VISUAL TURN IN THE DEVELOPMENT OF DIGITAL PEDAGOGICAL COMPETENCIES

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Introduction

The series of EDEN conferences offered a specific framework of thinking and scientific consultation to the word and interpret this problem. In fact, the starting point is an idea that is old but provides the base for didactical thinking. How should the learning material appear, and how should it be transmitted to the students? Visuality is a topic closely related to the modernization of education, and in the process of the evolution of mass education since the 17th century, by today it has become the essential didactical element of demonstration and has an impact on everyday practice as that. This lecture consists of three parts; first, it looks back upon the historical characteristics of the interrelations between visuality and pedagogy. The core of the Comenius turn is indicated by the fact that the paradigm of digital pedagogy, which has appeared during the latest decades, has placed the then very original idea (Orbis Pictus) amongst new and very practical frameworks. After the millenary, the topic of visual learning gained a new dimension: it became furnished with an environment richer than ever before by mobile communication. Finally, we point to the new experiments examining the interrelations between visuality and education explicitly in the evolution of the world of learning, wording conclusions that may urge many of us to think about this problem further and conduct constructive debates.

Visuality and education – new answers to old questions

During the second half of the previous century, renowned thinkers pointed out that the role of the images and in connection with this, the role of imagination is comprehensive and originally important in education. This is why Comenius' Didactica Magna, and especially the prototype of schoolbooks built on modern multimodality, the Orbis Pictus became the reference work of modern didactics. Following the centuries of the evolution of mass education, during the latest decades, we have seen acceleration at the level of scientific thinking, as well. One example for that is Arnheim, who in the chapter "Vision in Education" of his fundamental work titled "Visual Thinking" (Arnheim, 1969) points out that photographs, images, models or even live demonstration of the objects do not necessarily guarantee a „thoughtful grasp of the subject"; merely the use of visual aids does just not provide "a sufficiently favourable condition for visual thinking". "Thinking with pictures is an essential strand in the intellectual history of technological development." Another author who has had a deep influence on our picture of education, Ferguson, understanding the reciprocity between visual construction and the role of technologies in the 1970s, drew the new perspectives of visual inclusion and technical planning

(Ferguson, 1977; p.827). In fact, the rapid development of mobile communication, the use of the internet and the impacts of network services transforming learning created a new situation in the education. Owing to this, we may state that after three and half centuries visuality became the most important keyword. Contemporary visual technology – film, video, interactive digital media – is promoting but is also demanding a radically new approach to learning: the new age of visual learning has begun. It is well known that higher education has always been a unique laboratory for education-related innovations, concentrating significant research and development potentials and excellent subjects for experiments aiming at modernizing education, i.e. students. In the past 25 years, several theorists pointed out that growing curricular requirements cannot be efficiently managed by formal education and the traditional tools of education should be modernized. The EDEN has, in fact, created a reference of the historical importance of this process by its annual conferences, workshops, projects, and publications. Already in 2015 and 2016, we had the opportunity to publish our research ideas on this topic.

Subsequent to the millenary, the new learning paradigm has been built on the human-machine interactivity that can be considered the differential specificity of this form of learning. It is an important recognition that collective learning may originate from the human-machine-human communication, as well. In our present, the ICT tools being existent all the time and everywhere (especially mobile broadband communication tools) offer a new possibility of "managing" space-time which means a considerable learning potential. In case there are adequate conditions, we can principally communicate – receive and send information – at any point of space so that, owing to the asynchronous nature of time, our sent and received messages can reach our addressees and us according to our intentions. The possibility of the flexible management of space-time hides the possibility of a learning strategy adoptable within the system of personal capabilities and endowments. In this extended world managing time much more flexibility, the function of demonstration has changed, as well. It is not only the moment of making the pictures that have become simpler and "more democratic" than ever before but the access to the image contents has become much more open, as well.

From an educational aspect, it is an important characteristic that in the process of demonstration, understanding the *object* requires further *knowledge*, information, structures and activity samples. Recognizing this potential knowledge, after the millenary, more and more museums, libraries and archives in the world have been digitalizing their collections, and so *learning objects* bearing important cultural content or messages are becoming learning objectives. But the very same process, although in a spontaneous manner, is forming in the case of contents, mainly images, created and shared in the virtual space by individuals. This space can really be considered a learning environment the typical function of which is the transmission of visual contents. According to our preconceptions and experiments, these spontaneous processes can, however, be applied within the educational framework and from a pedagogical aspect, making learning more interesting and conscious.

