SPEEDING-UP ADOPTION OF E-LEARNING INNOVATION IN EUROPE: MISSION POSSIBLE?

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"Innovation is unfeeling. It waits for no individual, and respects no organisation.
It relentlessly flows ahead, washing those away who oppose it,
dragging the remainder into its strong undertow."
Steve Wheeler[1]

Introduction

The need to equip European citizens with the so-called 21st century skills[2] is one of the central targets of the most recent EC documents in the field of education and training, and the role of ICT in acquiring these skills, both in terms of digital literacy and of other "literacies", is recognized in all these policy communications (Bocconi et al., 2013; Brecko et al., 2014). The urgency of this can be perceived if we think that 15 million new jobs will be available in Europe by 2020 that require a total or partial new skills set, as estimated by the European Commissioner for Education and Culture in the March 2010 University-Business Forum. Furthermore, a number of recent studies[3] show that ICT is increasingly used in learning settings throughout Europe form school education to higher education to vocational training and adult learning, with different degrees of "penetration" in different sectors of E&T and in different countries; and that some national ICT-for–learning policies, such as the Iniciativa Novas Oportunidades in Portugal[4], are having an impact on the level of innovation that the Lisbon strategy and the ET2020 strategy have set as one of the main targets for European society in 2020.

The evolution of the concept of ICT for learning in the European policy discourse, mainly brought forward by the European Commission, shows how the narrative has moved from a strongly technology-driven experimental-like niche at the time of the DELTA and ESPRIT programmes in the late 90s, to a more mature phase where the main aim was to develop new solutions able to reach as much actors as possible – during the period 2002-2010 with the

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[1] http://steve-wheeler.blogspot.com.br/2014/02/disruption.html
[2] A complete list of definitions of the concept of 21st century skills is provided at
http://www.imls.gov/about/21st_century_skills_list.aspx
[3] A review of recent studies in the field can be found in the MATEL report, at
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=6360
[4] See more at http://www.novasoportunidades.gov.pt

eLearning Action Plan – to the present phase, where the key policy objective is scalability. This clearly responds to a mismatch between the recognised potential of ICT to support innovation and change in education and the reality in most European countries. Education is in fact far from having fully embedded the potential of new technologies, to improve the efficiency, accessibility and equity of training and learning systems. Just think that 63% of nine year olds do not study at a highly digital equipped school and only 20 to 25% of students are taught by digital confident and supportive teachers (European Commission 2013).

As suggested by a recent IPTS Report, a "policy recipe" for replication and multiplication of successful implementation does not exist, and 'one-size-fits-all' and 'one-off' models of innovation do not work in education. On the contrary, policies should encourage multiple and differentiated pathways to scale up innovation in 'organic' ways (Kampylis et al., 2013). Scaling up should be considered as a contextualized and organic process that allows for continuous change and adaptations in order to address on one side the continuously shifting requirements of society and on the other the fast technological developments of our times. Along these lines, the policy priority of the European Commission in terms of learning innovation is very clear: "Evidence indicates that the EU-wide experiences on innovative learning need to be scaled up into all classrooms, reach all learners and teachers/trainers at all levels of education and training. A full uptake of new technologies and OER requires more than boosting experimentations across Europe" (European Commission, 2013, p.4). Clearly, the European Commission wants to go beyond experimentations, and to put in place the conditions for mainstreaming the meaningful and high-impact use of ICT for learning in all possible lifelong learning settings. In line with this policy objective, the European Commission is supporting a number of projects which have the aim of fostering scalability of ICT-for learning (innovative) practices in Europe.

How to speed-up innovation adoption the HoTEL Innovation Support Model[5]

The first step taken by HoTEL to design the Innovation Support model was to analyse the four main genesis models that exist in the field of Technology Enhanced Learning. First, a *technology and industry-led model*, in which the availability of a new technology, normally not specifically designed for learning, finds a number of educational or informal learning applications that may lead to large adoption out of massive industrial and commercial investment. The case of tablets use within classrooms but even more importantly in informal learning corresponds to this model. Second, a *research-led model*, in which learning theories search and find application in experimental learning settings that are created and monitored to check learning effectiveness, usability and other key features of both generic and learning-specific new technologic applications. Third, a *practice-led model*, spontaneous bottom up innovation emerging from individuals or communities of teachers and learners that find

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original ways of using technology to materialise new ideas about learning and teaching and are able to demonstrate their effectiveness in new contexts of use. Fourth, *the policy-led innovation mode*l, materialised by the many national programmes launched since the 80s to diffuse ICT and its use in classrooms. In the HoTEL view, these policies gave support to one or the other of the existing three models, or a combination of those, without really establishing a different genesis model. Policies may become very relevant, on the contrary, in the subsequent steps of innovation life cycles, and notably adoption, scaling up and institutional exploitation.

