

Influence of Digitized Environments on Learning and Teaching in Distance Education (DE)

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Abstract

The purpose of this paper is to demonstrate the way digitized environments are changing the nature of teaching and learning in distant education (DE). The questions that guided research for this paper were: what are digitized environments and learning spaces? In what ways have these digitized environments influenced teaching and learning in DE. Dramatic advances in information and telecommunication technologies have brought about what is referred to as digitized learning environments and new learning spaces in DE. The study concluded that digitized learning environment has opened unknown opportunities based on computer media, network, and hypertexts and hypermedia to name a few. The implications are that learning has become more self-directed, autonomous for both students and the teachers whose interactions have changed from content dominated to constructivist collaborative technology-based pedagogy.

Keywords: Digitized environment, learning spaces, traditional and constructivist approaches.

1. Introduction

Globalization and the rise of the knowledge economy along with an increased demand for lifelong learning in a post-industrialized era have contributed to the evolution of teaching and learning in distance education (DE) institutions. There have been dramatic advances in information and telecommunication technologies that have brought about what is referred to as digitized learning environments and learning spaces in DE (Rekkedal, 2006). DE is often used synonymously with many other terms such as: web-based learning, computer-mediated instruction, virtual classrooms, on-line education, e-learning, e-education, computer-driven interactive communication, open and distance learning, I-Campus, borderless education, cyberspace learning environments, distributed learning, flexible learning, blended learning, and mobile-learning and the list is increasing all the time (Valcke, 2003). In this paper we shall use the term DE as it comprehensively incorporates important conceptual and practical elements of the digitized environments.

Keegan, (1980, p. 44) quoted in Holmberg, (2005, p.8) identified some characteristics that distinguish DE from traditional teaching and learning. These are: separation of teacher and learner from each other and from the instructional base; planning and preparing student support through learning materials and use of media to link students and instructors. The earliest learning technology in DE started after discovery of a printing press which allowed the use of correspondence education. This was followed by audio, video, computer and current Internet, Multi-media and World Wide Web. Progress in generation of information communication technologies (ICTs) had moved DE from the two way dialogue to more advanced synchronous and asynchronous interaction in teaching and learning.

When media technologies such as telephone, radio, television, cassettes, satellites and computers were discovered, the expectations were that these would revolutionise education but after the initial hype, the new technologies left only a marginal impact without changing the process of teaching and learning (Peters, (2010); (Garrison, 2009). Internet, multimedia and World Wide Web have extraordinary influence on learning and teaching in all levels of educational institutions and organizations. The web has penetrated teaching and learning much more than any other previous technology, with the important exception of the printed book.

The purpose of this paper is to demonstrate the way digitized environments are changing the nature of teaching and learning in DE. The research questions that guided research for this paper were: what are digitized environments and learning spaces? In what ways have these digitized environments influenced teaching and learning in DE? (See also Peters, 2010, p. 105-106).

2. Conceptual Framework

Changes in learning and teaching have been informed by various pedagogical approaches and this paper examined objectivism and constructivism as discussed by a number of scholars (Anderson and Dron, 2011; Peters, 2010; Bates,

2011). Objectivism explains traditional education which has been in existence for many years in various cultures in the world and has been universally recognised as the conventional mode of teaching and learning. According to Bates (2011, p. 30) in traditional expository education the body of knowledge is organised into subjects, disciplines or content areas to be learned and defined by students. In this traditional mode, teaching is authoritative whereby a body of knowledge is transmitted by those that know (teachers) to those that do not know (learners). Learners are assessed on their ability to memorize and reproduce accurately what they were taught (Dick & Carey, 1996). Objectivist instructional design is based on behavioural approaches systems thinking of quantitatively measured outputs (Bates, 2011, p.31). Initial teaching and learning addressed students as individuals independent of one another and there were scarce learning groups rather than rare didactic and social meetings.

Constructivism is a paradigm or worldview that posits that all knowledge is a product of human construction whereby learning is a constructive process in which student actively constructs or creates their subjective representations of objective reality (Gould and Brown, 2003). Constructivist teachers encourage students to constantly assess how the activity is helping them gain understanding. By questioning themselves and their strategies, students in the constructivist classroom ideally become "expert learners." This gives them ever-broadening tools to keep learning. With a well-planned classroom environment, the students learn how to learn (Thirteen ed. online, ND).

