies.

One essential element of this shift of thinking about business is the insight that knowledge is not a "thing" that can be managed like other assets. In line with recent developments in knowledge theory (von Glasersfeld, 1995) the reasons for this view can be summarized in four key points about the essence of knowledge (Wenger *et al.,* 2002): a) Knowledge lives in the human acts of knowing and learning, b) Knowledge is tacit as well as explicit, c) Knowledge is social as well as individual, d) Knowledge is dynamic.

What is Knowledge Cooperation? A Theoretical Concept

If knowledge is mainly tacit (in the head of people) and only to a limited percentage explicit (in documents, systems, processes) and if it is both individual and social, then it cannot be separated from the individuals and from the community that create, use and steward it. As a consequence, what we need is an approach that has its primary focus on distinguishing, balancing, connecting and negotiating between knowledge in its two fundamental dimensions: individual and social. This is exactly the goal that defines knowledge cooperation.

To achieve this goal we have defined knowledge cooperation as *"the participative cultivation of knowledge in a voluntary, informal social group"*. The group is informal in the sense that its members meet outside the reporting roles connected to their position in the formal, organizational hierarchy to which they belong. The dynamics of knowledge cooperation is determined by two cross-coupled *learning* loops that should take place and be promoted together: 'cultivation' and 'participation'. Each individual learning loop is defined in its own terms and is in principle autonomous, meaning that it could function alone, independently from the other. But only the cross-coupling of the two loops, represented in the diagram by the lemniscate curve (∞ – the infinity symbol), allows to create an interacting duality where the two learning processes – the cultivation of knowledge and participation in cultivating knowledge – are always involved. In this duality what is of interest is understanding or promoting the interplay and integration of learning and knowledge processes. The duality of participation and cultivation that constitutes knowledge cooperation provides a framework to analyse or design the various knowledge processes not only with a knowledge but also with a learning perspective (integrative approach).

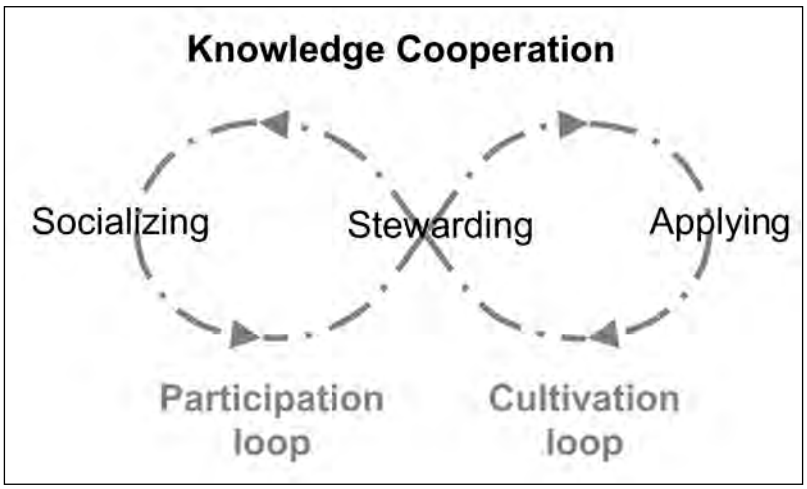

Figure 1. Knowledge Cooperation Model with its two learning loops and three groups of knowledge processes

Knowledge cooperation consists of three groups of knowledge processes closely connected by the two mentioned learning loops (Figure 1):

a. *Stewarding knowledge* – This group of knowledge processes encompasses processes like acquiring, developing, making transparent, sharing and preserving knowledge. They are used for handing down, reproducing and renewing knowledge and experience. What should be noticed here is that these processes are not considered at a cognitive but at a coordinative-cooperative level (see the cooperation model by Wehner *et al.,*1998): knowledge stewarding does not intervene therefore directly in individual cognitive processes as too easily alleged by certain critics of Knowledge Management.

b. *Applying knowledge* – This group of knowledge processes collects what happens when knowledge resources are used in business processes. The learning loop of 'cultivation' is established, if employees of the formal organization (teams, departments) informally participate at the same time also in communities of practice (Wenger *et al.,* 2002, 18 ff). This multiple membership creates a learning loop which has its focal point in the employee: he or she gain experiences in their daily work within business processes and can incorporate them in the community of practice, where this knowledge is stewarded collectively and prepared for flowing back to the business processes from where it originated.

c. *Socializing knowledge* – This group of knowledge processes collects what happens in personal and institutional relationships between the people involved in stewarding and applying knowledge; important elements to be considered in this group are: involved people as individual persons, their ties, their interactions (regularity, frequency and rhythm), the atmosphere, the evolution of individual and collective identities and, last but not least, spaces (physical or virtual) for meeting together. This group is very important because it allows taking into account the social aspects of stewarding knowledge, applying it and learning together.

How to Implement Knowledge Cooperation? A Practical Method

How could the concept of Knowledge Cooperation be applied in a real business environment where learning and knowledge processes need to be integrated? A method that implements this concept in a practical way is that called "Business Learning Community" (BLC). A BLC is a network of people who come together, mainly online, meet and interact because they share interest and passion about a common knowledge domain. Stewarding, applying and socializing knowledge are implemented as follows. People in a BLC follow the objective of cooperatively taking care of knowledge resources by *stewarding* the knowledge base of the community. The members of a BLC are connected through informal, collaborative learning (co-learning) and they cultivate in common the knowledge that they consider as relevant in view of *applying* it. "Common" here means that bonds between individual members develop only in the course of a social and collaborative learning process. This collaborative learning process is a social process characterized by intense interactions of giving and taking at an ideal level through dialogue, conversations and mutual acceptance. Only such a process of *socializing* knowledge can lead to a joint effort of developing and cultivating knowledge resources as well as to the emergence and strengthening of shared values. In this way from an initial number of individual persons step by step a learning and knowledge community emerges and develops through different stages like an organism.