Each of these genesis models of TEL innovation carries with it some strengths and some weaknesses. An integration of approaches is very desirable and an important part of the Innovation Support Model that HoTEL is trying to build, with the aim of integrating the experience and findings from all these different TEL innovation communities. The figure below illustrates further this integration concept via the three HoTEL Learning Exploratorium Labs.
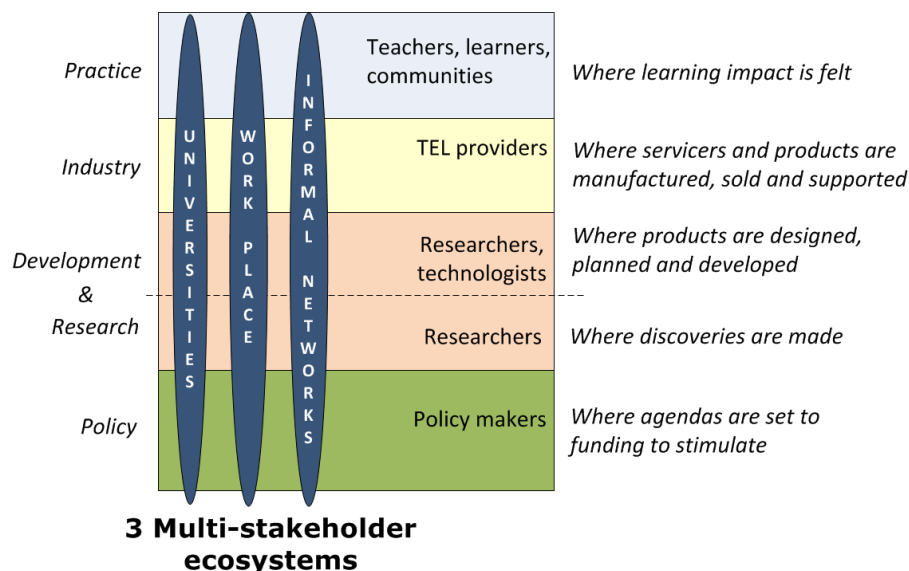

Figure 1. Integration at the level of sector-stakeholders

In view of the HoTEL project[6], three main problems affect and delay the adoption of innovation processes in ICT for learning, whatever genesis model we look at. First, innovative practices in the use of technologies for learning are often not sufficiently considered by research whereas bottom-up innovation is playing an increasingly important role in the field. Second, there is a need to verify the impact of existing learning theories on ICT for learning practices to determine whether this has led/is leading to innovation. Third, the lack of an holistic approach in the field puts at risk the effectiveness and mainstreaming of new ways of using ICT for learning purposes: too often the time span between the identification of technologies that have a potential for learning, the theoretical analysis of pedagogical implications, the piloting of such technologies and their adoption (first at small scale and then

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[6] All information about the HoTEL project is at http://www.hotel-project.eu

mainstreamed) is so long that the technology itself becomes out-dated compared to the changing environment and learning needs.

Based on these critical assumptions, the HoTEL project has been working in the last two years to contribute to more effective, holistic and faster innovation cycles in European Technology-Enhanced Learning (TEL), by proposing an *Innovation Support Model* able to increase quality at the level of the innovation cycle itself and of the different phases foreseen, that can be replicated in the future. At the very moment, the project is testing the support model in the frame of three "innovation laboratories", and will produce its final results at the end of 2014.

In the field of TEL, innovation may frequently start in a classroom or in a community of practice, or may be the result of massive use of a technology not born for educational purpose. This means that any "innovation support model" must fit into the variety of modes and contexts in which innovation may emerge, and have different, adaptable ways to support it. The road to success for a TEL innovation depends, to a large extent, on the possibility to be understood and supported by some categories of stakeholders that are not always the same (e.g. industrial investors, school leaders, publishers, policy makers, teachers' networks, student associations, consultants, et cetera). Not all of them might ultimately influence every kind of innovation with similar leverage, but it is important to consider the full spectrum of involved interests to select the most crucial representatives of stakeholders to discuss/support the innovation development. Furthermore, what appears a big success in a certain context may not work at all in another context (e.g. country, socio-economic environment, organization, or sector). It is therefore fundamental to identify not only "what works" but also "where" and "under which conditions", distinguishing between success factors that are relatively "unique", specific to the context, and others that can more easily be found or reproduced in other contexts.

