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The impact of new technologies on distance learning students

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Abstract

This is a European Commission Leonardo da Vinci Reference Material project on the impact of new technology on distance learning students. It is known that all the Ministries of Education of the 27 European Union countries pay millions of Euros annually in the provision of educational technology for their schools, colleges and universities. A review of the literature of the impact of technology, however, showed that the research in this field was unacceptably fragile. What research there was focused on the impact of technology on children in American schools. The project set out, therefore, to measure the impact of technology on adult education, lifelong learning and distance education, with a particular focus on adult distance learning.

Keywords: Educational technology, adult education, lifelong learning, distance education, impact of technology, e-learning, higher education, European program, Hochschule

The project

The project commenced on 1 October 2006 and ends on 30 September 2008.

The partners in this project are:

- Ericsson Education Ireland
- Distance Education International, Ireland
- FernUniversität in Hagen, Germany
- Università degli Studi Roma III, Italy
- University of Plovdiv, Bulgaria
- Corvinno Technology Transfer Centre, Hungary

Literature

The extant literature on the impact of technology on learning is fragile and inconclusive. This was the view of the World Bank in March 2005 (Impact of ICTs [1] on learning and achievement). In the UK in January 2004 Cox et al (A review of the research literature relating to ICT and attainment) reach the same conclusion. In the USA in 2005 similar findings come from the University of California at Santa Barbara.

A detailed search of the literature shows that what research there is, is nearly all on the impact of technology on children in American schools. There is little or nothing on adult education, on lifelong learning or on distance learning. This focus on lifelong learning and distance learning is the focus of this new proposal.

This research situation is unacceptable in an area that is costing European governments millions of Euros annually.

Distance education

One of the major manifestations of the use of technology in education is distance learning. This is because in conventional education technology is a supplement to the teacher and used by the teacher to make the content of the course more persuasive. In distance education, however, technology is a substitute for the teacher (and not just a supplement). The essential of distance education is that it replaces the interpersonal communication between the teacher and the taught and replaces it with an apersonal form of communication mediated by technology.

Today distance learning is a rich and complex concept containing five major fields of education and training provision. These are:

1. Distance education: the provision of education and training at a distance by Open and Distance Teaching Universities, open education institutions and distance education departments of conventional institutions.
2. E-learning: e-learning is the provision of education and training via the WWW for students who study mainly as individuals using LMSs (or virtual learning environments) like Moodle, WebCT and Blackboard.
3. Synchronous e-learning systems: these are the provision of education and training on the WWW to students who study mainly in groups using LMSs like Centra or Horizon Wimba
4. The use of the WWW for the provision of education and training on university and college campuses as a supplement to lectures or, alternatively, as a substitute for lectures when he courseware is provided on the WWW and lectures are cancelled
5. Mobile learning is the provision of education and training on PDAs (including palmtops and handhelds), smartphones and mobile phones.

The ultimate goal of the project is to provide a set of findings that help instructors understand the implications of various technologies for their students, and to provide research-based principles for how instructors can best use technology in their teaching.

Methodology

The methodology employed is based on the 'Identifying and implementing educational practices supported by rigorous evidence' of the US Department of Education, Institute of Education Sciences of December 2003, probably the most recent and most authoritative educational research methodology. These guidelines are based on randomized controlled trials.

As the extant literature of the impact of new technology on learning was considered fragile and inconclusive, it was important, therefore, to use in the project the best methodology available.

This was considered to be the methodology proposed by the Institute of Education Sciences of the US government Department of Education in Identifying and implementing educational practices supported by rigorous evidence (December 2003).

These guidelines are based on randomised controlled trials that are well designed and implemented plus the quantity of the evidence needed. Randomised controlled trials are studies that randomly assign individuals to an intervention group or to a control group, in order to measure the effects of the intervention.

The process of randomly assigning a number of individuals to either an intervention group or a control group ensures, to a high degree of confidence that here are no systemic differences between the groups in any characteristics except one - namely, the intervention group participates in the intervention and the control group does not. Therefore the resulting differences of outcomes between the intervention and the control group can confidently be attributed to the intervention and not to other factors.

In order to obtain a finding of statistically significant effects, a study usually needs to have a relatively large sample size. A rough rule of thumb is that a sample size of at least 300 students (150 in the intervention group and 150 in the control group) is needed to obtain a finding of statistical significance.