Step by step the BLC also develops a stronger identity which can appear for example in a culture of learning specific to that BLC. Elements which characterize the integration of learning and knowledge processes in knowledge cooperation are:

- The members of a BLC commit themselves on a long term basis and cooperatively to a certain domain of knowledge (research, innovation, marketing, etc.). This is a collection of topics, key issues, problems and open points that BLC members commonly experience in their daily work and that are of great importance to them. It is an area of expertise that brings people together with passion, guides the questions they ask and the way they organize their knowledge and creates a sense of accountability to the development of a practice. BLC members can take responsibility to provide the organization the best knowledge and skills in the domain to which they are committed.

- The objective of the community is to share existing knowledge of its members in a certain domain and to acquire and develop new knowledge about the same domain. In doing this they explicitely value both the collective (we learn) as well as the individual (I learn) learning process. A typical feature of a collaborative learning process in a BLC is learning about a common topic from the experiences of all or part of the involved members (inclusive learning). And from working on common tasks and problems through projects, cases and stories.
- An interaction model which could be used for BLCs is Ruth Cohns model of theme-centered interaction (TCI). The concept of TCI provides a first, important tool for analysing and designing both the individual ("I") and the social ("we") dimensions of knowledge cooperation.
- BLC dimensions to be implemented: a) negotiation of goals, b) negotiation of meaning and knowledge sharing, c) openness and reciprocity, d) process reflection (metacognition), e) learning from errors and experiences, f) increase of individual and collective knowledge, g) participation, identity building, mutual respect and mutual acceptance.

Knowledge Cooperation: An Experiment with MOODLE

Currently at our university we are exploring the implementation of knowledge cooperation following the BLC method with an internal project called "CoRe". The knowledge and learning domain is that of research and participants in the community are primarily business people who work for us as part-time lecturers with very low (<10%) part-time engagements. The goal of CoRe is to initiate and promote research activities among these lecturers. The main learning space of CoRe is implemented in MOODLE and is conceived as an online cooperation room where some of the most advanced collaborating tools (e.g. wikis) are used as enablers of stewarding, socializing and applying knowledge within the learning loops of participation and cultivation of knowledge.

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INSTITUTIONAL ORGANISATION AND USE OF TECHNOLOGY FOR TEACHING IN HIGHER EDUCATION IN NORWAY

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Abstract

Use of technology for teaching and organisational structures relevant for this paper were examined in three higher educational institutions in Norway. Technology is mainly used to communicate administrative and content relevant information to students. More advanced use, involving fundamental changes in pedagogy, is less common. Support structures were found to be important for technology implementation, but their effects appear to depend on system wide factors, such as incentives and involvement from leaders. This is confirmed by results from similar studies in other countries.

Introduction

To establish a broader basis for policy making at national level and strategic management at institutional level, two surveys on use of ICT for teaching in higher education have been carried out in Norway. Both surveys are done on behalf of the Norwegian Ministry of Education and Research. The first survey, done in late 2004/early 2005, was aimed at mapping broad patterns of technology use and relevant aspects of institutional organisation. A central conclusion was that the volume of technology use for pedagogical and study administrative purposes had increased sharply during the last few years, mainly due to large scale implementations of learning management systems (LMS) virtually in all higher educational institutions (Arneberg *et al.* 2005). Typically, these systems are used for simple communication purposes, often in combination with simple text based electronic learning material, which is similar to patterns recently found in UK (Bricheno *et al.* 2004) and other countries in Europe (Rambøll management 2004). Clearly, this indicates that the potential of technology for increasing quality and flexibility of higher education in Norway is far from reached. To address how further development may be stimulated, the second survey focus more narrowly on organisational traits of the educational institutions, asking how these features may promote and/or hamper the development of fruitful use of technology in teaching. This paper reports results from this survey.

Data and methods

The survey was done through case studies of three higher educational institutions:

- The University of Oslo, the largest and oldest HE-institution in Norway, with an academic staff of about 3000 and around 30 000 students.
- The University College of Bodø, a much smaller and more recently founded institution (academic staff counting 300 and about 4000 students).
- The Norwegian School of Economics and Business Administration, the smallest of the three institutions (academic staff counting 200 and around 2000 students) and with a specialised research and education focus on economics and business related subjects.

Data were collected through interviews, documents and a questionnaire send to students. Both academic staff, support staff and leaders at various levels were interviewed, between 10 and 20 persons at each institution. Data were gathered during the autumn of 2005.

Results and discussion

Looking at how technology is used, the data confirm the picture found in the first survey: the most common way of using technology for teaching is communication (through an LMS) of administrative information and content/curriculum relevant information, the latter often in the form of simple text

based learning material. More advanced use, involving fundamental changes in pedagogy, is much less common. In addition, more content specific technology is used to some extent, for example enterprise resources planning systems in business management courses and software used to make advanced calculations in mathematics courses.

Academic staff reports that use of technology has made communication with students significantly easier. Another result is more flexible courses, with one effect being that new groups of students are recruited, particularly people in full time jobs. Thus, technology seems to reduce the gap between on campus and distance education. However, some of the academic staff members expressed concern about drop-out of on-campus students from regular teaching activities, in particular lecturing, probably because these students feel they get sufficient information through the technology based information systems (such as a LMS). A large proportion of the students (around 80 %) report that technology increases the general quality of the learning environment and make studies more flexible. Thus, they are generally satisfied with technology being used, and academic staff members report that they often demand it.

Support structures were found to be important for implementation of technology use. Technical support was important for making academic staff members motivated for using technology in their teaching activities. Such support includes both staff training, day to day assistance (for example answering questions on how to use various functions in a LMS) and system management. If technical support is lacking or deteriorates (for example as a result of changing priorities within an institution), volume of technology use may fail to rise or decline. In addition, pedagogical support was also available in some or parts of the three institutions. This support can have the form of seminars, individual supervision or specialised courses where use of technology is coupled with pedagogical issues. Although individual members of academic staff clearly profit from such support, institution wide effects are more uncertain. For example, specialised courses are often poorly attended. One reason for this may be that incentives for pedagogical use of technology have not been established widely in any of the three institutions, so that academic staff may choose to give priority to other tasks, such as research (e.g. Skarstein and Toska 2003).

