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SciVerse ScienceDirect

Procedia - Social and Behavioral Sciences 64 (2012) 427 – 436

Procedia
Social and Behavioral Sciences

INTERNATIONAL EDUCATIONAL TECHNOLOGY CONFERENCE
IETC2012

The Barriers of Using Education Technology for Optimizing the Educational Experience of Learners

Juliet Joseph*

University of Johanensburg, Corner Kingsway and University Roads Auckland Park, Johannesburg, 1709, South Africa

Abstract

The paper will discuss the impact that education technology has on the teacher-student experience and does learning really takes place or has the educator been removed from the learning environment. Technology can enhance the teacher-student experience; the study will conclude that the educator-student learning experience can't be replaced by technology due to human and social elements which technology lacks. Education technology does not have interpersonal interaction and an increase in technology can lead to less interaction within teacher-student interactions. Communication constitutes of 80 through language, while 20% is nonverbal such as writing. Education technology falls into the 20 precent category concluding that it is not the best tool.

Keywords: barriers, technology, teaching and learning, technology integration, change; teacher-learner education

* Juliet JosephTel.:+27 11 477 8263.
E-mail address: jjoseph@uj.ac.za

1877-0428
doi:10.1016/j.sbspro.2012.11.051

Technological challenges in education technology continue to prevail and will only become effective when the impact and focus remains on the learner and ensures a positive learner experience-then the barriers will be omitted

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1. Introduction

The communication and information age has progressed in ways never used before in society, work environments, institutions and people's lives through the use of laptops, iPhones and iPods. This has led to an awakening for learners to become more competitive in the global marketplace, increasing the demand of technology. Globalisation has led to an increase in the use of technology within education; this does not necessarily mean that it has impacted on learners in a huge way. Cradler (2003) (Schrum and Glassett, 2006) said that there is not enough evidence on the impact of education based technology on learners. Bretag (2011) said that education technology has led to a "rebuild" and not "remodel" as teachers are now teaching through the use of power-point slides as opposed to chalk boards. Education institutions use technology as a means to build onto existing methods, as opposed to optimally utilising the technology in more meaningful ways this is demonstrated when learners use laptops but limit their use of functionality on the laptop. Technology when used for educational purposes should create a meaningful learning experience for learners and teachers.

The use of education technology and information and communication technology all promote for learning by using technology. Catherall (2005) identifies e-learning; learning technology; online learning; blended learning; ubiquitous learning and mobile learning as the different types of learning technology each with their own features. The mediums of learning identified are computer-based; video conferencing; satellite, webcast and CD-ROM. These types of learning are on the increase as education institutions want to produce high calibre students who are compatible with the international globalised order (The Economist, 2008). Jaffer, Ng'ambi and Czerniewicz (2007) said that education technology can enhance teaching and learning if the focus is on education objectives and technology can be used as a possibility. The study will give an understanding of term education technology and how it impacts on teaching and learning by highlighting its strengths and the challenges which hamper a meaningful education experience for both teacher and learner. The study will therefore examine how technology shapes the future of education.

The UCLA Report (2007) noted that education technology can lead to active learners who master their learning content and increases learner modes of critical thought ensuring students' progress at their own level, use multimedia applications, have greater communication and collaboration skills and writing and research skills. This becomes critical factors when they become professionals in their respective fields. Catherall (2005) identifies dimensions of self-regulated learning which demonstrates that this type of learning create greater enquiry from a personal perspective leading to problem solving from one's own experience and enquiry. Koller, Harvey & Magnotta (2001) said that technology based learning works just as well as traditional teacher learning and costs even less, although other scholars argue that technology can be costly due to upgrading costs and new technology which become available (The

Economist, 2008). This means that new technology can be used to enhance traditional teaching and learning, in order to embitter the education experience. There is however a gap in learning objectives and online deliver, both has become important in ensuring that bigger learning goals are met. Traditional teaching fills the gap as the teacher oversees that learning gaols are met, although the need for global competitiveness and communication, insight and thought , and research have not be filled. Even though technology is on the increase, financial constraints due to the ever-changing needs of technology; leadership challenges, infrastructural demands and support continue to hamper the effectiveness of technology, particularly in Third World countries.

Koller, Harvey & Magnotta (2001) question how credible education technology is in comparison to teacher-student traditional teaching and learning. This paper shares the views of Kirkup and Kirkwood (2005) and Wagner (2001) (Jaffer, Ng'ambi and Czerniewicz, 2007) that education should be driven by context and content objectives and not by technology. They further posit that technology can impact on teaching and learning positively, although it is not the only means and the successes of the technology education experiences must be identified and the areas where there is not significant impact must be omitted.

