

Engaging e-Learning in Higher Education: Issues and Challenges

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ABSTRACT Many higher education institutions have adopted a variety of Learning Management Systems (LMS) as platforms for e-learning. The key to effective e-learning implementation courses is not multimedia, rollovers, or drag-and-drop interactions. It is how the students get engaged by the content. A desktop review was carried out to explore and establish conceptions of how e-learning tools can enable and sustain students engagement in the learning processes. The review indicated that e-learning tools can enable and sustain students content engagement through content presentation tools, critical engagement through collaboration tools, self-regulated learning through assessment tools, self-engagement through the variety provided by e-learning tools, on-task engagement through access to information through hyperlinks, and substantive engagement through the ability for students to skip material they already know and understand, and concentrate on new knowledge. It was concluded that regardless of the available tools, e-learning can be implemented by foregrounding the student activities as the means by which to achieve engagement.

INTRODUCTION

Background

Many universities in sub-Saharan Africa provide access to knowledge to a diversity of students from mainly rural, poor and disadvantaged communities. Some of the challenges facing these institutions are:

- Low throughput rates.
- A large number of first year students lack computer skills and general academic skills.
- Use of traditional teaching methods (Dwayi 2011).

In line with international benchmarks, e-learning has been identified, in many of these institutions as an appropriate tool to support and improve the quality of teaching and learning. For example at Walter Sisulu University, it was felt that there was a need to invest in Information and Communication Technologies (ICT) to enable students to learn to work with ICT in their daily activities, to provide easier access to educational materials and information and to bridge the gap between secondary and tertiary education (WSU 2009). Many institutions have adopted a variety of Learning Management Systems (LMS) as platforms for e-learning implementation. Ideally, the implementation of e-learning in teaching and learning support the transition:

1. From passive reception (as in lectures) to active engagement in the construction of

knowledge, through the use of e-learning tools that facilitate the learning process.

2. From text (as in blackboard notes and printed hand-outs) to multimedia multiple representations.
3. From coverage (learning purely for examination purposes) to mastery (learning for competence in the subject).
4. From consideration of ideas and concepts in isolation to examination of their meaning and applications in real world contexts (Green and Gilbert 1995).

Moreover, entrance test results in many of these institutions and performance of students in the first year indicated gaps between the high school and university (Engelbrecht et al. 2005). There is a need for on-going support for first year students, to bridge this gap. A possible solution is the use of e-learning support materials and tools. Used appropriately, e-learning provides helpful and suitable environment for enabling the desired transition in teaching and learning as envisioned above by supporting students and lecturers to actively engage in the teaching-learning process. Therefore there is a need to define “engaging e-learning” in order to implement it in higher education. To address this problem, the overarching question is: How can e-learning tools enable and sustain students engagement in the learning processes? The answer to this question will be derived from the following enabling questions:

1. What tools are available?
2. What tools are used?

3. What informs the selection?
4. Are they useful in the attainment of the goals?

This paper arises from the researcher's work as an e-learning specialist tasked with developing e-learning systems at a university. The researcher's role is to advise and capacitate teachers on the use of technology to support teaching and to ensure that student participation in e-learning is in line with the institutions e-learning strategy. The implementation of e-learning aims to stimulate and maintain students' engagement which, in an e-learning environment, is very important as the learner is significantly in control of the learning process (Ally 2004).

Pedagogical Model

In this study it is noted that the use of an e-learning environment can contribute to, but not deliver learning (Dabbagh 2005). Thus, as Nyvang (2006) observed "the integration of pedagogy and learning models within the appropriate technology is essential to make e-learning successful". In other words, the conceptualisation and design of e-learning needs to be driven by principles of sound pedagogical practice. Constructivism is a dominant theory in e-learning design derived from learning theories advanced by philosophers such as Dewey, Piaget, Vygotsky and Bruner (Koohang et al. 2009). It is defined as active construction of new knowledge based on a learner's prior experience. Constructivism places emphasis on the mental processes involved in establishing meaning and requires self-regulation and the building of conceptual structures through reflection and abstraction (Dick 1991).