The birth of digital pedagogy – facing new visuality

In our new world, which, owing to the ICT tools, differs from any of the previous ones, we also have to reconsider plenty of pedagogical questions. In the world of interactions, the channels and community-making elements of interpersonal communication have transformed (especially in the web 2.0 environment), and the more and more open access to learning contents and the never ever seen methods of online learning and community learning influence pedagogical thinking, as well. Digital pedagogy has made a considerable try to renew pedagogical thinking after the millenary. In fact, by virtue of the initiations of the previous one and a half decade, the definition of digital pedagogy, which deals with the new pedagogical problems appearing in the context of teaching-learning and research in a learning environment dominated by interactive technologies, is still being formed. This is what we also did at the Budapest University of Technology and Economics (BME) app. fifteen years ago, and by issuing two students' books – Digital Pedagogy (2006) and Digital Pedagogy 2.0 (2013) – and launching a course, we have provided the possibility to get to know digital pedagogy for hundreds of students.

In our age, knowledge has become dynamic, and the process of gaining it has become necessarily extended in space and time. On one hand, it has become diverse, it is connecting to education at a higher and higher level, an on the other hand, the years spent within education have doubled during the latest century, from 6-8 years to 12-16 years. It is widely agreed that everyone needs digital competences that make the person capable of applying electronic media self-confidentially and critically both at work and in their free time. This competence is also related to high-level information management abilities and developed visual communication capabilities. The new competences connected to info-communication technologies include, at the most basic level, search for, evaluation, storing, creation, introduction, and transmission of information of multimedia technology, communication through the internet and the capability of participating in networks.

However, in the development of education and especially the learning environment, there has been a specific *spatial transformation* going on in terms of the transmission of visual information. In image content services (see, for instance, the success of Facebook, Instagram or YouTube), an epochal development has taken place. A virtual service environment rich in visuality has been born, which has basically changed and personalized the existing functions in terms of the teaching-learning tools. This process was supported by the fact that the users have become potential content providers, increasingly in everyday practice, as well; the users of the internet have become more and more important factors by uploading their contents and images.

In this new learning environment, the students, too, have a special position: on one hand, they are open to new information, but on the other, owing to the nature of development, they also demand the possibility of orientation and active development.
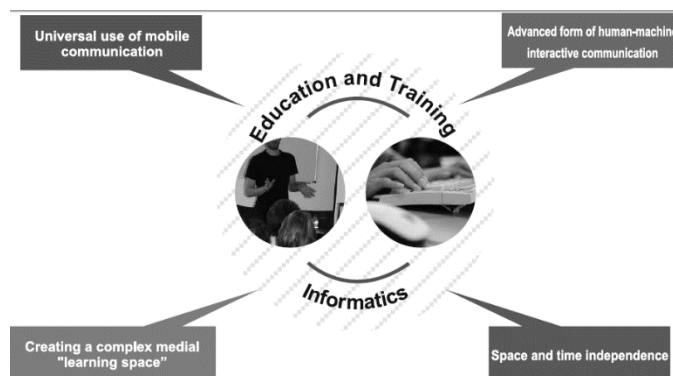
Figure 1. The new characteristics of educational informatics (source: diagram created by the author)

This is how, during our researches, it has become a new answer to old questions that e-learning should be made more than an "experimental teaching method" by extending the frameworks of online learning. Utilizing the advantages of its flexibility and the fact that it allows accessibility in space and time, comfort and personal time management in acquiring the learning material, we must open the process of content development, and make it possible for teachers and students to share new contents. This is how the development of the Open Content Development (OCD) concept in 2015-2016 that was built on the fact that interactive online learning solutions allow the recording and wide-range accessibility of digital content (text, picture, sound, and video).

Microcontent as a visual tool

The project, that invited the teachers, who were ready to teach in an interactive and cooperative way in open content development, i.e. in an online learning environment and the students possible to be motivated, to join the development into the process of learning material construction (creation of microcontent), was initiated as a four-year unit of the methodological grant program of the Hungarian Academy of Sciences. This development paradigm sets out from the conception that the use of mobile communication has become general, which allows a high-level interactive connection between human and machines. In this process, a complex medial learning space can be established, in which the development and acquisition of the learning material can be more flexible in space and time than ever before.