Within the scope of the HoTEL project, innovation support has been defined as a support in the different steps and processes that bring innovations to be generated, adopted, incorporated in use, scaled up and eventually exploited in commercial or institutional ways; and where innovation support refers to the way a "professional body" of analysts and stakeholders representing users categories, advisors, fund raisers, institutional and private investors, etc. can help innovators to succeed, or to succeed more quickly than they could do without this support. From this perspective, innovation support models are essentially relational models, linking innovators to their context through a structured set of interactions that, in the case of HoTEL, take place within and around the *Exploratorium Labs*. The Learning Exploratorium Labs represents a key concept of the HoTEL project: they are innovation-friendly learning environments, one in higher education, one in corporate setting, one within an international professional network focused on eLearning quality, which will test and support selected TEL innovations in real-settings. While the Labs provide direct interventions to the selected innovation cases via use of innovation experts from all the above four sectors, HoTEL has also scheduled other specific activities to support this integration: mapping of R&D discoveries and future areas of research, identification of technology development trends coming from the industry sector, research on new learning paradigms

and on how they relate to known learning theories, etc. As shown in Figure 1, these different innovation sectors are supporting the Labs with different types of intelligence, such as competitive, market, technology, research and policy intelligences that help the stakeholders to both make informed decisions when assessing their innovations as well as to invite members of these sectors to join the labs.

Need for a systemic approach

The field of Technology Enhanced Learning (TEL) is considered to be a diverse and multi-level domain, involving many types of players, working in different cultures and operational contexts, under varying jurisdictions, with differing and sometimes opposite approaches to pedagogy and the task of education. Looking more deeply, the TEL domain is not only varied, but the adoption of TEL in general, and "products" in particular, is also complex, with many technical and organisational interdependencies. Multiple root technologies such as content delivery and assessment need to be integrated with other technologies that are found outside TEL, such as those related to Big Data, Artificial Intelligence and internet of things. These kind of technological innovations which are produced on the interface of several technologies are in turn giving birth to new pedagogical innovations, and new learning and educational practices, such as seamless learning, microlearning, rhizomatic learning, etc. In addition, TEL innovations have a nature of expansion and change, which transforms both the learning practices and the communities themselves that adopt the innovation (Paavola et al., 2004). For example, in the school sector, Engestrom (Engestrom et al., 2002) tells us that there are several factors that make innovation in schools very difficult. These factors include social, spatial, and temporal structures embedded in classrooms, teachers' culture of working in isolation, and political top-down governance. Thus, most TEL innovations are not linear, single rooted or independent, but rather systemic, involving several converging and or competing technologies, complex interactions by many players, who have to collaborate in order to align their contributions and develop holistic solutions, rather than simply the introduction of new standalone products. Hence, these types of systemic innovations have "a nature of integrality" (Kaivo-oja, 2011), and at the same time a nature of multi-diversity, since the applications envisioned usually require for different development pathways per involved technology. Different providers of systems, content and services are often mutually dependent and a degree of coherence between them is necessary to transfer TEL innovations to the mainstream. Further, many other types of stakeholders have to come to agreement about what is wanted and how it should be provided. When organizations are looking to introduce and manage TEL innovations, they need to take into account the whole eco-system in which they are operating. The focus is on desirable systemic change by which we mean changes in business (and learning organizations), learning processes and practices, as well as technological (software, and tools and infrastructure) and social (e.g. role of learning in developing European citizens, their employability, and personal fulfilment). At the same time TEL innovations can also be regional, national and at European levels.

For systemic innovations to be successful the "functional logic of the whole product/service delivery and supply chains (suppliers, manufactures, distributors, value-added resellers, installers and consumers) may change because of the new innovations" (Kaivo-oja, 2011). In case of TEL, educators, software developers, brokers, policy makers may also have to be aligned, co-innovate and make changes for the successful adoption of innovations. Most common types of incremental innovations are (i) technological innovation, (ii) business innovation and (iii) social innovation. In systemic innovations, these three types are systemically interconnected, so that systemic changes in one of these three innovation types can introduce changes or innovations in the other two innovation types as well (Kaivo-oja, 2011).
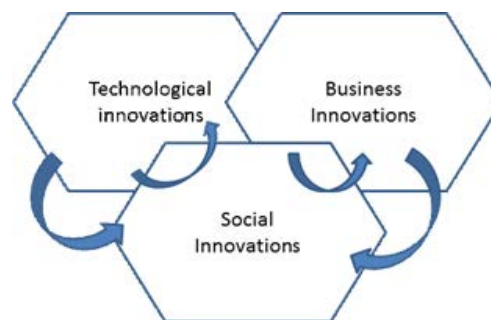

Figure 2. Synergy field of different forms of innovations
(source: Jari Kaivo, 2011, Figure 1.a Systemic synergy of technological innovation, business innovation and social innovation, p.7)