However Constructivism is not a coherent learning theory due to its being open to a variety of interpretations. The assumptions that underlie these interpretations vary in a number of respects and have consequently resulted in the development of variety in the types of constructivism. For example:

- Cognitive constructivism is based on the assumption that knowing is an actively constructed individual thought process.
- Radical or critical constructivism stipulates that reality is only a speculation, or a supposition, or a function of the workings of our cognitive structure and thus a very personal experience.

- Situated constructivism assumes that we can know only what is real; therefore knowledge is grounded in the experience. The process of constructing knowledge involves examining and understanding the experience where the process occurs.
- Social constructivism presupposes that knowledge is an active process of constructing meanings socially through language and sharing cultural practices (Solomonidou 2009: 1791).

Constructivist theory, in its many forms allows students to participate constructively in their learning endeavours by constructing their own knowledge. Hence, a key principle common to all constructivist theories is that learning arises from active involvement of students in the learning process (Fosnot 1996; Cholewinski 2009). Engaging learning requires such active participation in the learning process and thus this constructivist principle should form the foundation for the pedagogical model, to guide the choice of instructional strategies and development of e-learning.

In addition, constructivists envision knowledge, learning and instruction through a number of principles such as:

1. Knowledge is constructed based on what we already know.
2. Knowledge is shaped by experience (doing).
3. Learning is an active process of constructing rather than acquiring knowledge and should be interactive to promote higher-level learning.
4. Learning should be made meaningful to students.
5. Learning should be collaborative and cooperative
6. Instruction is a process of aiding that knowledge construction rather than communicating knowledge.
7. Students should be given time and opportunity to reflect on and internalize experience. (Fosnot 1996; Cholewinski 2009)

These principles are relevant for engaging e-learning implementation. They can be used to guide the transition from passive reception (as in lectures) to active engagement in the construction of knowledge, through the use of e-learning tools that facilitate the learning process. Thus these constructivist principles should form the foundation for the pedagogical model,

to guide the choice of instructional strategies and development of e-learning that would support active student engagement.

Student Engagement

Students learn best when they are fully engaged in the learning process (Parsons and Taylor 2011: 17-36), therefore engagement is an important factor in successful implementation of e-learning.

Student engagement is defined as “students’ psychological investment in and effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote” (Kong et al. 2003: 5). Accordingly, high level engagement (HLE) is a process in which students make multiple and varied responses, through creative and sustained reflections, to instructional cues (Schone 2007). This engagement has three dimensions: cognitive, affective and behavioural (Chapman 2003). However, the focus of this review was cognitive engagement.

Cognitive Engagement

Cognitive engagement is a measure of investment in intellectual tasks or the extent to which students are attending to and expending mental effort in the learning tasks encountered (for example, efforts to integrate new material with previous knowledge) (Chapman 2003). Through the use of cognitive and meta-cognitive strategies, students attend to information, store information in memory, access knowledge and use that knowledge to solve problems (Parsons and Taylor 2011: 17-36). In addition, cognitive and meta-cognitive strategies assist student to monitor and guide task comprehension through problem solving, industry and resilience.

Cognitive engagement can be considered to embrace the following objectives:

- Content engagement: cognitive interaction of the student with appropriately challenging subject matter (McLaughlin et al. 2005)
- Critical engagement: a process of approaching course materials in a questioning fashion, asking whether course ideas or theory are relevant and useful (Bunnel et al. 2009)
- On-task engagement: ways in which students engage with a specific learning

task (Ainly and Hidi 2002). This involves, attending, recalling, collecting, comprehending, quantifying, planning, generalizing and non-cognitive behaviours that are focused on a particular goal (Gettinger 1984).