Leaders were involved in various degrees in strategic planning and implementation of technology use at the three institutions, and it appears that poor involvement from leaders hampers both of these processes. Thus, the study confirms what has previously been found in the USA, Canada and Australia (Bates 2000) and the Netherlands (Fisser 2000), that implementation of technology for teaching purposes requires an institution-wide approach, including, among other things, support structures, incentives and leadership.

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THE IMPACT OF THE ORGANIZATIONAL ENVIRONMENT ON PROCESS-ORIENTED WORKPLACE LEARNING

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Abstract

Using activity theory, organisational theory and didactics as theoretical foundations, a comprehensive model of the organisational dimensions relevant for workplace learning and knowledge transfer will be developed. In a second step, a Learning Assessment Guideline will be elaborated. This guideline will be designed to permit a targeted analysis of organisations to identify the status quo in those areas crucial to the implementation of workplace learning and knowledge transfer. In addition, this self-analysis tool will enable learning managers to select adequate didactic models for e- and blended learning. As part of the European Integrated Project "Process-oriented Learning and Information Exchange" (PROLIX), this model of organisational prerequisites for learning and knowledge transfer will be empirically tested in for-profit and non-profit organisations in Great Britain, Germany and France (to be finalized in autumn 2006). The findings concern not only the capability of the model of organisational dimensions, but also the predominant perceptions of and obstacles to workplace learning in organisations.

Learning and knowledge transfer in organizations

In many organisations and enterprises, the training and learning opportunities on offer and the possibilities for generating and transferring knowledge do not adequately fit actual business needs. They are often either made available at a too late stage or do not focus on the individual's actual needs for effectively fulfilling their role in the business process. Consequently, the training offered is not accepted by the workforce since it meets neither their own business needs nor indeed those of the enterprise.

In addition, company management is often not fully aware of the type of knowledge and competencies needed to run its business (processes) properly. As a result, organisational and process changes are frequently decided without awareness of the impact of the gaps in competencies that might subsequently be opened. Furthermore, learning opportunities and support services to accompany modified processes often lack appropriate definition.

With these obstacles in mind, the overall objective of the European Integrated Project "Process-oriented Learning and Information Exchange" (PROLIX) is to align learning with business processes, thereby enabling organisations to improve their employees' competencies more quickly and better in line with continuing changes in business requirements. However, to ensure maximum effectiveness, PROLIX also has to look beyond simply developing tools and methods and give appropriate consideration to the specific organisational environment in which such tools and methods are to be implemented and used.

Furthermore, the adequate planning of learning measures and selection of appropriate didactic models has to incorporate the specifics of a particular organisational environment. A learning assessment guideline builds the basis for integrating the status quo of crucial organisational dimensions into workplace learning and knowledge transfer.

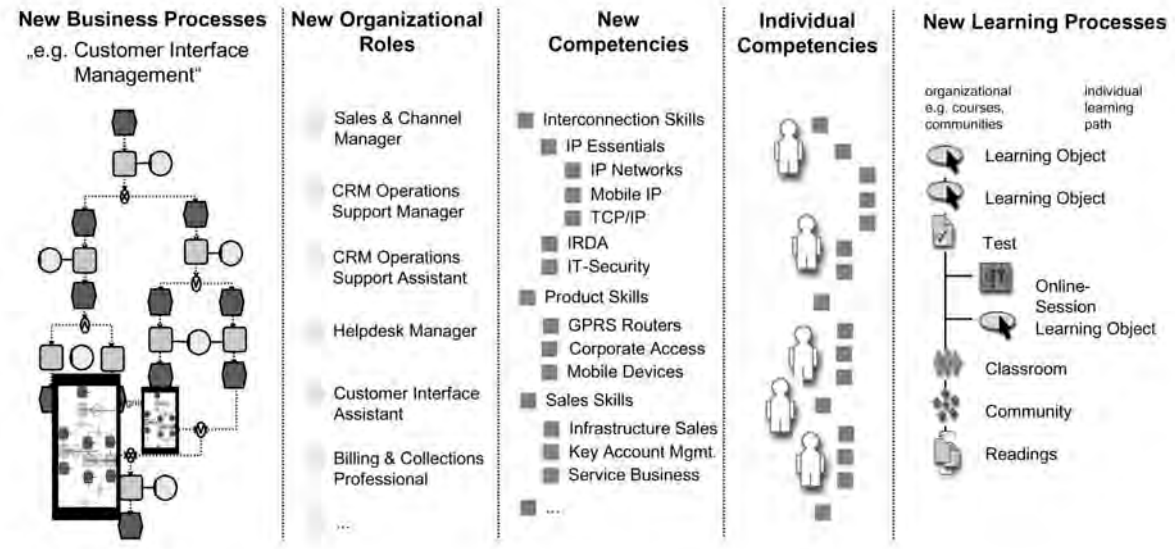

Figure 1. Learning as a key enabler for business process management and change

The impact of organisational characteristics

Research findings suggest that the use of data and information in organisations is dependent on the subjective interpretation of those individuals and groups who will transform these inputs into actions and performance. For this reason, companies must influence and support knowledge management capabilities in several different areas (e.g. leadership and company culture) by deploying and integrating available methods, instruments and technologies to provide a beneficial environment for the use and creation of knowledge and competencies (Wiig, 2004; Cegarra/Sabater, 2005; Malhotra, 2000). In doing so, organisations must also actively encourage and support participation. Since individuals can be seen as operating both independently and interdependently, it is their socially-derived personal history, values and ways of knowing that mediate how they participate and learn in social practice, e.g. in the workplace. They need to find meaning and value in the learning activities offered. Inconsistencies between workplace values and employee values may lead to resistance. Different skills, abilities and ways of motivating employees to participate are required, for example to attract the interest of and motivate reluctant participants. Opportunities to participate and receive support seem to be essential for achieving rich learning outcomes (Billett, 2001).