2. Main problem and research objective

Education remains important and because of our globalised world and the technology age, the compatibility of learner to be technologically savvy is pivotal. Technology will continue to dominate many aspects of human existence and if integrated optimally can only further ensure better teaching and learning takes place in the education experience of learners. There is a need to investigate whether education technology impacts on the teaching and learning experience in a positive way in comparison to traditional learning. The study focussed on how education technology, through teaching and learning can ensure that the students have an optimal education experience. The study discusses education technology and teaching and learning, in order to explore and make a significant contribution to the existing literature. The study seemed to answer the following key research questions: Has education technology been successful in creating an optimal educational experience for learners? What is the result of education institutions using technology as a means of learning and its effects on the education experience of learners?

2.1 Primary objective

The primary objective of this study was to investigate the use of technology within learning environments and its impact on teaching and learning.

2.2 Secondary objectives

The following secondary objectives were identified in order to achieve the primary objective:

* To conduct a literature review which will assist in identifying what education technology entails and its learning methods?
* To review current empirical research on the topic
* To summarise, draw conclusions and provide recommendations based on the empirical results.

3. Literature review

Education technology is a study and practice which facilitates learning in order to create, manage and use technology to improve teaching and learning (AECT, 2004). Education technology (e-technology) and learning technology has become an important aspect in skills development globally. In such, education based technology has a number of barriers for all stakeholders involved, once overcome technology will be have greater impact in the curriculum as opposed to only being a subject on its own, without clear education objectives and with student having access to it all the time.

Su (2009) said that technology can be used for integration and transformation purposes. The integration of technology ensures that technology enhances current learning, whereas transformation allows for technology to teach learners things which were not taught until new technology was found. The paper agrees with Su's view that technology should be used to transform education in addition to maintaining the teacher-learner experience this will beneficial for all. The concept learning has evolved and does not hold the same meaning it held in the past. Perkins (1992) defines technology as the retention of knowledge. The AECT (2004) said that learning entails understanding and retention of knowledge, it is a study which uses different types of technology in education, in order to focus on learning and its facilitation of appropriate technology , to improve performance (AECT, 2004).

Traditional teaching and learning takes place when the teacher instructs learners and student ask questions based on the teachers instructions, it can however be interactive and engaged. The content given to students is for the group and not for an individual, this can impact of individual learner progress because the teacher has to attend to a class of students; learners are placed in classes according to their age, the content and context is age specific as well. The content is presented in a personal manner and students can have access to the educator immediately, there are not stumbling blocks for the knowledge transfer process to take place.

Constructivist learning entails greater engagement and interaction for students, the teacher is only a guide and enquiry is based with the learner. The content and progress is based on individual needs. Learners interact across age groups either via peer learning or individual learning and due to technology student have greater interactivity and engagement (Su, 2009).

The types of technology based learning can occur at any time and place; or can be self-paced where it happens at any time or can be content-centric with a little teachers-student interaction or learner-learner interaction or learner- focussed where the learner navigates learning. This type of learning is when

technology replaces traditional face-to-face learning it is not text-based learning and the instructor does not have to be in the same room as the learner and is therefore technology delivered learning. This type of learning can be computer based learning which includes mediums such as E-learning (Koller, Harvey & Magnotta, 2001).

Based on the traditional and constructivist learning models it is clear that both methods have strengths, however traditional teaching is interactive and engaged with content and peer learning. It is also applicable to all field of study and the content might be age specific but the educator challenges the students to work harder, motivates the student and can address any problems immediately, therefore creating an added advantage which technology alone cant.

Table I: The benefits of education based technology

Technology can be used anywhere, anytime, in large or small groups, is cost effective and can be updated as new technology emerges.
Has a greater geographic reach, is self-paced training to match the learner, scalability, effective learning delivery, a variety of education methods available, and greater tracking of progress (Koller, Harvey & Magnotta, 2001).
Catheral (2005) said that some education technology can be flexible, improves IT skills of learners, creates greater learner-learner interaction, is easily accessible to a wide knowledge base; ensures greater teacher-teacher interaction, with progress being tracked.
Technology learning promotes for social learning (online chats); self-regulated study; imitation by peers within groups; is interactive(The Economist, 2008) ;
Technology ensures learning goals; creates meaningful feedback; identifies needs; modelling strategies; providing guided and independent practice; task engagement and performance; providing students with control of their learning and elicit student work to create understanding of language and concepts (Digital Learning Imperative, 2012).
Technology creates personalised learning, professional development, data and assessment, digital content or software, blended and hybrid learning, online courses, tools and devises; learning management platforms and personalised learning (Digital Learning Imperative, 2012).