- Self-regulated learning: metacognitive activities of planning, monitoring and modifying cognitions, management and control of effort on task (Corno and Mandinach 1983)
- Self-engagement: intrinsically motivated engagement out of curiosity, interest, enjoyment or to achieve their own intellectual or personal goals (Dev 1997)
- Substantive engagement : sustained mental concentration, focus and habits of thoughtfulness (Newmann et al. 1988)

Engagement Levels

According to Brown (2010) to distinguish the level of complexity at which students can be engaged requires taking cognitive complexity as a separate dimension of engagement. Separating the dimensions allows engagement with each mode of performance at all levels of cognitive demand. For example, initial exposure to any task can occur through cognitively low level, simple and accessible activities. As proficiency is built, possible engagement can become more complex allowing for higher levels of cognitive demand.

Low level activities involves producing previously learned facts, rules, formulae, or definitions; or committing facts, rules, formulae, or definitions to memory. Low level activities require limited cognitive demand for successful completion. The clarity about what needs to be done and how to do it results in lower levels of student engagement.

High level activities require students to explore and to understand the nature of concepts, processes, and relationships between them. Dealing with the conceptual ideas that underlie practice is necessary for the successful completion of the tasks and development of understanding. Activities that require complex, creative and sustained reflection results high levels of student engagement.

e-Learning

e-Learning can be broadly defined as ‘learning that is supported by information and com-

munication technologies' (de Villiers 2005: 347). It is not simply the possession of ICT skills, but primarily involves the use of various instructional formats and technological methodologies in learning, particularly the use of software and online learning. The "e" in e-learning stands for electronic media which can be accessed from CD-ROM, Internet, or any other electronic or interactive media.

According to Nicholus (2003), there exist a large number of published articles on implementation of e-learning by institutions. However most of the literature on e-learning is practice-based and largely descriptive in character composed of narratives of what people have done. With few sources of literature specifically concerned with e-learning theory, presently there is no theory for e-learning and there are few theorists who can be readily identified as authoritative. Nicholus (2003) collated a set of aggregated findings by researchers in e-learning, suggesting that they may serve as fundamental principles for e-learning implementation. Applying these principles to e-learning implementation; firstly e-learning is taken as a tool that can be applied within varying education models and educational philosophies. It can be used in two major ways; the presentation of content and the facilitation of the learning processes. Secondly, the overall aim of education does not change when e-learning is applied. Hence the choice of e-learning tools should reflect rather than determine the pedagogy of a course. Thirdly, e-learning advances primarily through the successful implementation of pedagogical innovation. This innovation should take into cognisance the ways in which students engage with the learning opportunities provided to them in order to create effective e-learning practice.

e-Learning Tools

e-Learning tools are any computer software or application, ranging from sophisticated, online, real-time, multi-player games to basic applications like, Microsoft PowerPoint and Microsoft Word. These tools fulfil many functions in the teaching and learning process such as content presentation, assessment administration, collaboration facilitation, communication facilitation, management of assessments results and information dissemination. Active engage-

ment in the construction of knowledge can be achieved through the use of e-learning tools to facilitate the learning process.

METHODOLOGY

A desktop review was used in this study. This method was the most appropriate in exploring and establishing conceptions of how e-learning tools can enable and sustain students engagement in the learning processes. The objective was to critically analyze a segment of a published body of knowledge through summary and syntheses, classification and comparison of prior research studies, reviews of literature, and theoretical articles. The search for relevant literature involved keyword searches including e-learning, engagement, learning management systems, learning, higher education, and e-learning tools. The review was based strictly on publicly available web based information.

RESULTS

This section presents a descriptive synthesis of results. These are organised in form of answers to the research questions.

What Tools are Available?

According to Border et al. (2006), there are four main categories of e-learning tools; 1) learning management system (LMS), 2) synchronous collaboration applications, 3) all other computer tools/applications including asynchronous communication applications; and 4) game play or simulation software.