Constructivist teachers pose questions and problems, and then guide students helping them find their own answers. They use many techniques in the teaching process. For example, they may:

- prompt students to formulate their own questions (inquiry)
- allow multiple interpretations and expressions of learning (multiple intelligences)
- encourage group work and the use of peers as resources (collaborative learning)

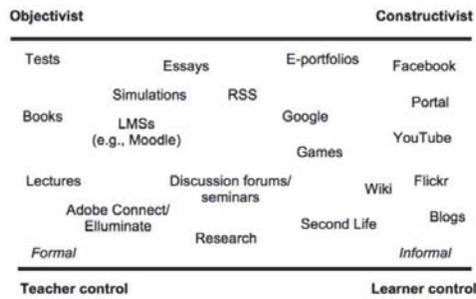
Constructivist approach borrows from many educational practices in their explanation of teaching and learning. They argue that students are not a blank slate upon which knowledge is put but they come to a learning process with their own experiences, understanding and ideas. This prior knowledge is the raw material from which they construct new knowledge. Students create new understanding for themselves and the role of the teacher is to coach, moderate, suggests, allowing the students room to experiment, ask questions, try and find out how things work. Learning activities require the students' full participation (like hands-on experiments). An important part of the learning process is that students reflect on, and talk about their activities setting their own goals and means of assessment.

Students are in control of their own learning process, and they lead the way by reflecting on their experiences a process that makes them experts of their own learning. The teachers help by creating situations where the students feel safe questioning and reflecting on their own either privately or in group discussions. The teacher should also create activities that lead the student to reflect on his or her prior knowledge and experiences. Talking about what was learned and how it was learned is really important as exploration of questions leads to more questions (Bates 2008).

The constructivist classroom relies heavily on collaboration among students. There are many reasons why collaboration contributes to learning. The main reason collaborative learning is frequently applied in constructivism is that students learn about learning not only from themselves, but also from their peers. When students review and reflect on their learning processes together, they can pick up strategies and methods from one another. The main activity in a constructivist classroom is solving problems. Students use inquiry methods to ask questions, investigate topics, and use a variety of resources to find solutions and answers. As students explore the topic, they draw conclusions and revisit their conclusion as exploration continues.

Students have ideas that they may later see were invalid, incorrect, or insufficient to explain new experiences and it is these ideas that are useful in integration of knowledge. Constructivist teaching takes into account students' current conceptions and builds from there. When a student gets a new piece of information the constructivist model says that the student compares the information to the knowledge and understanding they already have (Thirteen ed. Online, n. D. (Please note that a lot of information was extracted from the latter resource). Bates (2011) depicts the changes from traditional to constructivism in the following figure 1.

Figure 1. Analysis of Web 2.0 tools from an educational perspective



Source: Bates. (2011, p. 38)

3. Learning Spaces

Learning spaces is an expression the extension of learning environment that has been opened by use of Internet and ICTs. These spaces are “any kind of distributed virtual reality that can be used for learning” (Tiffin & Rajasingham, 1995, p. 10) or learning environment. Unlike the traditional classrooms, the new learning spaces offer chances to individual; independent and active digitally imparted learning within the virtual learning spaces. There is a need for structural changes to teaching and learning from traditional locations to the computer supported learning. These learning spaces are unlike the traditional as they comprise of the unfathomable incomprehensive sphere behind the screen of a computer monitor and they offer chances to individualise, independent and active digitally imparted learning (Peters, 2010, p. 109).

Digital learning environment is the result of the educational paradigm shift from empirically target-reaching instruction to constructivist learning whereby learners are not mere objects but are subjects of learning process (Peters, 2010). He further said that learning is not merely receiving and processing offered knowledge but it is an active dispute with learning objectives selected by students after interactions with others. “Teachers no longer concentrate on presenting selected and articulated teaching contents but on “discovering and shaping stimulating learning environments ... which enable students create their own constructions.” (Garrison, 2009, p. 24). Students are able to be autonomous learners by being invited to take part inactively initiating and running their own learning. This type of learning extends the educational field in the imagination of the learners as they are provided with new opportunities and chances. Digitized environments have made a significant shift in approaches to teaching and learning as they challenge the very existence of formal educational institutions because students are empowered to create and manage their own digital learning materials.