4. The barriers of education technology

The barriers of education technology can be split into categories. The *student barriers* include more self-discipline needed by students, reduced contact with educator and peers; special needs by students and printing costs (Catherall, 2005). The *educator barriers* associated with learning include how responsive the system is towards academic input, learning support availability, cultural implications impact on the attendance of learners, an information overload due to the internet, plagiarism and security threats are on the increase and not all subjects can be taught via learning such as Humanities and Arts. Park, Lee, Blackman and Belland (2005) said that teachers would like to have more time to plan their classes, have

technology support and ensure better leading and guiding with the use of technology, as well as have feedback based on their work. They highlight the use of incentives for their professional growth and rewards.

Table II: The barriers of education technology

Cost implications; technology is disruptive; entrenched organisational culture focussing on traditional learning; technology can disrupt classes when opened in class; availability and access to information can lead to increased cheating and plagiarism (The Economist, 2008).
Dawes (Bingimlas, 2009) holds the view that change, might not be easily accepted-there will be some degree of resistance
Challenges around the those who have access to this technology an those who don't (digital divide) ; differing levels of computer literacy levels; less involved due to decreased teacher-learner and learner-learner interaction in the learning experience continue to persist (Koller, Harvey & Magnotta, unknown).
Barriers of technology include lack of motivation due to poor social skills, poor computer skills and a lack of availability of access; a lack of time and class time and a lack of motivation and social awareness and school culture (Catherall, 2005).
Bingimlas (2009, 1) said that the major barriers of education technology include a lack of confidence, competence and a lack of access to resources.
Misalignment between teachers and administrators creates difficulty for teachers (Park, Lee, Blackman and Belland (2005))

5. Challenges of education technology

Table III: The challenges of education technology

The digital divide still exists (The Economist, 2008).
Educator challenges on training remain (The Economist, 2008).
Educator challenges on support and infrastructure of technology used are eminent
Higher wearing a way of technology exists (Koller, Harvey & Magnotta, unknown).
Problems on accommodating individuals with disabilities (The Economist, 2008).
High start-up costs and a lack of proven result or credibility (Koller, Harvey & Magnotta, unknown).
Catheral (2005) identifies challenges around infrastructure problems, upgrades are needed; integration and technical support problems.
Then there are the teacher challenges around technology support and infrastructures (Koller, Harvey & Magnotta, 2001).

Both teachers and learners need to revisit what can work optimally for their teaching and learning experience to take place progressively and they need to determine their future collectively. There is also a need for public participation in identifying the needs of educators and learners in the education experience (Jaffer, Ng'ambi and Czerniewicz, 2007). The barriers of technology can only be eradicated when there is a common understanding and agreement by all stakeholders on each of the aspect. It will take time and research to validate why technology is important.

6. Research design and methodology

Firstly, the study conducted a quantitative study on the nature of technology based learning and how this practice contributes to teaching and learning. There is not enough large-scale concrete research which has been done on the topic and this calls for a strong and sustained case which will contribute to ensuring that technology enhances the education experience of learners in a meaningful manner. Secondly, both teacher and learner technology integration barriers have been identified in an effort to increase the effectiveness of this practice. A desk research study was used. This aim of this study was to investigate how technology based learning contributes to teaching and learning, have education institutions that practice this been successful in their education goals. Primary and secondary sources were used to conduct desk research; library sources; internet sources; documents reports; websites, and papers.

7. Findings and conclusion

The study examined how technology based education in schools has contributed to learning outcomes. There unfortunately is no going back as we live in a technological age and technology has become acceptable and the norm. Brandsford, Brown and Cocking (2000) (Kozma, 2003) said that educators play an important role in ensuring the effectiveness of technology within education and it is for this reason that Park, Lee, Blackman and Belland (2005) recommend that teachers become the driving force in ensuring technology enhances teaching by including all relevant stakeholders provide feedback to teachers; ensuring greater collaboration and knowledge sharing among teachers , increase rewards and incentives for teachers and for change to occur at the individual and organisational level within education institutions. The paper agrees with the UCLA (2007) recommendations that there is a need to investigate student engagement, information literacy and student learning and course design in the education technology future plans as not enough research has been done. Laurillar (2001) and O'Hagan (1999) (Katsifili, 2010) illustrate that education technology can impact on certain teachings and learning objectives, if it is aligned to the aims of the education experience. It will therefore contribute to the teaching and learning needs and not merely on using technology for the sake of it (Jaffer, Ng'ambi and Czerniewicz, 2007).