Learning management systems are information systems that administer instructor-led and e-learning courses (Brown and Johnson 2007). Through LMS student progress including training, evaluating, and tracking of results can easily be established. Examples of LMS include applications like Blackboard, Moodle, WebCT and Desire2Learn. These LMS applications can be quite robust by offering the ability to include self-contained surveys or assessments, to track individual learner use of the course site and all of the components thereof, and to provide forums for asynchronous and synchronous learner-to-learner and learner-to-instructor communication.

Synchronous collaboration tools allow real-time communication and interaction between

users via voice and video, as well as, a virtual whiteboard, text-chat and possibly application sharing capabilities (Elnahrawy et al. 2003). According to these authors, synchronous collaboration tools include, but are not limited to, applications like Wimba, CentraOne, Horizon-Live, Elluminate, and NetMeeting. Email, instant messaging, blogs, podcasts, surfing the Web, CDs, DVDs, mp3s and online and offline computer applications can be used to deliver e-learning. These tools can facilitate real life assignments such as distance learning and distributed authoring.

Games and game play is the up and coming fourth type of e-learning delivery tool (Border et al. 2006). According to these authors, gaming is making its way into education through a number of approaches. From the use of Solitaire in Business Education classes to assess mouse skills to SIMS in middle school Social Studies to teach types of government,

What Tools are Used?

LMSs are the preferred tools of e-learning implementation because they form a centralized learning environment from which all the other tools can be launched. From a lectures point of view, the benefits of using an LMS include among others:

- a) Control over registered users
- b) Provides a secure environment for learning.
- c) Learner centric, not only course centric.
- d) Communities can capture and retain shared knowledge / learning.
- e) Comprehensive access controls – content can be made as private or as private.
- f) Provide opportunity for institutions to maintain links with former students and connect with future students
- g) Archival capability for knowledge reuse and sharing. Content updated rapidly. (Du et al. 2013; Chu et al. 2010)

From the students' point of view, the benefits of using an LMS include among others:

- a) Centralized learning environment to ensure consistency. Uniformity of content;
- b) Learner-centered;
- c) Immediate capabilities evaluation. Fostering Self-paced learning;
- d) Personalization; Time and location flexibility; Just-in time help;
- e) Encourages students to take responsibility (Vecchio and Loughney 2006).

Taking Blackboard Learning as an example of a LMS, it has built-in tools to enhance the teaching and learning with online supplementary activities. From the LMS's centralized learning environment some of the tools that can be launched for usage and engagement are presented in Table 1.

Table 1 gives an indication of the extent to which active engagement in the construction of knowledge can be achieved through the use of e-learning tools to facilitate the learning process. The next section takes a closer look at how e-learning tools are used.

DISCUSSION

What Informs the Tools Selection?

From above it seen that the selection of which tools to use can be based on what the lecturer want to achieve in a given activity. Through the LMS, it is possible to upload a series of learning activities, created in some authoring software, into the learning modules. For example, students can be asked to work in groups to co-author a document using a Wiki and/or Discussion Forum, individually reflect on their learning through a blog or a journal, and then work on and submit an assignment through Self-and-Peer assessment tool.

Are the Tools Useful in the Attainment of Engaging e-Learning?

In order to answer this question, criteria for evaluating engaging e-learning can be set as the use of e-learning tools to enable cognitive, affective and behavioural engagement to achieve the expected learning outcomes. The advantages of e-learning gleaned from Roffe (2002), Wang (2003), and Zhang et al. (2004) indicate that engaging e-learning can be attained.

The e-learning content presentation tools enable students to cognitively interact with appropriately challenging subject matter (content engagement). This can be done flexibly when and where it is needed.

