

New Perspectives for Learning

Insights from European Union funded Research on Education and Training

Issue Five
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e-learning
Research
Issue

This newsletter is the fifth in a series of occasional issues highlighting for policy and decision makers, some of the key conclusions and recommendations of projects conducted under the EU Targeted Social Economic Research (TSER) Programme and under the Key Action "Improving the Socio-economic Knowledge Base".

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European research supports the e-Learning Action Plan

Speaking at a recent conference aimed at kick-starting new social-economic research, European Research Commissioner Philippe Busquin highlighted the importance of "Ensuring that everyone in an enlarged European Union has access to learning opportunities if we are to invest in our kids' future. Understanding the problems concerning education and training and how we can address them, will help us develop more effective policies to ensure that current and future generations get a decent start in life."

Many people see new technologies as having an important role in helping to overcome some of the problems associated with education and training and are looking towards incorporating their use within what are hopefully more effective policies. However, recent research on the use of information and communication technologies (ICT) has identified that other factors need to be considered besides just providing access and implementing the technology.

The success or failure of an ICT-related educational innovation can be determined by many factors. Teacher training appears to be one such critical factor. Research also demonstrates that educational institutions are social organisations that both influence the ways in which an innovation will be adopted and are influenced by that innovation.

"success or failure of an ICT-related educational innovation can be determined by many factors"

Editorial

The study of educational reforms helps us understand that the availability of technology alone cannot bring about radical change. Research funded by the European Commission's DG-Research under the Fourth and the Fifth EU Framework Programmes shows that besides access to technology - a number of other factors determine the success or failure of ICT-related educational innovation. These factors go beyond technical issues and even beyond classroom issues.

Research shows that some technologies are embraced but others are resisted. Some technologies become normalised and institutionalised, whilst others become marginalised or are modified by the various players in learning institutions over time.

Research suggests that educational innovation involving the use of ICT should not be considered only as a matter of access to technology or only as a matter of implementation. The use of technology in classrooms is found to be socially contextualised, interacting with the institutional and organisational cultures of schools and reflecting elements of the prevailing social relations in and around the context of use. Research demonstrates that educational institutions are social organisations that both influence the ways in which an innovation will be adopted and are influenced by that innovation.

This newsletter reports results from completed EU-funded research projects and from project clusters that could help policy and decision makers working in this area.

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The eEurope2002 and eEurope2005 Action Plans adopted by the Council of Ministers and the European Parliament identify e-learning as a top priority, and fix ambitious objectives for the infrastructure, equipment and basic training which are pre-requisites for its integration. The eLearning initiative further develops these objectives from an educational point of view, stressing the need for innovative pedagogical approaches and for ambitious objectives regarding learning quality and easy access to e-learning resources and services. It also stresses the need for removing other structural obstacles to innovation, such as organisational and legal barriers, and the way knowledge and competencies are evaluated and certified.

The Council of Ministers endorsed the eLearning initiative and the importance of ICT for education and training in its eLearning resolution in July 2001, encouraging the Member states "to continue their efforts concerning the effective integration of ICT in education and training systems, as an important part of the adaptation of the education and training systems". This followed the report of the Education Council, entitled "The concrete future objectives of education and training systems", which underlines the importance of ICT in modern education and training systems, confirming that ICT is "of increasing importance in open learning environments and virtual teaching".

Therefore, it is very timely that recently completed European socio-economic research (funded by the European Commission's DG-Research under the Fourth and Fifth EU Framework Programmes) can provide some insights in to the complexities of introducing any ICT innovation within existing organisations. Lessons learnt from such research may usefully feed into regional, national initiatives and the proposed European eLearning Programme.

The European Commission's DG-Education and Culture is seeking funding for a multi-annual programme (2004-2006) for the effective integration of Information and Communication Technologies (ICT) in education and training systems in Europe.

