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Technology-Enhanced Learning:
Supporting Learning in the 21st Century

Pat Manson

Technology-Enhanced Learning may not flow readily off the tongue or be easily translated as a brand name, but it very consciously reflects what it is: using Information Communication Technologies (ICT) to secure advancements in learning. By taking advancements as the objective, we go beyond the attempt to reproduce classical ways of teaching via technologies. Technology-Enhanced Learning combines but places equal emphasis on all three elements: on technologies, on learning and on enhancements or improvements in learning. This will help us in devising ICT-based solutions which motivate and inspire learners and teachers, engaging them in meaningful learning and teaching experiences.

Keywords: e-Learning, European Commission, Game-Based Learning, ICT Research Programmes, Technology-Enhanced Learning.

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The European Commission, in the framework of its ICT research programmes, is supporting Technology-Enhanced Learning. The context for this research continues to be shaped by a number of trends, economic and educational policy-related. First, in the workplace, learning technologies are becoming an integrated and critical component of business processes, corporate knowledge management and human resource systems. If learning can be delivered seamlessly, providing knowledge without interruption to people's normal work and if time-to-competence can be reduced, then organisations can better show return on investment in the learning systems. In this context, greater emphasis is placed on informal and organisational learning.

The second noticeable trend is on the individualisation of learning, i.e. the tailoring of pedagogy, curriculum and learning support to meet the needs and aspirations of individual learners, irrespective of ability, culture or social status. This is accompanied by the shift to assessing learning outcomes and doing this not at set ages but according to the progress and needs of the individual. Technologically, the focus has moved from sequencing of content to sequencing learning activities and pedagogical scenarios.

The focus on the individual is giving new prominence to engagement and creativity. Here a number of different technologies are creating opportunities for supporting motivation and empowerment of the learner. Recently, there has been a dramatic increase of interest in game-based learning or "serious games". These games have defined learning outcomes, and exploit video-game principles, such as self-pacing, built-in remediation, assessment and motivation, for education and training. Immersive environments, advances in narratives, virtual characters and storytelling are suggesting new ways to generate affective engagement and improving attention span. Visualisation, simulations and virtual experimentation enable learners to explore problem spaces in new ways. Information Technologies and creativity, with cognitive models/processes inspiring computational models/processes, is an emerging trend in both education and industry, supporting innovation and problem solving.

"Technology-Enhanced Learning" was coined to identify what the researchers working on ICTs and education saw as a new perspective. Some six years ago, research results were helping to push the mainstreaming of e-Learning in the form of learning management systems, remote access to electronic resources and courseware through virtual campuses and brokerages, and training and simulations for the workplace. The interests of research shifted then towards looking at the learning process and the learner, at understanding the interactions between learner and systems, between groups of learners, and between learners and teachers/mentors. This was enabled by newer technologies that better supported participation and interactivity. The focus was less on integration of technological components but

rather on understanding learner behaviour in using the systems to learn.

Today we can move forward. We can look at how (or if) the appropriate use of the technologies results in improvements in learning, making it more effective and more efficient. However, if technology-Enhanced Learning is to be successful as a new model for research and for learning, then there are a number of challenges for the research and educational communities. First, the emphasis on learning as the driver means that any approach must be multidisciplinary, involving not only different strands of technological research but also pedagogy, psychology and cognitive sciences extending into neuroscience. Secondly, if Technology-Enhanced Learning is defined as a factor for improvement, then we need to be able to demonstrate where and how improvements take place.

If technology is to enhance learning for the 21st century, it is critical that research builds a convincing scientific body of evidence as to which approach works and under which circumstances. From there, we can create showcases and exemplars of what works, demonstrating how individuals are supported in learning and in developing competencies throughout life.