Organisational prerequisites for learning and knowledge transfer

The success of instruments and methods aimed at developing knowledge and learning is influenced by both the characteristics of the organisation in question and the cognitive habits of its employees. Corporate culture, organisational structures, leadership attitudes and human resource management are all important examples of such relevant characteristics. These domains have to be influenced, coordinated and adjusted to establish a favourable environment for the implementation of process-oriented learning and knowledge transfer.

A number of different models have been developed to identify and structure the areas relevant for knowledge and learning in organisations. Four such models and the structures they propose are described briefly below.

1. IPK Model of Knowledge Management

The Fraunhofer IPK knowledge management model includes the following six "design fields" (Mertins *et. al.,* 2001):

- corporate culture
- leadership

- information technology
- process organisation
- controlling
- human resource management

2. Organisational Dimensions

Mingers takes a pragmatic perspective in characterising the comprehensive spectrum of dimensions which impact an organisation's ability to use and develop its knowledge effectively as follows (Mingers, 1999):

- Strategies: business strategy, learning and knowledge goals and visions, etc.
- Structures: incentives, career opportunities, means of communication, etc.
- Processes: process management, learning and knowledge processes, transparency of decision-making, etc.
- People: systematic human resource management, free play for activity and creativity, etc.
- Corporate culture: values that foster or hamper the sharing of knowledge, gender equality, communication habits, cooperation and confidentiality, etc.
- Information and communication technologies (ICTs): information management, intranet, internet, different needs of men and women in ICTs, etc.
- Space: spatial opportunities for communication and interaction

3. Knowledge Management Assessment Method

Bornemann/Sammer propose an assessment methodology covering the following four levels of knowledge management (Bornemann/Sammer, 2003, also Figure 2):

- goals level
- knowledge level
- business processes level
- data level

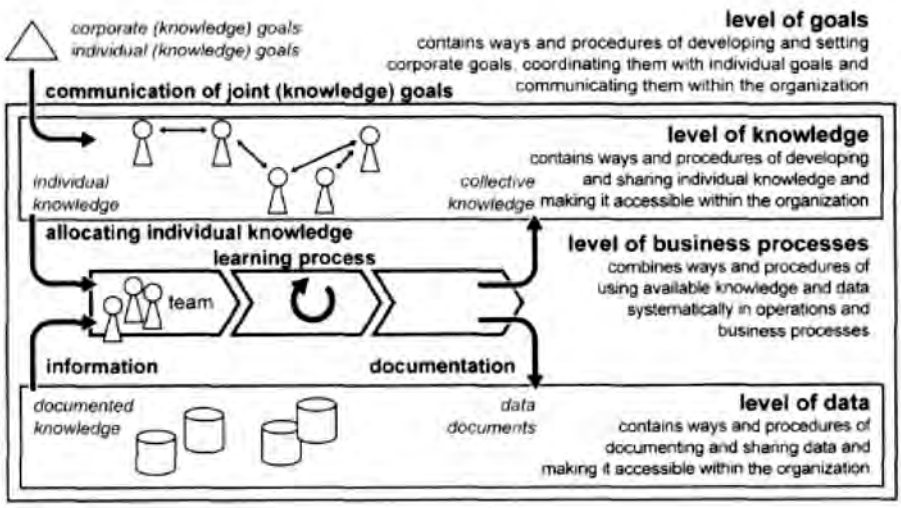

Figure 2. Different levels of knowledge management (Bornemann, Sammer, 2003)

4. KM Assessment

The KM Assessment developed by the European KM Forum is divided into the following major sections (European KM Forum 2002):

- General
- KM Strategies
- Human & Social KM Issues
- KM Organisation
- KM Processes
- Technologies
- Leadership
- Performance Measurement
- Implementation
- Business Cases

Learning Assessment Guideline

The Learning Assessment Guideline under development in the project PROLIX will enable organisations to diagnose their ability to successfully apply process-oriented learning and knowledge transfer. It will also indicate which specific areas in the organisation are particularly critical for achieving the goals set by the PROLIX project. This assessment will allow the person responsible for learning management (e.g. human resource management, trainers) to analyse the actual organisational environment in which process-oriented learning is to be implemented. Even though it is not possible to define target states and actions that will be universally valid for every organisation or organisational area, recommendations can be given for suitable didactic models and measures in key areas on the basis of a learning assessment.

The analysis focuses on aspects relevant for learning and knowledge management. In this way, the person responsible for learning and knowledge management obtains an overview of learning maturity in the different organisational dimensions as well as recommendations for measures to improve the current status. Information on the appropriateness of didactic strategies for specific organisational environments will be included in the descriptions of the didactic models suggested by the system.

Activity theory as an analysis framework

Activity theory will be the main framework for the analysis. It focuses on the interaction between human activity and consciousness within its relevant environmental context. It provides an appropriate framework for analyzing learning needs, tasks and outcomes within organisations. The socio-cultural, socio-historical lens of activity theory helps managers and designers of workplace learning to analyze human activity systems (Jonassen, Rohrer-Murphy, 1999).

The following five principles can be used to summarize the current shape of activity theory. The first of these principles is “that a collective, artifact-mediated and object-oriented activity system, seen in its network relations to other activity systems, is taken as the prime unit of analysis” (Engeström, 2001). The second is the multi-voicedness of activity systems and the inclusion of different points of view. Historicity, the third principle, indicates that activity systems take shape and become transformed over longer periods of time. The central role played by contradictions as sources of change and development is the fourth principle, while the fifth principle “proclaims the possibility of expansive transformations in activity systems” (Engeström, 2001, Figure 3).

	Activity system as unit of analysis	Multi-voicedness	Historicity	Contradictions	Expansive cycles
Who are learning?					
Why do they learn?					
What do they learn?					
How do they learn?					