In preparation for this proposal more than 700 European universities are involved in large-scale co-operation projects, and in an in-depth reflection on the organisation of universities and on pedagogical requirements to be embedded

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A full list of Briefing papers and details of ongoing projects can be found at: - <http://www.pjb.co.uk/npl/index.htm>

in the use of new educational approaches and models. As regards the training of teachers and school management, there is now a tendency to focus less on the 'e' of e-learning, and more on the 'learning' component of the process. Successful use of the new content and services depends to a large extent on the quality of teaching and the commitment of teachers.

Where more advanced training is available, teachers find support to collaborate more closely, to design educational resources, to assess their own teaching, and to use technology as a tool for enhancing their approach to learning and teaching. In this respect, the pedagogical context is very important and more needs to be done to understand the success factors for good practice.

The results of recently-completed EU-funded research provide insights for good practice as well as the basis for further research. This e-learning edition of the newsletter highlights some of the key conclusions and recommendations of individual research projects and project clusters in this field.

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Impact of ICT-supported learning innovations

A large number of information and communication technology (ICT) supported learning innovations have been funded by regional, national and European-based bodies over the last few years including some funded by the European Commission DG for Research under the Targeted Socio-Economic Research Programme (TSER) and the Joint Multimedia Call with a TSER component. However, little research appears to have been conducted on assessing the overall impact of these individual projects.

This project cluster has aimed to optimise the results of these ICT-based learning projects by monitoring and reviewing the projects in order to identify key qualitative indicators of innovation and a new research agenda for future actions. This has been looked at from the following perspectives: -

- 1) New methodological approaches to learning in technology-based learning scenarios and their efficiency
- 2) Institutional/organisational consequences, including cross-cultural issues to be solved
- 3) Contribution of ICT to lifelong learning.

A number of conclusions were drawn that lead to recommendations for future research.

The project considered that there should be support studies for developing pedagogies for learning in the knowledge society, with the focus on the management of cross-cultural and linguistic issues in the framework of a European education space (e.g. transregional/transnational joint courses and/or learning materials development, transnational joint-student support, transnational collaborative learning, layered approaches of learning platforms).

Future research should pay attention to the emotional aspects of learning in ICT-based environments, like the extent to which social and learning skills, self-managing skills, and other meta-cognitive capabilities are developed. There should also be studies in emerging new competencies, skills and meta-skills of teachers, tutors and other academic staff (as

well as managers) for e-learning. There is also a need for in-depth study of people's information seeking behaviour in ICT-based learning situations and its relation to the building of knowledge.

At the strategic level, there should be longitudinal studies to investigate the sustainability and scalability of the recently introduced learning innovations, like the learning effects arising from learning with ICT (such as learning in new scenarios combining face-to-face and virtual learning), changing habits of study, new assessment components, long-term teaching effects, and promotion of the notion of "classroom observatory" type of activities.

There is also a need to address the lack of rich evidence on the issues of equity, exclusion and gender. Some fundamental questions are related to how we can handle new forms of exclusion as a consequence of the level of education and limited access to technologies of electronic transmission information; and to what the pedagogical factors are that inhibit / promote social exclusion.

The rhetoric of European lifelong learning needs to be made more concrete by bridging the gap between theory and practice across the different sectors (and different 'patrimonies') of learning; developing a knowledge base on 'what works, for whom and under what conditions', with particular regard to the use of virtual learning (e-learning) in education and training; and by the consolidating knowledge on new ways of promoting social inclusion (e-inclusion) and integrating social inclusion policies with education and training policies more effectively.

Further information: -

Project Title: "Monitoring and evaluation of research in learning innovations (MERLIN)" (August 2002)

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Contact details on page 5

or get the Briefing Paper at: -
<http://www.pjb.co.uk/npl/bp39.htm>

"should be support studies for developing pedagogies for learning in the knowledge society"

"pay attention to the emotional aspects of learning in ICT-based environments"

"investigate the sustainability and scalability of the recently introduced learning innovations"

Thematic Network on Virtual Learning Environments for Higher Education

“market pressures are more evident than political pressure when implementing virtual learning environments”

New information and technology systems are claiming to result in new ways for flexible education and training. “Virtual campuses” are emerging. “Virtual learning environments” are being created by organising the learning environment in new ways, based on different technological configurations for learning and communicating between peers and teachers.