5.1 Findings

Table IV: The outcomes on education institutions using technology

The digital learning imperative concluded that 45 percent of student who used technology to solve problems, 42 percent used technology to for experiments or be creative 17 percent developed demonstrations and 13 percent designed and developed products.

Kozma (2003) conducted in a study for 174 case studies, of innovative pedagogical practices of technology over 28 countries. The outcome concluded that when technology was used in collaboration to traditional teaching and learning there was professional development for the teacher and student ,they became more problem solving orientated; designed new things; examined their own work and managed information better and had stronger communication and collaboration skills

In 1985 Apple computer launched a project called Apple Classroom of Tomorrow (ASCOT). The research was conducted using seven classrooms where each teacher and student received a two computers one for home and one for school the results where (www.nsba.org):

-Teacher used computers more to do to their work
-students became more stimulated and interactive with peers as opposed to becoming socially isolated.
-The youngest children also adapted to using technology (age)
-software support didn't become a problem for children
- student performance was good
-teachers and student had positive behavioral changes

ASCOT findings after 10 years (www.nsba.org)

-technology acts as a catalyst for student learning and teacher teaching
-Student became interactive and engaged
-Technology remodeled education
-absenteeism reduced and drop-out rates declined at the high school level
-Change occurs over time and not immediately

Honey (2005) (Earle, 2002) in her study refers to 15 instances where technology within schooling has impacted positively on: reading; language and writing skills, better learning; better learning attitude and self-esteem; achievement in subjects, interaction and engagement.

Schacter (1999) researched five big studies on education technology as well as two small scale studies which used newer technology. The findings concluded:

Kulik's Meta-Analysis Study: 1st study: meta-analysis was used over 500 individual studies

Outcomes: higher percentile scores, faster learning and positive attitude changes

Challenges: Positive effects were not achieved in all field

Sivin-Kachala's Review of the Research: 2nd study: reviewed studies with consistent patterns

Outcomes: better achievement throughout school, improved attitudes

Challenges: student population; software design access to technology and educator's role

The Apple Classrooms of Tomorrow (ACOT); 3rd study: reviewed a partnership between Apple and five schools

Outcomes: Better problem solving and reasoning (not conclusive), better attitudes for teacher in teaching and students.

Challenges: Apple participant scored the same as non-apple participants in reading comprehension; math's and work study

West Virginia's Basic Skills/ Computer Education (BS/CE) Statewide Initiative; 4th study: Assessed West Virginia's 10 year education technology project

Outcomes: better performance; positive attitudes by teacher and learner; departmental goals were met; cost effective , increased instructional time and tutoring was across ages

Harold Wenglinsky's National Study of Technology's Impact on Mathematics Achievement; 5th study: assessed fourth and eighth grade students nationally using new advanced technology

Outcomes: more stimulation and performance increased; professional development of teachers impacted on student performance; improvement in math's results.

Challenges: Student who used education technology did not have immediate positive changes, only 5 weeks after inception in the program in comparison to non-users

Student performed worse on drill and practice technology

Scardamalia & Bereiter's Computer Supported Intentional Learning Environment (CSILE) Studies 6th and The Learning and Epistemology Group at MIT 7th study: analyzed two smaller merging studies using new advanced technology which seemed promising

Outcomes for 6th study: measured understanding, reading and language, promotes reflection focusing on multiple perspective and greater thinking.

Outcomes for 7th study: better math's results; better learning.

Based on the findings technology was used in collaboration with traditional teaching it impacted positively on the education experience of the learner. The use of technology ensured that learners could work independently, solve problems, increased communication and collaboration and have greater access

to information. The findings also concluded that more research is needed on the topic, when curricular content and teacher motivation is considered with technology it can impact meaningfully on education.

6. Recommendations and Implications

Based on the results, education institutions using technology as a means of educating learners, experienced positive and meaningful teaching and learning outcomes. Stone- Wisker (Schacter, 1999) said that education should be placed first before technology and the education gaols should drive the process, if not technology use becomes ineffective. Based on the above technology will remain well into the future and has positively left its mark in certain fields, surely if used in collaboration with traditional teaching can change and shape the face of the future of teaching and learning forever.

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