Procedure

The seven issues addressed by the project were:

- Impact of technology on learning in Open Universities, distance education systems both academic and corporate
- Impact of technology in 'traditional' e-learning
- Impact of technology on learning in synchronous elearning
- Impact of technology on learning in the use of the WWW on-campus

- Impact of technology on learning in mobile learning
- Impact of technology on learning for men and women
- Impact of technology on learning for younger and older learners.

Thus five of the issues deal with the various forms of distance education and two are more general: the impact of technology on learning for men and women and the impact of technology on learning for younger and for older learners.

In the project for each of the seven interventions of the impact of technology on learning each of the six partners (Ericsson Education Ireland, Distance Education International, Ireland, the FernUniversität in Hagen, Germany, the University of Plovdiv, Bulgaria, Corvinno Technology Transfer Centre, Budapest, Hungary, and the University of Rome III, Italy) supplied 25 students for each of the control group and intervention groups for each of the seven interventions.

The project went beyond the stipulations of the Identifying and implementing educational practices supported by rigorous evidence guidelines by collecting data from Ireland, Germany, Bulgaria, Hungary and Italy and not just from one country.

Products and results

The results of the first survey, which investigated the impact of technology on Learning in Open Universities and Distance Education, and was led by Prof. Dr Bernd Krämer of the FernUniversität in Hagen have been published online (in English and in German).

In this study the intervention group was composed of students who had studied at an open university, and the control group was made up of students who had never studied in distance education.

Professor Krämer concludes:

“This study has confirmed that it is generally accepted that the use of technology in higher distance education is beneficial for the student population at large and for special needs students in particular. We found that there is no significant difference in the judgement of participants with or without experience in learning at an open or distance university that the use of technology in distance education can overcome several disadvantages of this study model including impeded interaction between tutors and students, indirect communication, or reduced opportunities for social interaction. A large majority of participants in the study agrees that ICT facilitates easier access to material for those studying part-time (90%) and the application of ICT to support learning and teaching and providing Internet access to student administrative processes has improved distance education (75%). Multimedia environments are considered to provide a high benefit for teaching and learning in open and distance universities. 80% of the population agrees that learning is enhanced when text and pictures are integrated in a multimedia environment. On the contrary, while still being the majority, only 50% participants agree that ICT was used to provide individualized learning programmes. Our hypotheses that it is generally accepted that the education

provided by open university compares with that of campus universities and the degrees awarded by open universities are equally well recognized as those awarded by traditional campus universities was not fully confirmed."

The report on the impact of technology on learning in e-learning was prepared by Professor Nevena Mileva of the University of Plovdiv in Bulgaria.

She concludes:

"Presented results show that responders in our sample held a fairly positive view of the different advantages that ICT can bring to learning and education. However, this positive view of ICT was accompanied by a rather positive attitude towards learning with traditional education methods and one which questioned the value of ICT in education. A closer inspection of the answers on the individual questions reveals that the responders were especially interested in the use of ICT for purposes of information exchange, such as 'to communicate with the tutor' and 'to share information and ideas with people from the team'. If ICT is to be used in an educational context, our responders specifically expressed doubts about the quality of the human interaction when there is no face-to-face contact."

The report on the impact of technology on learning in synchronous e-learning systems was prepared by Dr Desmond Keegan of Distance Education International, Dublin, Ireland. Dr Keegan finds that synchronous e-learning systems, though widely used in corporate training in the United States are little known and little used in Europe. His report, therefore, includes a clarification of this form of training provision.

Dott Francesco Agrusti of the University of Rome III, Italy deals with the impact of technology on learning in the growing tendency to use the WWW on-campus, either as a supplement to the university lectures or as a substitute for lectures when the lectures are cancelled and the content of the course is provided only on the WWW.

The remaining reports: the impact of technology on learning in mobile learning by Gabor Kismihok of Corvinus University of Budapest, Hungary, the impact of technology on men and women by Joseph Thomson of Erricson Education Ireland and the impact of technology on younger and older learners by Dr Desmond Keegan of Distance Education International, Dublin, Ireland are still in progress.

Further information

Further information is to be found on the project website: www.ericsson.com/impact .

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[1] information and communication technologies (ICTs)