This project established a thematic network to evaluate educational and training innovations in the current implementation of virtual learning environments. It defined a virtual learning environment is defined as:

“A place or community arranged specifically for learning purposes and mediated by the intensive use of information and communication technologies, and one that is based on ideas of the structure of knowledge and learning, and the practical arrangements necessary for learning connected with time, place and repetitive rituals which together provide the social organisation for learning and teaching.”

The main components of virtual learning environments consist of pedagogical functions - learning activities and materials, tutoring, teaching situations and evaluation; appropriate information and communication technologies - suited to a pedagogical model; and the social organisation of education - time, place and community.

The project concluded that virtual learning environments tend to be introduced in parallel to other forms of study, raising concern about their sustainability. Market pressures are more evident than political pressure when implementing virtual learning environments in institutions with them tending to be initiated by

“virtual learning environments tend to be introduced in parallel to other forms of study, raising concern about their sustainability”

enthusiastic staff. Yet financial priorities, perceptions of the university's role and arrangements for learning and assessment inhibit institutions from totally embracing virtual learning environments.

It was found that virtual learning environments do provide access for more students and client populations, although some tutors found it hard to monitor learner's satisfaction. However, virtual learning environments could improve the current quality/variety of teaching/learning and reduce the administrative burden on teachers.

Virtual learning environments are considered to be new sources of income or reduce current costs for institutions. Some academics also considered them as a way of enhancing their reputation and career potential.

However, it was considered that regulations for validating virtual learning environments based learning would be required to guarantee the quality of service delivered. Barriers to the implementation of virtual learning environments include faculty members' resistance to change; funding, lack of adequate facilities and no priority over other users. But, as Europe's telecommunications infrastructure is improving along

with the available bandwidth and with the availability of low cost powerful computers and software suites, virtual learning environments are technologically and economically accessible.

A number of policy recommendations were made concerning approaches to implementing virtual learning environments at the institutional level. At the teaching/learning level teachers need special training for online-education. Teaching in virtual learning environments needs competence in technological (so-called *hard skills*) and organisational aspects as well as new skills in applying relevant didactical methods, moderating and facilitating (so-called *soft skills*).

It was also considered that support is needed for the development of “innovation units” consisting of technical groups, academic departments and teams of teachers to work

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Supporting ICT-related learning Innovations in Schools

Information and communication technology (ICT) has the potential to enhance the education and training sector, but recent research activity in this area has shown that the teaching community involved in these research projects have found it difficult to embrace the results in their daily practices. This project cluster examined the results of four previous ICT-related studies and aimed to provide a guide for teachers and schools to select educational designs and technology applications/solutions that are suited to their needs and therefore increase teachers' confidence in utilising research results in their everyday practice.

The innovative use of ICT in teaching/learning is a major research area actively supported by the European Commission under initiatives like the Targeted Socio-Economic Research Programme of FP4 and the Socio-Economic Research Action of FP5; the Educational Multimedia Task Force, the IST Programme, SOCRATES/MINERVA and e-Learning Initiative.

Taking the results of four projects undertaken within these initiatives, this project cluster has aimed to make the link between practice, research and decision-making. The recommendations are considered to be relevant to future policy-making by the European Commission as well as individual European Union Member States.

The project cluster concluded that innovative use of ICT in teaching and learning could stimulate dynamic learning environments. But, the effectiveness of ICT based innovations; scientific knowledge and/or new educational/pedagogic models rely on their successful integration into existing educational activities.

The research considered that teachers are the central figures for the cognitive, emotional and social development of their pupils in ICT-related teaching and learning. However, new models and the use of ICT have changed teachers' roles. The implementation of ICT in school teaching and learning has affected the distribution of roles and responsibilities and classroom interaction. However, regardless of their differing learning patrimonies and characteristics, the research concluded that schools do still enable ICT teaching/learning innovations.

