
ECOMPETENCE IN EUROPEAN HIGHER EDUCATION – ICT POLICY GOALS, CHANGE PROCESSES AND RESEARCH PERSPECTIVES

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Abstract

Driven by technological innovation, Europe is moving towards a post-industrial society in which knowledge has been identified as the key factor for growth. As the creation of new knowledge is the core business of universities, the European Union needs an innovative and effective higher education system. The model of eCompetence development proposes a change management approach and conceives the human factor as a point of departure for eLearning innovation in universities. The main assumption of this approach is that technology-driven innovation in universities can only be successfully realised if the individual members of the organisation are aware of the need to adapt their work culture to the changing environment and to make full use of the potential of ICT. In a recent follow-up proposal that we submitted to the EU in 2005, the research and development areas of the *eCompetence Initiative* have been deepened and widened substantially in scale. It is proposed to undertake research at *horizontal* and *vertical* organisational levels. These core areas can be subdivided into six subtopics that all define specific actions for eCompetence development of university staff:

eCompetence and the human factor (horizontal actions)

- on the individual level;
- on the intermediate level;
- on the leadership level.

eCompetence and the wider context (vertical actions)

- the teaching and learning culture;
- the Bologna Process;
- knowledge management.

This paper provides an overview of the current policy trends in the funding of innovative research at the intersection of the higher education and information technology sectors and outlines the relevance of eCompetence as a topic and a possible strategy approach in the ICT policy goals of the European Commission.

1. Striving for the knowledge society: ICT Policy Goals of the European Commission

In our globalised world of the 21st century, knowledge has been identified as the key asset for the successful development of the European economy and society. In 2000, the European Council built on this concept in the Lisbon declaration of core policy goals towards building "... the most competitive and dynamic knowledge-based economy in the world by 2010 (Lisbon decision, 2000)". Subsequently, in 2002 the Education Council and the Commission adopted the "Education and Training 2010" programme that sets the target to make "... Europe the world leader in terms of the quality of its education and training systems (Education and Training 2010 Programme)" and outlines within the European Research Area the role of European higher education in the knowledge society.

As the creation of new knowledge is the core business of higher education establishments, the Commission published, in 2003, a communication on the role of universities within the knowledge society (European Commission, Communication, "The role of universities in a Europe of knowledge", COM 2003). In this debate, the Commission implied that the growth of the knowledge society depends on four parameters, one of them being "... the dissemination of new knowledge through information and communication technologies". Furthermore, the European Higher Education Ministers stressed in the Communiqué of 2003 Berlin Conference that the qualification frameworks for the European Higher Education Area need to offer "... a wide range of flexible learning paths, opportunities and techniques (Berlin Communiqué of the European Higher Education Ministers 2003)."

2. The Search for the Holy Grail: ICT Potential in Higher Education

ICT related funding programmes at European, as well as at national levels, have enabled the production of a wide range of digital tools designed to support development towards knowledge-intensive economy areas. In the higher education sector these tools allow, e.g., ubiquitous and multi-channel access to, and delivery of, information; storing and retrieval of data/information, development of interoperability between systems, communication and exchange of information in CSCL (computer supported collaborative learning).

The range of digital tools can all be understood as single "bricks" that can be used to construct an overarching *knowledge management system* in higher education institutions. Which poses the question: What is the mortar that will bind the bricks together in an effective way and drive the educational innovation within universities forward? Both learning systems and knowledge can be assumed as two essential factors in supporting competence development in the use of new media. The challenge that arises, when it comes to a *sustainable* integration of ICT in universities, is to find a way to relate knowledge management and the existing teaching and learning systems and respects the need for handling *tacit* knowledge and the demand for more flexible and interactive learning processes.

This focus, on a better understanding and exploitation of tacit knowledge in ICT environments, is strongly emphasised in the strategic objectives (of the funding policy) of the *Technology-enhanced Learning Unit* of the DG INFSO (Directorate-General Information Society and Media). The problem with tacit knowledge is that it is not easily accessible. The science philosopher Michael Polanyi (1891-1976) characterised tacit knowledge with the aphorism: "We know more than we can tell."¹ So tacit knowledge consists often of habits and culture that we do not recognise in ourselves. As this kind of knowledge can hardly be codified, it seems almost impossible to externalise and represent it by using a hierarchical knowledge management system. We do not want to extend this discussion at this point, only to make clear that tacit knowledge has been found as a *crucial* input to the innovation process in societies at the level of individuals. It is certainly likely, therefore, to be an important factor for the development of new competences in the use of ICT in higher education.