Figure 3. Matrix for the analysis of expansive learning (Engeström, 2001)

Model of the organizational dimensions relevant for workplace learning

Based on previous work in this field, the authors propose a comprehensive model of the organisational dimensions relevant for workplace learning and knowledge transfer. This model will cover several of the dimensions identified as crucial for both assessing the status quo and determining future intervention steps, and includes the following areas:

- Relevant characteristics of the target groups/users
- Strategy, controlling
- Organisational culture, leadership
- Data, information, information and communication technology
- Human resource management
- Processes, organisational structures
- Work design, office architecture

This comprehensive new model is based not only on theoretical research, but also includes results drawn from activity theory and empirical work (e.g. qualitative interviews in various organisations). It aims to integrate the organisational dimensions and aspects found in the proposed knowledge management and activity theory models described above.

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ESTABLISHING AN INTERACTIVE E-LEARNING PROGRAMME BY USING PROJECT BASED COMPUTER SUPPORTED COLLABORATIVE LEARNING

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Introduction

This paper will present the innovative approach of POOL project [2] in matters of curriculum development. It will focus on the testing phase of POOL model with a group of students and will describe the key aspects and the methods considered to develop a series of training activities which are currently being tested. It will show how the international set-up of POOL is reflected in the activity and results of this project.

Project Organisation OnLine

The POOL project aims to enhance existing project management standards and practices in initial university-level education in the field of engineering, combining technical skills with soft skills training in a distributed environment. The virtual and transnational dimensions taken in this training have rarely been considered at all. It is assumed that the innovative approach of the POOL project in combining and integrating all these aspects should give curriculum designers the criteria to select the relevant training aspects so that the actual courses reflect and simulate current industry needs. The students will be able to acquire key competencies such as virtual group collaboration, working in multinational teams, presenting technical facts both face-to-face and in a virtual environment as well as being familiar with Europe-wide standards of project documentation.

The innovative approach of POOL is applied on an integrated student project in which the different courses serve as an input needed to meet the goals defined in it, as well as to achieve the learning outcomes proposed in the training. Neither they are online courses nor traditional lessons carried out online but the combination of these and other methods in order to successfully achieve online collaboration for project management. Therefore, the student project is entirely integrated in the different platforms used for this purpose.

Technology, Society and Information

The following graphic reflects three main perspectives which might be adopted as a basis to classify training activities.

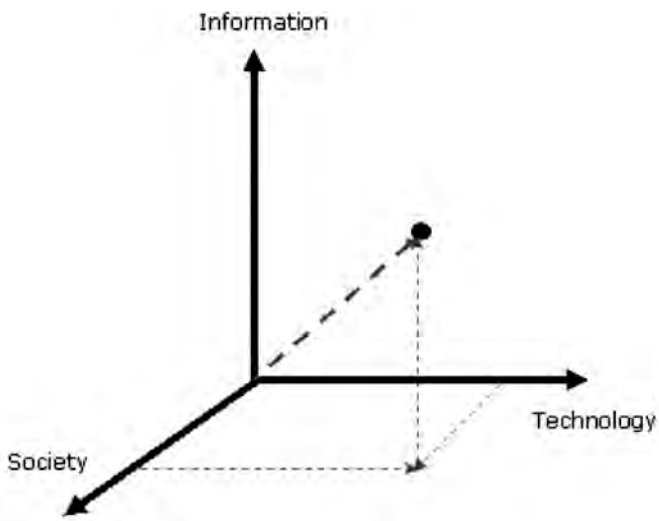

Figure 1. Technology, Society and Information

Training units can be mapped to the axes in Figure 1. like listed below:

- Technology – Collaboration Skills: competencies needed to handle the technology available used to ensure a successful collaboration in a virtual environment.
- Society – Soft Skills: competencies required in matters of language and intercultural communication issues.
- Information – Standards: competencies dealing with information in the form of standards.

The intention here is to show the practice orientation of POOL, in which other aspects besides theoretical and technical knowledge are incorporated too (information and society). Therefore, it is not about designing additional courses in order to develope non-technical competencies that should be acquired, but a real integration of these contents into the courses.

The Target of POOL

As shown in Figure 2., the particular case of POOL approach can be also conceived as a three-dimensional space in which three main aspects are taken into account in terms of knowledge: collaboration, soft skills and competence required to work with standards.

The aim here is the creation of a curriculum model consisting of different training activities which reflect the combination of technical and soft skills using European standards. These different training activities can be imagined as points within these three dimensions. This space allows a clustering of activities based on their degree of skills needed to reach the learning outcomes defined for each one. A clear benefit of grouping the activities is that it facilitates identifying potential dependencies in terms of competencies and supports the selection of methods to define interfaces between the different disciplines trained to perform online project management. Another advantage of this division is that it simplifies the application of assessment methods. Each dimension could be assessed independently so that all of them can be later combined in order to produce a final assessment result.

The outcome is not only defining a set of training activities but also finding out the right way – that is, a correct synchronization of workpackages in POOL – to better reach such an integrated curriculum to be applied in a transnational and distributed setting.