The impact of digitalization on teaching and learning is much stronger than was the case in earlier periods of industrialized education according to Peters (2010, p.28). For example, advanced technologies such as email, chat, and video/teleconferencing are making DE possible to communicate at anywhere and anytime. According to Nunan, (2008, p. 29) the traditional mission of distance education had been to provide access for all learners who were in some way handicapped, by geography, economy personal or politics and other disadvantages. However, the quality of distance education is getting higher so that many students and teachers insist on excellent communication in online classes through the use of ICTSs and other learning technologies. Different students such as adult learners, at different levels, may always require a different model in order to address their learning requirements.

Bates, (2011, P. 38) has stated that knowledge based economies require the following:

- good communication skills (reading/ writing/speaking/listening);
- ability to learn independently;
- social skills: ethics, positive attitudes, responsibility;
- teamwork;
- ability to adapt to changing circumstances;
- thinking skills: problem solving; critical/
- logical/numerical;
- knowledge navigation: where to get/how
- to process information;
- entrepreneurial skills: taking initiative to

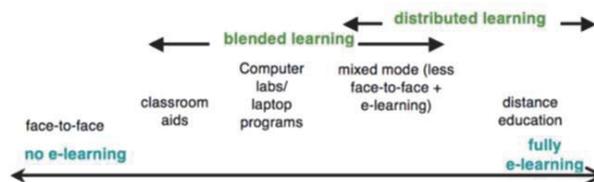
- seize an opportunity;
- IT and computing skills.

Prensky, (2001, p.1) claims that students today are not the same our educational system were designed to teach ... "today's students think and process information fundamentally differently from their predecessors. Those born after 1993 now entering university have grown up all their lives with technologies such as mobile phones, computers, video games, and so on and therefore are "digital natives." Exposure to technology has allowed these digital natives to access and process information more quickly, multitask more easily, prefer graphics to text and random to sequential access, thrive on instant gratification and rewards, and prefer games to serious work. They are different from "digital immigrants," that is, people who did not grow up with this technology, but have learned to adapt to it later in life. Educational institutions need to change their approach to accommodate the needs of such learners, but it is difficult for most teachers to do this, since many are digital immigrants, not natives (Bates, (2011).

Many digital natives are early and heavy adopters of Web 2.0 tools such as MySpace, Facebook, YouTube, and Twitter as these mesh well with their prior experience and needs. There is little research or systematically collected empirical evidence at this stage that the skills digital natives have developed in their personal and social lives carry over into academic work. Academic knowledge is distinct from experiential knowledge according to Laurillard (2002, p. 218) and there is need to ask what they are searching for as they click extensively on hyperlinks rather than reading sequentially. Users make very little use of advanced search facilities, assuming that search engines "understand" their queries. They tend to move rapidly from page to page, spending little time reading or digesting information and they have difficulty making relevance judgments about the pages they retrieve. (p. 14) Students of all age groups including digital migrants and silver surfers are spending time on the web and Web 2.0 technologies widely for a variety of purposes

Online learning environments enable educators to shift focus from an authoritarian style teaching with lecturers pushing information at students to social constructivist learning with students becoming the focal point (Swan, 2010). Students participate actively and collaboratively. It also changes how easily we can modify courseware by use of development teams to redesign/modify courses for hybrid and completely online formats, changing exercises and activities to better suit the technologies available and interaction needs for the course. Discussion threads can be organized for students to discuss concepts or involve instructor participation. By increasing student-student interaction, the instructor shifts to become a moderator/facilitator of discussion rather than acting as the "sage on the stage" (Morgan, 2011). Bates and Poole, (2003) depict the teaching and learning as follows:

Figure 1. Different forms of e-learning (from OECD, 2005; Bates & Poole, 2003)



Source: Bates, (2011, p 24)

Use of web 2.0 technologies and the influence of technological, pedagogical content knowledge (TPACK) for curriculum planning I were presented at a UNISA curriculum conference as ideas that may become a model for teaching and learning in the future (Van den Berg, 2013). Figure 2 below show these presentations as follows:

Figure 2. Web 2.0 technologies. Source: van den Berg (2013: p.3)



Source: Van den Berg. (2013, ppt. présentation UNISA curriculum conférence)

Web 2.0 is a new range of web tools that entered eLearning around 2005 and have brought the ability to empower the end-user to access, create, disseminate and share information easily in a user-friendly, open environment. Usually the only cost is the time of the end-user. There are often few controls over content, other than those normally imposed by a state or government (such as libel or pornography), or where there are controls, they are imposed by the users themselves (Bates, 2011, p. 25). Table 1 below explains what web2.0 tools are:

