

Technology's Impact On e-Education

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The purpose of this paper is to identify some of the major advances in technology and the impact of those advances on e-Education. In particular, this paper will focus on advances as related to access, storage/presentation and interaction. Finally, in the course of examining each technological advance, this paper will seek to establish possible ramifications for the future of e-Education.

The first technological advance centers on the issue of attempting to expand Internet access capability to as many people as possible. The prime mover in this effort has been the increase in broadband technology. Essentially, the advance in associated technologies has resulted in increased mobility, speed and range of usage. The Wireless Interoperability for Microwave Access (WiMax) technology is creating opportunities for Internet access in remote rural areas (*Computerworld*, 2005). The user will no longer need to have a hard-wire connection or direct line of sight in order to obtain Internet service (*Computerworld*, 2005). Along with increasing the range of possible user access, the technology is affording the user maximum mobility during access.

Currently, there are several companies offering mobile broadband technology referred to as 3G for phone usage (Greenberg, 2005). While at present the main focus of the technology is to be found in the marketing industry, it is conceivable that this mobile technology would allow for anytime, anywhere learning as well. If this mobile technology is combined with QR (Quick Response) codes, then learning centers can quite possibly provide for information updates for users regardless of the location of the user. In Japan, the marketing industry fixed posters with QR codes to provide users with endorsement updates which the user received via the phone upon approaching the posters (Greenberg, 2005). The same technology could be utilized for learning environments. For example, learning teams, which are an integral part of an asynchronous learning environment, could have a

useful tool for updating team members throughout the term of a course. The impact can be felt on learning as well.

Broadband technology has pushed some to advocate for a redirection of learning. The increase in access (in particular the capability in terms of information) creates a situation where some feel the learner should be given more freedom of action in the learning process (Cullen, 2005). Naturally, the impact on e-Education would focus on the role of the educator. Educators would need to adjust to a world wherein learners have nearly unlimited access to information, anywhere and at anytime.

Along with increasing capacity for access is the advance made in storage and presentation. This advance is centered in the improvements made with respect to CD-ROM and DVD capability. While some question whether the Internet might not obviate the need to seek technology advances in CD-ROM technology (Tenopir, 2003), it is apparently also the case that CD-ROM is an extremely popular form of delivering e-Education programs (*IT-Training*, 2005). If considerations of hardware advances are any indicator, then multifunctional advances which allow for read/write and rewrite capability must surely imply that the industry does not share in the view that CD-ROM and DVD are not long for the world (Jacso, 2000). In fact, there is currently a major struggle between Sony and Toshiba to determine DVD formatting (Demos, 2005). This is obviously a function of a desire to maximize sales for things like movies and games. Nevertheless, e-Education programs which are presented via DVD-ROM technology would most likely be impacted. And, in any case, the struggle would seem to indicate that no one feels the technology is on the way out. Combine all of this with the recent explosion in ability to access technology needed to burn CD-ROM and DVD formatted information and it would seem the technology is far from moribund (Benzuly, 2004).

This would bode well for the delivery system maintaining its relevance in the world of e-Education. There would be issues surrounding copyright which would most likely impact on e-Education institutions as they currently do in the entertainment industry. That debate is for another time but one that the e-Education industry would need to address. Copyright issues aside, the industry could save money by reusing education programs which when combined with interactive features and updating technology delivered via the Internet (enhanced by broadband technology no doubt) would make CD-ROM and DVD cheap yet powerful delivery methods.

The last major advance is one that is nascent as related to applications beyond those for which it was initially intended. Electroencephalography (EEG) technology was initially designed to assist with health care related issues. However, as is too often the case, the technology has found its way into the marketing industry (Mucha, 2005). The technology is being utilized to identify buying patterns and the effectiveness of particular advertising on consumers (Mucha, 2005). One of the most important advancements these efforts have

created is the ability to utilize lightweight, small, less costly equipment on site where things are being sold (Mucha, 2005).

In addition to the equipment becoming more user friendly the application of the technology has resulted in the increased range of user interaction with computer technology via brainwaves (*Economist*, 2003). Scientists in Germany have been doing research where participants play video games without an input device such as a joystick (*Economist*, 2003). Paralyzed individuals have been able to control the movement of a cursor through brainwaves (*USA Today*, 2004). It does not take much imagination to fully regard the implications for e-Education and perhaps even for what it means to learn.

One can envision a world much like that portrayed in the popular film *The Matrix* where all one needs do in order to 'learn' a thing is plug into a computer and have the information directly and completely downloaded into the brain. At present the direction appears to move from the user to the computer. Even if that were all the research unlocked, it would mean that the keyboard and mouse would be relegated to obscurity. It would mean learning would not be restricted by physical impediments. It would mean that quite possibly the term e-Education would come to mean all learning anywhere, anytime.

These then are the major technological advances held by this paper to have the most relevance on e-Education. Access, storage/presentation and interaction (and perhaps learning itself) are all affected through the technological advances outlined in this paper. The upshot of all the advancement seems to point to an e-Education environment wherein the learner is increasingly gaining independence in the learning process. Moreover, the technology may one day redefine epistemological assumptions with respect to what it means to learn.

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