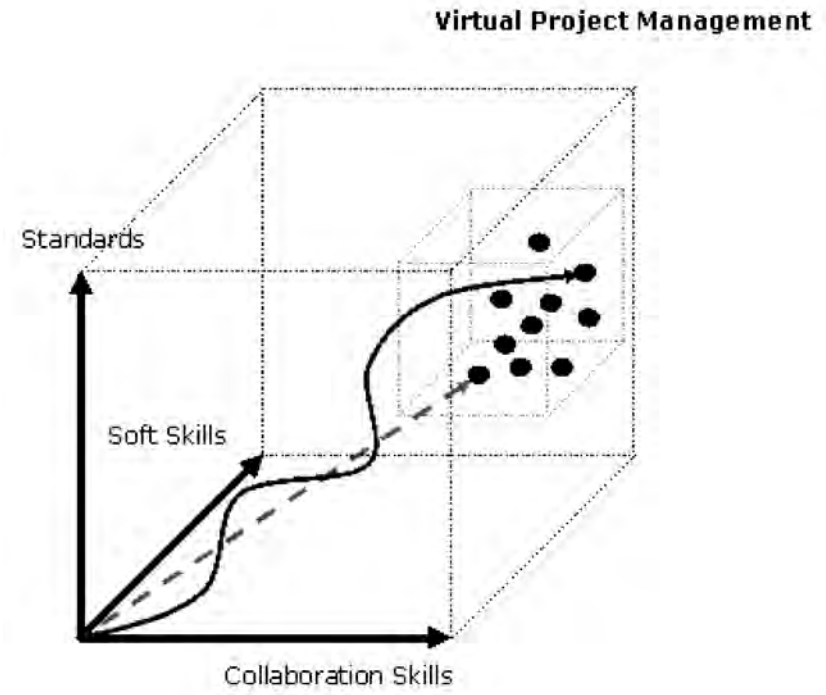

Figure 2. Virtual Project Management

Testing of Activities in a Real Student Project

Student Project in the Field of Telecommunications

In this second phase of POOL project a draft of a curriculum model already developed is still being tested. Each work package in POOL has developed a training plan with different examples of activities which cover all competencies already predefined during period of analysis. A few of these training units have been selected to be automatically put into practice in order to check the correctness of the research made on this field.

For this purpose, three groups of students from Austria, Finland and Romania are currently carrying out an online project in the field of telecommunications. Having a student project as a basis, real-life problems encountered can be reported, experiences collected and some adaptations can be done in the curriculum to enhance it.

In order to provide a modular view, the training activities have been classified in different categories like defined in Tuning Project [1]. This categorization provides a more comprehensive idea about how different collaboration methods could be combined.

In a higher level, two different groups of categories can be identified. The first group covers those categories of training activities that could be directly applied, for example, in a master course on online project management. The second group of categories is part of the POOL research process supporting at the same time the student project progress. Table 1 below shows these two groups of categories.

Table 1: Classification of training activities

Categories of Training Activities which support the Student Project	Self study: developed materials can be accessed online by the students – i.e. "Text Study" Online collaboration (group discussions) • within the student groups or • supervised/monitored by the trainer Asynchronous collaboration • Discussion boards (forum) • Mail Lessons: the trainer presents a specific training unit using the communication platform. Experimenting (theory into practice): online sessions are held in order to put into practice the theoretical knowledge acquired.
Categories of Training Activities which support POOL research and Student Project	Monitoring of project integrated in the collaborative environment Verification of state of work ("check lists") Assessment Evaluation Feedback from the students

The Process of POOL

The work of POOL at this point is "finding the way" to best integrate all the training activities. This is carried out through a process of refinement and continuous adaptations of the developed draft of curriculum model.

For each training activity, the following elements are analysed:

- Level of collaboration skills needed
- Soft skills required
- Extent in which standards can be incorporated

Based on these three dimensions, a training activity is located in a certain point. This allows measuring the degree of knowledge which is needed for each training activity. This results in a space consisting of different clusters of activities which – in the particular case of POOL project – provides information on different issues:

- Time-wise: training activities located in the same cluster might be carried out in the same period. In the case of one activity mainly focused on how to present a report, it will be located in a different cluster than other activity focused on how to plan a project. On the contrary, two activities which are in the same cluster might have common aspects which could be considered in a joint training session. This way, repetition of same concepts in the contents of the training sessions can be avoided and therefore a good integration of the courses can be ensured.
- Content-wise: the interdisciplinary nature of the training activities located in the same cluster might deal with concepts that may overlap. The training could be then trained either in a joint training session or in independent training sessions which take into account the contents in other courses.

An Example of Application

This section presents two different areas – time management and presentation skills – (workpackages in the POOL structure) belonging to different dimensions considered for the curriculum. These two selected areas are very representative ones since they differ very much in the main contents. The "time management" issues would fit in the Collaborative Skills dimension, whereas "presentation skills" falls into the Soft Skills dimension.

Table 2 shows the connection between two courses where the students have to present the timeline of the project plan each one focusing on different aspects. The quality of the student presentation depends on the achievement of the learning outcomes in both areas and for that purpose it is needed that both courses are ideally synchronized like described before.

Table 2: Interdisciplinary courses: interfacing between different training areas

	Knowledge	**Focus on**
Time Management and Project Planning	Deals with project planning, time issues, roles assignment, dependencies between tasks, etc.	• Workload • Resource Assignment • Task dependencies
Presentation and Soft Skills	Deals with presentation and writing skills, verbal and non-verbal communication.	• Structure • Style • Clarity

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THE METHODS, AIMS AND PROBLEMS OF ICT AND E-LEARNING DEVELOPMENT IN LITHUANIAN UNIVERSITIES

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This article analyses the achievements of intensive implementation of ICT and e-learning in Lithuanian universities, as well as related problems and the solutions to these problems. It also describes the strategy of implementation of the new technologies into the process of learning and the reasons that determined the choice of the strategy in the Lithuanian universities. In addition, the article discusses the main factors that determine the need of new learning methods and technologies at universities, the needs of students and the tendencies of their ICT competence development. The problems of the expansion of e-learning efficiency and the tendencies of distance learning integration are also emphasised in the article.

1. Introduction

E-learning was given attention and interest on a larger scale in Lithuania in the middle of the last decade on the initiative of individual teachers from various universities in order to test the possibilities of the new learning technologies, while in this decade it has become one of the priorities in the process of the state development. This has been determined by not only the attention given to e-learning in 'Lisbon Strategy', EU and the initiatives of the national knowledge society development, but also rapid economic development of the country, the needs for its restructuralisation and social changes. The development of e-learning has received huge resources, the institutions of education have been provided with modern ICT, new e-learning infrastructures and special programmes, funded from the state budget as well as the EU foundation, have been originated, however, the efficiency of all the mentioned means, as well as in many other countries, have appeared to be far less than it has been expected.

In the initial stage of the e-learning development the main attention was given to the supply of education institutions with the ICT equipment, the development of the teacher competences, and the transfer of all the available learning material into the electronic environment with no change in the infrastructure of the learning process organisation. It soon came to light that formal transfer of the traditional learning material into the electronic environment was the most expensive and the least efficient means of the e-learning organisation as no possibilities of the cooperation of new independent studies and available learning resources were employed in this process. In order to solve the problem, an integrated learning model employing the elements of traditional classroom and asynchronous distance learning and adjusted to the conditions of a small country with a dense network of universities was implemented.