¹ http://en.wikipedia.org/wiki/Tacit_knowledge

The potential of ICT, to act as a driver and innovator in European higher education, is unquestioned. But this potential of technology, to enrich and to enhance the teaching and learning process, and to support flexible learning modes, has not yet been fully recognised nor systematically exploited in European universities. Various recent studies show that the integration of ICT into such institutions is being realised only at low levels (Collis, Van der Wende, 2002; Wedekind, 2004; Euler 2004). The diffusion of new technologies seems to be advancing at a low level and threatens to fail at a margin that has been dubbed in one German study, as the *5% hurdle* of eLearning integration into universities. (Wedekind, 2003; see also Zemsky and Massy, 2004, for the situation in the US). With reference to the diffusion model for innovations that Rogers has developed, in universities, the use of ICT in teaching and learning is still driven in the academic staff by the "early adopters" and thus far fails to be taken up by the "early majority" (Rogers 2003).



Figure 1: Change in Higher Education and University Response

Collis and Van der Wende conducted, in 2002, a survey on the use of ICT in higher education, in which they observed that, in general, institutions are changing from a period of mostly bottom-up experimentation to institution-wide encouragement of the use of ICT. With the help of a three-stage model, it is explained that:

- In many analysed cases the first stage of institution-wide ICT implementation, i.e. the establishment of institution-wide technological infrastructure, is in place;
- The second stage, i.e. rich pedagogical use of this infrastructure, is still in development;
- The third stage, to be labelled as strategic use of ICT with a view to the different target groups of higher education, has not been considered explicitly yet (Collis, Van der Wende 2002).

The reasons for this low level of diffusion and integration of new technologies are many. As a consequence, the need for an institutional *eStrategy* has moved into the limelight of current discussion on eLearning in the higher education sector - a strategy to integrate ICT in a sustainable way into the work structure of the universities. The strategic use of ICT in the teaching and learning process as one core task of universities requires explicit reflection and decision-making at the institutional policy level.

But the strategy decisions related to ICT use also face some serious obstacles. In broad terms, European university management is not professionalised and does not possess the power to define and implement a normative *eStrategy* into all levels of the quite fragmented organisational structures. In organisational theory, quite some attention has been devoted to "the university" as a complex organisation and significant concepts and behaviour patterns that are discussed in the studies, such as, for example, "loosely-coupled systems", "garbage-can decision making" and even "organisational anarchy" indicate the structural weaknesses of universities (Birnbbaum, 2000; Enders, 2003; Pellert, 1999). In addition, it seems that in a broad sense, neither the topic of eLearning nor the quality aspects

of teaching and learning are currently core priorities of much of the university leadership in European higher education.

3. Get your Team on Board: The eCompetence Perspective

So how can the potential of new technology be adequately used in higher education? How can the digital tools be applied systematically to the daily business of the universities and complement the teaching and learning process?

The *Swiss Centre for Innovations in Learning*, of the University of St. Gallen, has developed a complex model for the successful implementation of innovations in learning into a higher education context, which has been reviewed and refined in several studies that have involved a number of experts and drawn results from field research. eLearning is seen in the SCIL model as a core challenge to foster the innovation process in higher education learning. A pre-condition for any successful eLearning integration, the SCIL model assumes that the university has to develop an ICT strategy that aligns learning with its core business processes and suits its specific context and conditions. In the next step, the model defines five major areas that are relevant for a sustainable implementation of eLearning: pedagogy at the core of the change management process, and the fields of culture, organisation, funding/resources, technology.