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towards changing teaching practice in line with an institution's pedagogical model. Learning resources and materials must also be specifically designed for virtual learning environments. The division of labour for tutors, lecturers and other staff involved in learning campus operations also needs to recognise the difference in virtual learning environments workloads.

A number of cross-cultural policy recommendations were made to protect cultural minorities and those who prefer to learn through their mother tongue. The linguistic and/or cultural diversity of EU member states must be considered in the organisation of European education and training programmes in each country and on a trans-European basis. International virtual learning environment activities have demonstrated legal and economic problems, and highlight the differences in the learning patrimonies of the audiences. Financial considerations also need to be addressed.

Further information: -

Project Title: *"Implementation of Virtual Environments in Training and Education"*
(2000)

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<http://www.pjb.co.uk/npl/bp34.htm>

"teachers are the central figures for the cognitive, emotional and social development of their pupils in ICT-related teaching and learning"

"support is needed for the development of "innovation units" consisting of technical groups, academic departments and teams of teachers to work towards changing teaching practice in line with an institution's pedagogical model"

“many projects were less successful as they had no or too few teachers involved in their implementation stage and there was not a whole school involvement”

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The research found that there are two main approaches for the conduct of ICT teaching and learning innovations. The first uses real life experiences and practitioners innovative ideas. This can be fully integrated into the whole school's development plans. The second enables the teachers involved in the research and development to support and initiate educational innovations. These can enhance research through contributions to the design and methodology of research projects; tailoring situations for learning and research that are better suited to schools; expanding the anticipated uses of ICTs in education; providing insights into the strengths, limitations and suitability of research outputs in schools; localising the research outputs and disseminating results of the research to colleagues and throughout schools.

It was found that many of the projects were less successful as they had no or too few teachers involved in their implementation stage and there was not a whole school involvement in the design and evaluation stages. Also, teacher's language barriers' and heavy workloads affected the sharing of informal knowledge.

The sustainability of research and development driven innovations is threatened by the nature of research knowledge and practices; schools' attitudes towards research and development; the links between researchers and schools; the time spans of the projects and the nature of research and development products.

Further information: -

Project Title: *“Synergy between Practitioners' needs and opportunities, research orientations and decision making on the usage of ICT in primary and secondary education”*
(December 2002)

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Tele-guidance for teacher training

The use of tele-guidance for teacher training has been shown to significantly contribute to the professional development of student teachers, but the effect on their reflection had not been studied. Through collaborative research this project aimed to identify and develop online tutoring strategies using various technologies within different European cultural contexts.

The project recommended that urgent further research is needed into the advantages and disadvantages of telecommunication in teachers' education with reference to the influence of telematics on reflective skills; changes caused by telematics on the curricula of teacher training and dramatic changes to the curriculum and the teaching /learning environment.

Research is also needed into student's behaviour in classrooms, particularly the effect on day-to-day classroom practices and the role of tele-guidance in lifelong learning and the extent to which tele-guidance can encourage

learning at work and in other learning settings. Further research on changes in the tutors' role, the new skills required and ways of stimulating the professionalisation of tutors is also needed.

Further information: -

Project Title: *“Teacher training, reflective theories and tele guidance: prospectives and possibilities in teacher training in Europe”*

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<http://www.pjb.co.uk/npl/bp43.htm>

“further research on changes in the tutors' role, the new skills needed and ways of stimulating the professionalisation of tutors is also needed”

ICT Innovation in Science Teaching

Research looking at innovation in science teaching has concluded that very few teachers have a lot of experience in using computers and many teachers have very little experience. There is also still a lot of uncertainty about the role of computer as an integral part of education.

In all the countries studied there are policies to develop computing in schools, but there are substantial differences in the actual provision of computers. Generic software seems to prevail with word processing packages used the most, followed by spreadsheets. Simulations are strongly used by a few teachers, however their use is not generalised yet. But modelling tools are rarely used despite some very strong arguments in favour of their importance.