2. The Strategy for the Development of ICT Application for Learning in Lithuanian Universities

The last decade of the last century created favourable conditions for the application of ICT for learning in the Lithuanian universities when personal computers were on a mass scale being implemented in various domains of practical activities. After the computerised learning classes had been established, substantial and friendly software allowed to supplement the process of learning with the means for computer model development and analysis, and to implement all the necessary for the students skills of ICT application in various utilitarian domains. In pursuance to forward the implementation of ICT in the process of learning and to employ all the available resources superiorly the universities tried to achieve this aim both separately and in association by establishing associations and integrated infrastructures of ICT exploitation and application.

The most efficient infrastructure that accelerated the implementation of ICT noticeably and created favourable conditions to employ them in various Lithuanian universities was Lithuanian computer network of academic and scientific institutions LITNET (Academic and Research Network in

Lithuania). It is the association of academic and scientific institutions as well as other non-profit organisations, supported by the state and international foundations, the members of which have free and rapid access to the Internet and other common network resources. The development of this network on the basis of the Internet technologies was started in 1991 by integrating the biggest Lithuanian universities and the computation centres of scientific research institutions. At present LITNET network attends to over 500 science and education institutions, 15 universities and the largest libraries among them [1]. In the short-term this network is being planned to be expanded by integrating into it all the secondary schools, some libraries, museums, and other institutions.

Another efficient common infrastructure in operation is the network of distance learning LieDM (Development of Distance Education Network in Lithuania) the base of which originated in 1995-1999 on the basis of PHARE programme and has further been developed and funded by EU programmes and Lithuanian Education Ministry [2]. The development of this particular network is also a constituent part of the strategy for the development of the Lithuanian information society. Both these networks are closely related and complement each other. LITNET is the infrastructure of corporate application, equipment implementation and exploitation, while LieDM is the infrastructure of the application of this equipment and university intellectual resources for the purposes of distance learning. The main facilities that the latter network offers to its members are the means of teaching and learning process management (Learning Activity Management System), distance learning facilities, aid in preparation of distance learning modules, and preparation and coordination of corporate projects.

In parallel with the internal university ICT infrastructure application the main aim also lies in the development of the systems of integrated learning process service and administration, and electronic learning resource base. For this purpose specialised computer classes and multimedia learning aid design laboratories are being found at universities, new models of the learning process organisation are being implemented, and scientific research on these models is being amplified. The implementation of intranet technologies and rapidly developing possibilities of computer hardware and software create perfect conditions for the establishment and development of internal ICT application structures.

3. The Tendencies of the Development of the Student Contingent and their Needs

The main factors that determine the choice of means employed for the organisation and service of the learning process is the structure of student contingent and their needs. As late as the last decade these means were oriented to the graduates from the secondary schools with no experience in ICT application that could use the privileges of higher education. However, the situation has been rapidly changing recently.

As the data given by the Statistics Department in 2005 reveal [3], in 2004/2005 academic year the number of university students increased by 6%, although general number of students in educational institutions decreased by 1.5%, and in secondary education schools it even decreased by 3%. The tendency of decrease of the number of students in the latter schools, the graduates from which comprise the main part of first year students at universities, has been observed for more then a decade. This situation is determined by the social problems and high level of youth emigration.

In the autumn of 2004, approximately 80% of the secondary school students continued their studies, 47% of them became the students of higher education institutions, 22% chose colleges, and 10% entered professional schools. A strong tendency of aging has been observed among students lately. In recent years approximately 22% of university and college students have been 30 and above years old, therefore, the need of extramural studies has increased: 50% of the students have chosen extramural studies in colleges, and 32% have entered university extramural studies.

There has been another strong tendency observed: a rapid increase in the competence of ICT application and the improvement of the conditions of studying outside the institution by employing ICT. These changes are exemplified [3] by the rapidly increasing numbers of the personal computers and the Internet users at home (Table 1). It should also be taken into account that many of the employed have computers in their work places, also, the network of the public Internet access points – PIAPs – established and supported by the state and EU funds is constantly expanded [4]. In 2005 this network had 2000 Internet computers, and it was planned in the year to come to instruct approximately 300000 people (9% of the population) how to use Internet technologies.

Table 1: Households provided with the personal computers and households that use the Internet at home

	2000	2001	2002	2003 (1st term)	2004 (1st term)	2005 (1st term).
Households with personal computers	5,3%	8,5%	12,0%	19,3%	25,0%	29,0%
Households that use the Internet at home	2,3%	3,2%	4,1%	6,2%	10,6%	14,4%

The data in Table 2 [3] reveal that the search of information for education is one of the most frequently used Internet services. The most active Internet users are young people: for more than 80% of 16-24 year olds it is the most customary means of information service. Therefore, the latter situation reveal that rapid implementation of ICT in education institutions is not determined by the needs of the institutions themselves, but rather it is determined by the needs of the young people with considerable experience of activities in virtual surroundings.

Table 2: The possibilities of the Internet usage for personal purposes

Usage purposes	2004 (1st term)	2005 (1st term)
Communication	84,3%	78,8%
Search of the information about goods and services	52,4%	62,7%
Education and learning service	67,0%	63,6%
Radio and TV programmes	28,4%	31,7%
Games or music	52,3%	50,8%
Reading newspapers and magazines	71,9%	70,4%
Bank operations	23,1%	29,9%
Information in the network of state institutions	30,5%	32,8%

4. The Advantages of E-learning and the Problems of Its Implementation

It is characteristic for Lithuania presently that both the universities and the youth that come to study in them are well prepared for the rapid development of ICT application in the learning process. However, it is necessary to take into account that implementation of the new technologies in any domain of the activities requires additional input for the preparatory and utility work. This is especially important for the preparation of methodical learning aids and materials in educational institutions. Learning aids and materials provide the information about the subject, the methods, the principles of application of the acquired knowledge for the solution of various problems, and the organisation of the learning process itself. The traditional classroom teaching method requires the immediate participation of a teacher who has comprehensive knowledge of the subject, and who has to solve all the student problems and be the immediate study manager. In this case the scope of the learning material is not strictly regulated. The learning material in this case is most often limited to the extended plan of the themes, practical tasks, reference list, additional list of literature, and a calendar plan. Traditional teaching method can employ ICT as the means for the illustration of supplementary learning aids, however, it adds little to the efficiency of learning.