The challenge for innovation-supporters is to understand which element drives the systemic innovation (key innovation element) and then organize the other elements inside its strategic framework logic. For example, if (1) technological aspect of innovation is the key element of the innovation the other 2 elements of innovation are subsystems of larger systemic innovation (Kaivo-oja, 2011). In our case, we have added one additional innovation type "learning practice innovations" specific to TEL innovations.
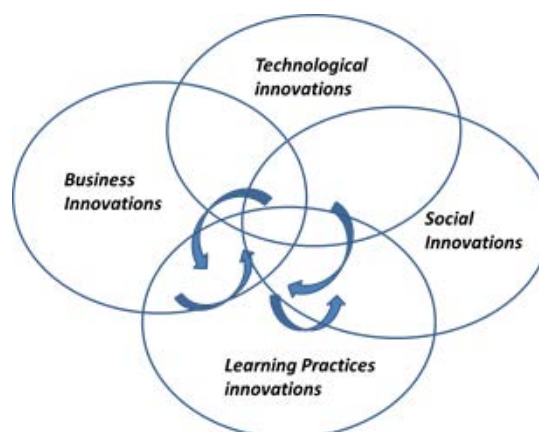

Figure 3. Synergy field of different forms of TEL innovations

This was so to take also into account the complexity of TEL innovations, which need to be fitted within or to innovate/disrupt current learning practices and pedagogies. Consider for example how innovations or "value propositions" from software designers and platform

developers influence and impact the individual contexts of teachers (teaching practices at schools, training needed to adopt the new systems, professional development) or those contexts of schools administrators and IT managers, where they need to make informed decisions on access, affordability, quality, and adaptability to existing organizational processes, or a ministry of education, who may have a say in how the innovation fits with the school curricula, place and time of adoption. TEL innovators need not only to be informed of the current and emerging learning practices supported by TEL, but also to understand the current analytical frameworks with which to make sense of this complexity and to use as checklists against proposed innovations or indeed learning paradigms to consider their nature. Such analysis of the related learning practices and the analytical pedagogical frameworks is intended to lead to improvement in design or in the change-management of its adoption. In other cases they may help identify the assumptions made of existing practices that can be combined with the innovation to ensure its viability.

Conclusion: the importance of holistic and context-sensitive strategies to speed-up innovation adoption in TEL

In a nutshell, the HOTEL Innovation Support Model is putting forward six "structuring assumptions" that should be taken into account when we want to support mainstreaming and scalability and to speed-up the adoption of TEL innovations:

1. Recognition of the diversity of innovation paths, along with innovation channels, start points, contexts, expected outcomes, success criteria and, in general, every single step and factor of the support model and the setting.

2. Recognition of an existent difficulty on measuring 'success' within a TEL innovation setting. How is success defined? Do we use pedagogical, technological, socio-economic, business-economic, or other criteria to determine what can be considered as being a success?

3. Embedded flexibility and adaptability of the support model in order to match different stages of innovation development and different contexts and innovation paths. The support model must take the various key factors from every context, stakeholder, and user, to integrate them into the innovation, so that a unique experience is produced. This unique experience feeds every actor of the setting (i.e. Higher Education, Workplace learning, and Informal Learning in Networks), included the model and the innovation themselves, making a full iterative cycle.

4. The core concept in the support model is that of a "multi-stakeholder ecosystem" (with different stakeholder representatives according to the nature of the innovation proposed) that analyses and eventually tests the proposed innovation from a multi-perspective approach, identifying all the strengths and the weaknesses from each relevant stakeholder's perspective. This test might be either (i) Practical, on the ground, with real users and in a real context-setting or (ii) Theoretical, with a deep-thinking test bench by experts and qualified users.

5. Context-sensitivity of the analysis and support action proposed, in order to distinguish transferable from non-transferable success factors, according to a well-defined set of criteria

6. If implemented, the innovation must take from the support model all the required input for a fresh start, making a two-step implementation phase. With this approach, the implementation makes use of all the lessons learnt and best practices from the theoretical phase with the Lab, but it will not be restricted by them when it comes to a market-context, which might take into account an additional set of success criteria and specific implementation conditions.

In other words, HoTEL calls for a multistakeholder and context-sensitive approach to TEL support, where it is fundamental to look at innovations by keeping in mind all the specific challenges that they have been facing, are facing and will be facing in the next steps of their development. For example, since TEL innovations are transforming the practices and the communities that adopt them, we cannot consider them as standalone products or services, without keeping into account that they interplay with their context, both influencing and being influenced by it. What should be done – in the HoTEL view – is instead to consider innovations as "system-activities" which aim at a specific innovation "objects" and which lead to a set of desired "outcomes" for the involved communities. This will enable us to understand the dynamic nature of these innovations and their relationship to the dynamics of knowledge creation within the communities involved (Engestrom et al., 2002). The HoTEL support innovation model takes this into account by providing some formative interventions in the form of its Exploratorium Labs, a historical analysis of TEL innovation milestones and trends, as well as the evolution of the learning practices. Thus, providing the opportunity for TEL innovators to assess and re-align their innovations within real contexts and setting.

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