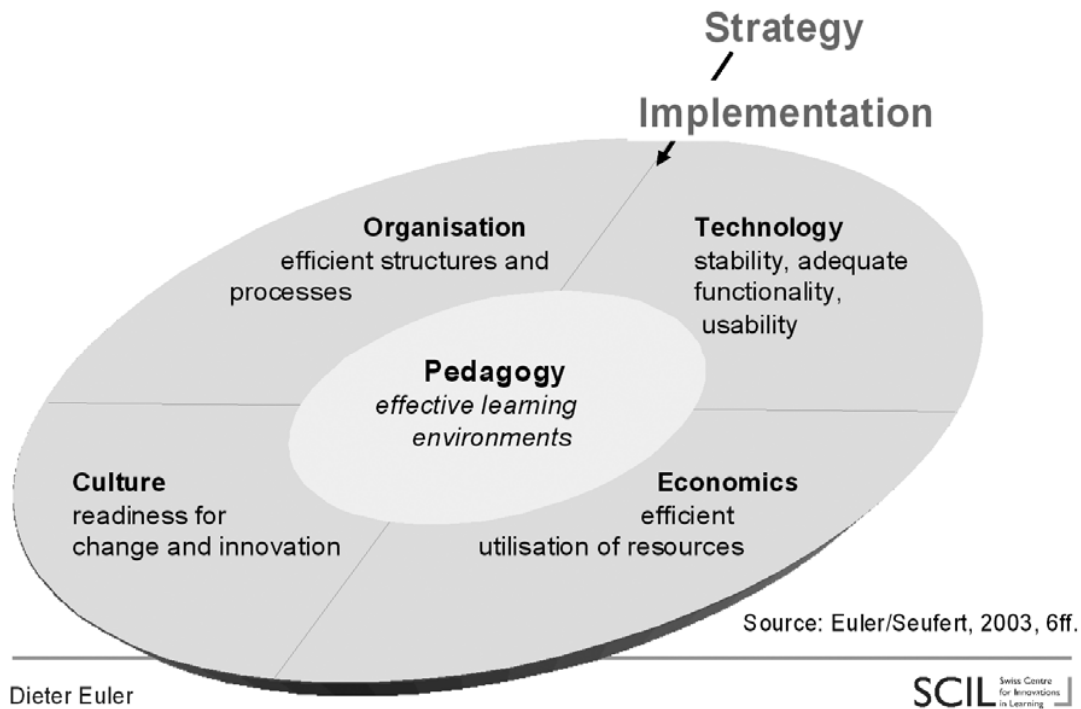


Figure 2: SCIL model for implementing innovations in learning

We propose to use the SCIL model as general reference framework for the research undertaken on eCompetence in higher education. Basically, the model assumes that you have to take into account variables from five different implementation areas in order to drive a sustainable education innovation forward in higher education institutions. The eCompetence topic represents one specific aspect within this overall innovation field, which is principally connected to all implementation areas. Nonetheless, the eCompetence topic has stronger affiliations in the areas of teaching and learning culture and

organisational structures and processes, as well as in the pedagogical area of the learning design within a university.

In this approach, the development of new, ICT-based teaching competences for academic staff is seen as one focal element of eLearning innovation. So the approach chosen in this paper and applied in the research framework of the European eCompetence Initiative is to reduce the complexity of a university-wide eStrategy, tackling all possible aspects and to focus on the eCompetence topic that includes two specific change management areas:

- *On an individual level:* competence of university teachers to use ICT for organisation and dissemination of knowledge in higher education.
- *On an organisational level:* conceptualise personnel development activities in human resources management and university leadership level for enhancing the competence of academic staff to use ICT in universities.

The main implication of this eCompetence approach is based on the assumption that the technological innovation process in universities (as any innovation in organisations) can only be successfully realised if the individual members of the organisation are aware of the need to adapt their work culture to the changing environment, which means in detail that:

- The individual teacher, as a member of the academic staff, realises the potential of ICT for enhancing teaching and learning in higher education, and
- The individual teacher supports the flexible learning model by gradually applying technology into the daily teaching practice in the university.

The point of departure for this approach, that has been chosen to reduce the complexity, is to focus on the *human factor* within the wider change management process in technological education innovation. It is a well-known insight that technology always tends to outpace pedagogy. Also, a major feature of initial eLearning funding has placed a strong emphasis on technology. But the full potential of eLearning cannot be realised unless the universities initiate the development of a strategic concept for sustainable integration.

This position includes, for eCompetence, the commitment, on the part of a large number of academic staff, to substantially improve the educational quality in universities. What is required is a strategy to organise quality processes that complement curricular innovation with consistent ICT applications. In the current state of eLearning it is essential to exploit the set of digital tools for the day-to-day teaching and learning activities that the individual university teacher undertakes. And in order to prepare any implementation of ICT into course design, it is essential for the university teacher to reflect upon and to re-think the "traditionally" used concept of learning.