The main advantages of classroom teaching against the independent studies of the textual teaching aid are a more substantial learning surrounding created by the teacher who uses various means and aids to convey the information and objective communication in this surrounding. The application of IT means allows transferring many traditional teaching elements used for the creation of the teaching environment into the e-learning material and thus create conditions for independent studies outside the classroom. However, these elements, as well as in the case of classroom teaching, have to be created by the teacher, and that requires preparation of a much more supplementary learning material and application of complicated technologies. In addition to high qualification, this requires new skills and consumes at least twice as much time. The research carried out by some authors [5] in this domain

reveal that the preparation of the learning material for independent studies even if no complicated ICT technologies are involved requires 5 to 10 times as much time than the teacher's preparation for an adequate classroom activity.

As the preparation of the courses by means of ICT requires additional funding and a large input of teacher work, it is necessary to find reserves for the compensation of the input into the organisation of such studies. Prepared learning material for the independent studies allows decreasing the number of hours of immediate classroom teaching. This is the practice in many foreign universities, where the load of classroom teaching is by 30% lower than in Lithuania. In this way not only the load of classroom work is decreased, but the expenses for the administration, capital investments, and the organisation of the learning process are decreased as well. The methods presently used in Lithuania for the calculation of a teacher and student load are strictly related to the number of hours of classroom work and thus underestimate the input of additional work related to the application of ICT and in this way discourage the implementation of these technologies.

The intensity of ICT implementation in the learning process requires fundamental revising the organisation of the learning process and its application to new conditions, and changing the proportion of theoretical and practical activities. Traditionally the focus in Lithuanian universities was on theoretical knowledge and development of logical thinking. This is clearly reflected in teaching programmes where more than 60% of classroom work is devoted for the lectures and consistent formation of the theoretical knowledge of the subject. Class practice, seminars and course papers are meant for the consolidation of the acquired knowledge, while independent studies are given accessory role, i.e. preparation for the classroom activities. Through the course of time this is a certified way of learning perfectly adaptable only in case of modest learning resources and the process of learning consists of reading books and sharing experience in the classroom.

5. The Tendencies of Integration of Traditional and Distance Learning

The new learning organisation possibilities provided by the ICT satisfy the needs of distance learning in the best way. Due to rapid economic and social changes and due to the increase in the age of students the need for such studies is constantly increasing. The main reasons that interfere a rapid development of distant e-learning in such a small country as Lithuania are the organisation of distant guidance and study result control, small amounts of students studying separate subjects, and heavy density of traditional educational institutions. Lithuania has 21 universities, moreover, more than 50% of the population is concentrated in 5 largest towns, and the remotest villages are situated only as far 150 km from a university.

There is no a unanimous opinion about the efficiency of the Internet technologies for distant study guidance. Some university teachers [6, 7] claim that the encouragement of the inter-student consultations decreased the input for the indirect guidance via the Internet and the maintenance of studies by 30%-40%, however, there is another dominant opinion also supported by the authors of this article on the basis of their experience that the input increased 2 or 3 times. The reasons of such an increase are the recurrence of the same questions, their inaccurate formulation, the problems of the answer supplement by visual illustrations, the requirements from the students to receive from the teachers the solution receipts to all the related problems. Therefore, the support for the independent studies should be organised in an integrated way by both the Internet and the immediate consultation. The selections of answers to the most frequently asked questions and the Internet conferences are relevant for solving small problems, however, more important problems and organisational questions should be solved and discussed through classroom activities. Therefore, a majority of Lithuanian universities choose an integrated model in the organisation of the learning process for the ICT implementation: for the theoretical part they prepare the learning material adapted to distant e-learning studies, and they arrange classroom activities for the development of practical skills, consultations and achievement control.

The establishment of the original virtual e-learning courses is purposeful only in that case when they are used by a great number of students and are relevant for a rather long period of time. It is often indicated that e-learning satisfies the conditions only if the learning material remains relevant for 3 or 4 years and is used by not less than 500-600 students [5]. Small Lithuanian universities can rarely satisfy such conditions, thus, they have to find access to supplementary funding. This problem is solved by the help of the contests organised by the Lithuanian Science and Education foundations, EU foundations, by the application of the learning material adapted for distant learning to intensify traditional studies, and by integrating the resources of several universities.

In addition, the effort is being made to modify the process of virtual e-learning material preparation by increasing the length of its application and by decreasing the input for its preparation and modification. This is achieved by creating open e-learning resources, by trying to compose e-learning modules from independent virtual e-learning objects that are accessed trough the Internet and allow demonstrating the features of separate fragments of the subject or the processes characteristic to them [8]. Open virtual learning objects and their cooperative usage is encouraged by the European Union, USA, Australian or other countries' special funds. This effort of the universities is also supported by the Lithuanian Science and Education funds.

6. Conclusions

Intensive ICT implementation to modernise learning in Lithuanian universities is determined by not only economic factors, but also by strategic determination and the need to prepare the specialists for work in a new information society. The implementation of the new technologies in the process of learning requires considerable amount of investments and work input, therefore, a thorough analysis of the factors determining their efficiency is necessary in order to employ all the advantages of ICT and e-learning, to avoid the problems related to their implementation, and to decrease the input. This can be achieved by selecting those e-learning requirements that correspond to the learning models and by applying rational methods for the e-learning material preparation and its modernisation. The expansion of the distant learning service points out the problem of close cooperation of all the learning institutions and all their resources, and creates conditions for the integration of traditional and distant learning infrastructures.

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