The OCD model is built on the elements of the classical didactical triangle: its input is made of the teachers, the students and the learning material with the specific challenges that the teachers' learning content development competences are of a problematic level and that the motivations to acquire learning material are rather low, especially in VET. As for learning contents, there are few modern learning materials, especially in the world of vocational training, and in this case, the dynamics of development lags far behind the actual needs.
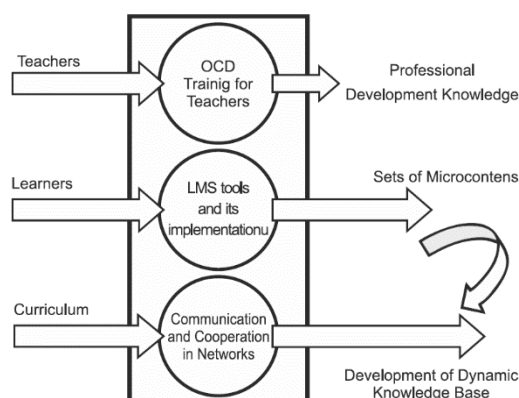
Figure 2. The new characteristics of educational informatics (source: diagram created by the author)

Our model was built on three main activities: first, it offered a special training for the teachers who joined the project. Second, it made it possible for the participants to use LMS tools and to learn methods necessary to handle these. This process started during the training by getting to know and applying the MOODLE system. Finally, in the evolving network we initiated a communication focused at development cooperation. Thus we considered the concluded personal development knowledge, the pile of the newly elaborated micro contents, the possibility that a dynamic knowledge base can be created by the participants and the open contents created by them as output factors.
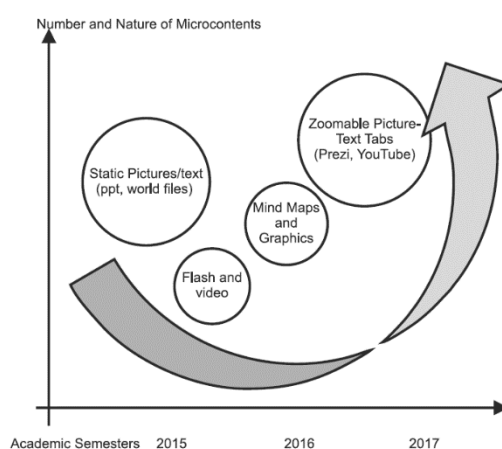

Figure 3. The new characteristics of educational informatics (source: diagram created by the author)

Figure 3 shows that the students and teachers who had become familiar with the main objectives of the model basically made static image-text type micro contents that appeared in PowerPoint slides or word files. Probably owing to the training and the new methodological knowledge, during the later semesters, dynamic image contents, too, appeared in the form of flashes and as embedded videos, mainly when YouTube educational films were used. The students, who were motivated to create microcontent by the teachers prepared within the frames of the project, joined open content development during last year. This population of students has brought about a sharp turn in genres; the number of the images and the graphs and diagrams made of them has considerably grown, which clearly indicates the advance of image structures. Finally,

it must be mentioned as the newest tendency that, mainly with engineer and economist students, learning units integrating complex image content have appeared; they bridge the dilemma of the visual presentation of micro contents, the increasing amount of information and visibility by applying presentation techniques offering zooming possibilities. Thus by increasing the sequence of the micro contents, image and text tableaus were made that took shape in a dynamic presentation of some minutes, with the help of Prezi applications. The solutions were implemented by using rich assets of images (photo, drawing or diagram) and video (mainly YouTube). Most of them were shorter than 5-10 minutes.

To sum up, we can state that a more intense use of visual elements may bring about a considerable turn in developing digital pedagogical competences; the possibility of this is clearly indicated by our experiments conducted in open content development so far, taking pedagogical-didactical aspects into account. Approaching the halftime of our project, a picture reflecting the changes of the genre of the micro contents created within the frames of the OCD model is taking shape. Between 2015 and 2017, almost 100 pieces of microcontent that could be taken as educational units were created that, regarding their visual and text elements, can be used in the methodological evaluation of education and in pointing out the main characteristics of the genre.

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