Although the situation is changing rapidly the use of IT in science is still 'fragile' and 'patchy'. Therefore the research recommended that training should be focused on the new opportunities created by the use of IT in science courses. In particular there should be a focus on IT "real-time experiments" that save time in capturing data in labwork, and allows more time

for students' interactions, for the analysis of different variables and for the rapid repetition of experiments.

Claims that IT helps deepen understanding need to be backed up with specific examples of classroom activities and an analysis of the benefits that are felt to be associated with them. Training should also aim at creating clusters of teachers in each school in order to diffuse expertise among fellow teachers and potentially greatly increase the take-up of innovations based on IT.

Further information: -

Project Title: "*Science Teacher Training in an Information Society*"
(April 2001)

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<http://www.pjb.co.uk/npl/bp33.htm>

"ICT-based modelling tools are rarely used despite some very strong arguments in favour of their importance"

Looking at Innovations

Research in innovations in education and training has found that many opportunities for innovation are related to the introduction and deployment of ICT in education and training, particularly when it is embedded in well-organised pedagogic practice and institutional arrangements.

It has therefore recommended that there should be encouragement of the use of ICT in both schools and higher education institutions by revising the national curricula and programmes to encompass online teaching and learning; encouraging institutions to envisage and implement inter-departmental re-design and collaboration, including collaboration between teachers, domain experts, animators and other rapidly emerging teaching functions, both within and between institutions. There should also be

encouragement of the setting up of joint programmes between institutions both schools and universities.

Further information: -

Project Title: "*Looking at Innovations in Education and Training*"

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"recommended revising the national curricula and programmes to encompass online teaching and learning"

Computer-supported collaborative learning

Research has explored the effectiveness of computer-supported collaborative learning networks in creating a community of learners who use educational technology to build knowledge together through learning environments. Experimenting with different kinds of educational software, the project studied almost 600 students from primary secondary and vocational education in five European countries.

The research concluded that computer-supported collaborative learning requires teachers and students to adopt an educational philosophy that focuses on “knowledge building” rather than “knowledge reproduction” as the main learning activity. This requires both teachers and students to believe in and trust a learning style that involves active, self-regulated, constructive and contextualised learning by groups of students more or less independently.

However, not every student or teacher is used to this way of learning and for many it was not easy to learn together with other students. In addition, it is not easy to integrate this new educational philosophy with existing philosophies in schools. Although other research has shown that co-operative learning is effective, if students have common goals and interests combined with individual accountability, in reality, it hardly occurs within existing school practice.

However, it was considered that computer support does add value by the easier organisation in the classroom of collaborative learning and the better visibility of collaboration processes involving of all students. It makes communication patterns visible and structures types of communication. It also makes types of thinking more visible and organises enquiry-based learning as well as learning to build knowledge and meaning collectively. Computer support also adds value by building connections with practice; and opening new forms of collaboration with other classrooms, schools, nations, and other partners like museums and universities.

The research found that teachers and students do like to work through computer supported collaborative learning, however it is not easy to integrate new didactical practices into existing curricula.

Although it was not possible to identify a strong correlation across the various computer supported collaborative learning environments studied, various positive effects were found that there was relatively consistent evidence of students showing more interest in collaborative learning; that the practises of learning and instruction changed considerably and that students worked in a more self-regulating way, directing their own projects.

The amount and quality of social interaction between teachers and students also increased. Students developed skills for using information technology and basic knowledge acquisition. They also learned to access extended

sources of information and motivation increased. It was found that there were significant advantages in using computer-supported collaborative learning in mathematics and languages, and in process-oriented measures like the quality of question raised and depth of explanation.

“not easy to integrate new didactical practices into existing curricula”

Further information: -

Project Title: *“Computer-supported Collaborative Learning Networks in Primary and Secondary Education”* (November 2000)

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“need to adopt an educational philosophy that focuses on “knowledge building” rather than “knowledge reproduction””

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