To envision technology *as a facilitator for learning* means that the concept of learning needs to be placed at the centre of a reflection process on educational innovation. This pedagogical change in perspective is not a recent phenomenon: the "shift from teaching to learning" is a well-discussed topic that has already been discussed in educational circles for some time (Huba and Freed, 2000). What is quite new in European higher education, though, are, in terms of socio-economic parameters, the changing university environment with increasing competition on global, and integration elements on the European, scale; the changing role of the students; the challenges of life-long learning and the potential that ICT can bring into the realisation of the pedagogical shift towards flexible learning (Wildt et al, 2003).

The objective to create and foster flexible, student-centred learning paths can be found in several EU policy reflections on innovation in European higher education, in particular in relation to the ECTS (European Credit Transfer System) process and the life-long learning challenges (Berlin Communiqué 2003; EUA Tuning Paper, 2003). If the normative higher education policy goal on ICT-supported

flexible learning is to become reality in the real operating environment of any European university, the challenge is to create an awareness in the individual teacher of how his/her role in the teaching and learning setting can be gradually transformed, from the traditional lecturer to the moderator and facilitator of self-directed student learning activities. To use a well-worn phrase, the ideal ePedagogy scenario where technology acts as facilitator of the learning process, the teacher needs to move from "the sage on the stage to the guide on the side". It is, at its core, this reflection and change process that the individual teacher needs to accomplish; what is dubbed here the development of individual eCompetence. The process of eCompetence development on the individual level has to be embedded into an organisational concept that details how the university can support the ICT competence development of its academic staff. This may be best done by linking the individual competence building to specific organisational objectives that are seen as priority issues. In this case, the idea is to link the eCompetence development of the individual teacher with specific portions of the Bologna process that are being implemented currently at the majority of European universities and that bear relevance for fostering the normative policy objective of enabling flexible, student-centred learning. In more detail, the issue of eCompetence and enhancing flexible learning may play a supportive role for the following areas in the Bologna Process:

- The role of teaching and learning in the common quality assurance framework,
- Curriculum development based on the modularisation model and the life-long learning perspective,
- The support of flexible learning paths,
- The promotion of European dimensions in higher education,
- And the enrichment of the student mobility schemes with complementary technology-based modules

The advantage of integrating "eBologna" into eCompetence development is that individual competency training and the integration of ICT into teaching and learning, maps to existing organisational processes and requirements that university management supports and is actively pursuing. This moves the topic towards acceptance as an essential area for research and development.

Where these synergies can be created, competence development will be based on a needs analysis that is identified in the specific teaching and learning context of the university teacher. Further, the appropriate pedagogical scenario conceptualised for ICT use (e.g. a specific virtual mobility tool) will be consistent with the current organisational priorities (e.g. the support of student mobility in European higher education). In other words, there is potential common ground for the development of individual and organisational eCompetence in the challenges posed by the Bologna policy framework.

The *technological* challenge that the development of eCompetence in higher education poses is rooted in the need to establish a knowledge management approach that is not restricted to the pure representation of static information, but integrates the tacit knowledge and competences of the staff members in the pedagogical teaching and learning context. The important, value-adding knowledge in a "knowledge-intensive" organisation is not primarily the static information, but it is the activity-related knowledge, the competences of the staff members. It is essential to find a model to integrate this knowledge management approach into the overall teaching and learning system of the university and into the different organisational or learning contexts, in which teachers and learners interact with each other.

4. Where do we go from here? – Research Questions related to eCompetence

These reflections do not give an immediate answer to the question of what the "e-competent" university teacher looks like, or how higher education institutions can support the development of new, ICT-related competences for academic staff, but they do shed light on where we need to look to answer these questions. They also suggest that there is not likely to be any one simple answer, but that solutions will be geared to the logic of the specific teaching and learning culture and the specific ICT integration approach of the university.

The most important implication of the method that this approach takes, on the development of eCompetence and the sustainable integration of ICT into higher education teaching and learning, is to position the human factor as the focal element of eLearning innovation in universities. Whatever the potential of the recently developed, and future emerging, technologies may be to technologically enhance the learning processes in universities, as long as the human actors themselves are not seen as the main target for implementing a meaningful change in the existing teaching and learning culture, there will be no structured model to systematically and optimally exploit and integrate the potential of ICT.