Table 1. Examples of Web 2.0 tools

Type of tool	Examples	Application
Blogs	Stephen's web (http://www.downes.ca)	Allows an individual to make regular postings to the Web, e.g., a personal diary or an analysis of current events
Wikis	Wikipedia	An "open" collective publication, allowing people to contribute or create a body of information
Social Networking	Facebook http://www.facebook.com/ My space http://www.myspace.com	A social utility that connects people with friends and others who work, study, and live around them
Multimedia archives	Pockrdacasts YouTube (http://youtu.be) Flickr (http://flickr.com) iTubes e-portfolio	Allows end-users to access, store, download, and share audio recordings, photographs, and videos
Synchronous communication	Skype Elluminate Adobe Connect	Allows free "real-time" audio and visual communication over the Web
3-D virtual worlds	Second life (http://secondlife.com)	Real-time semi-random connection/ communication with virtual sites and people
Multiplayer games	Lord of the Rings Online (http://www.lotto.com)	Enables players to compete against or collaborate with each other or a third party/parties represented by the computer, usually in real time
Mobile listening	Mobile phones Ubiquitous computing devises and applications	Enables users to access multiple information formats (voice, text, video, etc.) at any time, any place
Open Content	MIT courseware	Digital learning materials available free over the Internet, for use either by instructors or learners.

Source: Bates, 2011, p. 25).

Clearly as Bates (2011) has explained, these web 2.0 are powerful tools for enabling teachers set online group work and for students to create their own learning materials or and demonstrating their knowledge and skills. Courses can be structured around individual students' interests, allowing them to seek appropriate content and resources to support the development of negotiated competencies or learning outcomes. Content is now open; learners can go and seek, use, and apply information beyond the bounds of what a professor or teacher may dictate. Increasingly, quality educational content will become free, open, and abundant. Students can create and customize their own online personal learning environments and they can collect data in the field, without any need for direct face-to-face contact with either the teacher or other students.

This represents a major power shift from teachers to learners as argued by some scholars that traditional institutions such as schools and universities are now no longer needed for learning purposes, as the tools of Web 2.0 allow learners to control what and how they learn (Downes, (2006) and Illich (1973). Learners can be taught the skills needed to become independent learners (Moore, 1973; Marshall & Rowland, 1993). The new tools will make this learning of how to learn much more effective, but still only, in most cases, within an initially structured environment.

4. Conclusions

Digitized learning environment has opened unknown opportunities based on computer media, network, and hypertexts and hypermedia to name a few. This means that learning has become more self-directed, autonomous and the teachers have the demanding role of mastering student activities and interactions through technology and pedagogy. The behaviourist learning models that activated students through assignments, projects and tests cannot be useful in the third

and current DE generations/waves. Students are in control of their own learning accessing teacher software, links, and databases in global institutions as well as individuals who meet their learning needs. There is no sign that the pace of change in ICTs is slowing. If anything, the context is even more complex and challenging now than ever before. In such a volatile context, it is critical that DE institutions have processes in place that encourage dynamic change, innovative uses of technology, and monitoring and evaluation of what works and what does not.

Traditional or conventional teaching and learning where teachers develop the learning materials, deliver them and are in control of most of the learning responsibilities cannot meet the demands of today's competitive knowledge society. Factual or cognitive knowledge is not the only learning required. Cooperating with others, creativity and innovativeness are some of the other competencies crucial for life in the fast-paced knowledge economy. Learners in digitised environments dominate their learning processes and teachers have to become facilitators, counsellors and advisers. Teachers need technical support to fully adapt to the rapidly technological based learning, both in terms of ensuring the networks, software and equipment work properly and are adequately maintained and also in the design and development of Web sites.

Digitized learning environment have not proved to be a panacea for teaching and learning as online communication lacks the emotions that are present during face to face instruction as instructors and student are unable to pick up on the emotional cues during online or digitized classrooms. There is need for constructing communities of inquiry that would create some type of social community within the online environment in an attempt to reconstruct face to face interactions. Virtual learning environments create more educational opportunities for people from all economic backgrounds but they will never replace live experiences according to some arguments. The future of teaching and learning is dependent on the way teachers adopt virtual courses to fit well in the digitised environments of this information age.

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