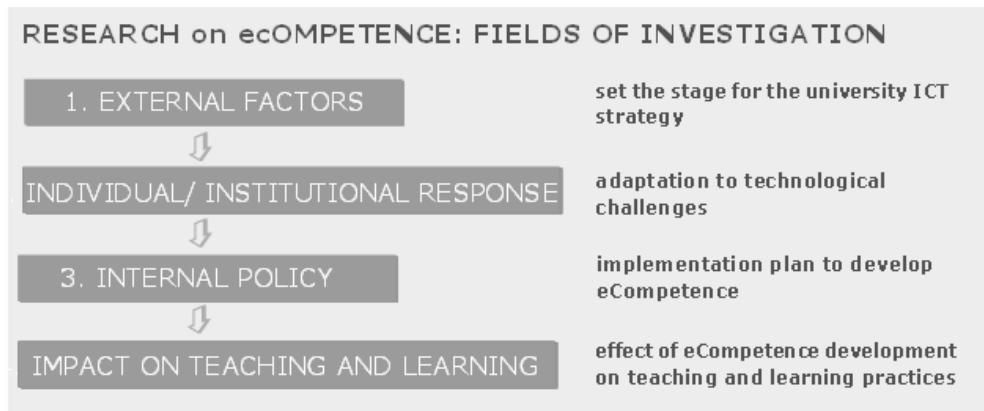


Figure 3: Research on eCompetence – Fields of Investigation

As indicated in the discussion above, the full potential of technology to enhance learning can only be realised in higher education if we can raise an adequate level of awareness in a broad population of academic staff members. ICT is changing the teaching and learning culture and the quality of learning can be reasonably raised with the help of an ePedagogy that reflects on the fostering of flexible learning models with the assistance of technology.

The main research objective of the development of an eCompetence model on a European scale is to explore interactions between the individual and organisational learning when it comes to technology-driven innovation and its consequences for the day-to-day business processes in universities, more specifically, the teaching and learning services, and the delivery of knowledge to the students. If technology is to emphasise the shift from teaching to learning and to enhance a flexible, self-directed learning at individual, group and organisational level, the pre-condition for this fully-fledged application of ICT potential is a change at all levels of the organisation. ICT-supported knowledge creation and distribution has to take place on the level of the individual teacher, the intermediate level of the study course, department or faculty and on the university leadership level. These three levels have been identified as the main points of departure for the research on eCompetence-related activity patterns and for the implementation of prototype models that aim to systematically support ICT-related competence development of the university staff.

The main goal of the development of such a model is to improve how current and emerging ICT can mutually enhance individual and organisational learning processes in higher education. The purpose of

this model is to widen the use of ICT in teaching and learning by addressing the members within academic staff and university leadership open for eLearning innovation (*the early majority*) with a wide pattern of eCompetence development activities.

The main rationale is the assumption that in a university, both the individual teacher and the organisation as a whole need to acquire, store, distribute and use knowledge related to the innovative use of ICT in the teaching and learning services as one of the core business processes of higher education. The management of technological innovation in such a complex organisation as a university is far from simple. We have learned from research dealing with the outcomes of previous and existing eCompetence programs that the traditional way of sending university teachers to courses is neither well accepted within academia nor achieving the needed new technological competences.

Rather, we have to investigate alternative approaches to competence development, to understand and emphasise the informal competence development that takes place in specific contexts. A major challenge is set for the technological support of this informal learning process by a knowledge management system that will intend to represent and help to organise the tacit ICT competence profiles of the university teachers and of the involved leadership members.

5. Ongoing European eCompetence Project Activities

In order to come to grips with the different levels and perspectives from which these research challenges can and should be addressed, a broad research programme is needed which reflects these levels and perspectives. First of all, this research needs to address the broad perspective from which university as well as university policy makers attempt to organise the technological innovation process that ICT causes within universities and the consequences for the way the students learn as knowledge workers in the knowledge society. At the same time, our research should provide insight into the strategies that are used and the conditions that are created to support the development of eCompetence and thus improve the integration of ICT into higher education.

The primary objective of the development of an eCompetence model on a European scale is to enhance the state of the art of innovative ICT use in higher education, by providing answers to the research questions outlined above. In order to achieve this, it will be necessary to develop a fully documented research knowledge base containing information, descriptions and indicators pertaining to effectiveness of existing eCompetence approaches and innovation policy. The work of the European eCompetence Initiative will contribute to this process and hopefully will assist in the formulation of strategic policy goals at the European level, particularly in terms of identifying priorities for future development of the Information Society Technologies Programme focused on higher education, professional development and training.

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