Collaborative and cooperative learning can be enabled through collaboration tools. These allow students to approach course materials in a questioning fashion (critical engagement), asking whether they are relevant and useful. E-learning allows students to select learning ma-

Table 1: Blackboard LMS functions, tools and engagement

<i>Teaching/Leaning functions</i>	<i>Interaction</i>	<i>Tools</i>	<i>Engagement</i>
<i>Content Presentation</i>	System-content	Learning module Glossary External links	Integrate content and activities Organise definitions of relevant terms Provide links to relevant content in online notes or websites
	Student-content	Word processing Presentation Mapping	Student construct products to demonstrate what they have learnt
<i>Assessment Administration</i>	Student-system	Tests	Measure performance
		Journal Self and peer assessment Assignment	Support reflection/self-assess Assess peers according to set criteria
<i>Collaboration Facilitation</i>	Student-student	Groups Wiki	Task to be completed Collaborative work Work collaboratively to create content
		Discussion board	Facilitate discussions
<i>Communication Facilitation</i>	Student-student	Email	Facilitate student-student-lecturer interaction
	Student-lecturer	Announcements Chat	Provide information Discuss in real-time
<i>Management of Assessments Results</i>	Lecturer-system	Grade centre	Mark and manage marks
	Student-system	Early warning system My grades	Identify students at risk View own marks
<i>Information Dissemination</i>	System-student	Calendar	Course planner
	Student-lecturer	Tasks Survey	List tasks to be completed Gather information from students

terials that meet their level of knowledge, interest and what they need to know to perform more effectively in an activity.

E-learning encourages students to peruse information by using hyperlinks and sites on the World Wide Web. In order to make sense out this information the student is required to collect, quantify, plan and generalise (on-task engagement). On-task engagement enables the students to achieve the objectives of a given task

E-learning encourages students to take personal responsibility for their own learning (self-regulated learning). Self-regulated learning results from metacognitive activities such as planning, monitoring, modifying cognitions, management and control of effort on task. Success in these activities builds self-knowledge and self-confidence in students.

Students like e-learning because it accommodates different types of learning styles. This leads to self-engagement where students are intrinsically motivated out of curiosity, interest, and enjoyment. Hence they are able to achieve their own intellectual or personal goals. Successfully completing an e-learning module builds self-knowledge and self-confidence and encourages students to take responsibility for their learning.

e-Learning courses progress faster than traditional courses. This is partly due to the e-learning

supports individualized approach. This allows students to skip material they already know and understand and move onto the issues they need training on. This leads to sustained mental concentration and focus (substantive engagement).

CONCLUSION

This study found out that there are four main categories of e-learning tools that can be used to enable and sustain students engagement in the learning processes, in higher education. Namely: 1) learning management system (LMS), 2) synchronous collaboration applications, 3) all other computer tools/applications including asynchronous communication applications; and 4) game play or simulation software. Out these categories, LMSs are the preferred tools of e-learning implementation because they form a centralized learning environment from which all the other tools can be launched, providing many benefits for both lectures and students. The selection of which tools to use is influenced by the objectives of a given learning activity.

The criteria for evaluating whether engaging e-learning can be attained or not was set as: the use of e-learning tools to achieve the objectives of cognitive engagement and the expected

learning outcomes. The review indicated that e-learning tools can enable and sustain students engagement in the learning processes through:

1. Content presentation tools which enable students to generate content which results in content engagement.
2. Collaboration tools which enable collaborative and cooperative learning which results in critical engagement.
3. Assessment tools which encourage students to take personal responsibility for their own learning thus enabling self-regulated learning.
4. The variety of e-learning tools which accommodates different types of learning styles thus enabling self-engagement.
5. The ease of access to information through hyperlinks which enables students to collect, quantify and plan info for doing given tasks thus supporting on-task engagement.
6. The ability for students to skip material they already know and understand, and concentrate on new knowledge, which leads to sustained mental concentration and focus which results in substantive engagement.

All the key objectives of cognitive engagement can be attained through e-learning; however there are a number of key challenges to successful implementation. First of all, students need to have access to a readily available computer as well as the internet. They also need to have computer skills with programs such as word processing, Internet browsers, and e-mail. Without these skills and software it is not possible for the student to engage in e-learning. Secondly, slow Internet connections or older computers may make accessing course materials difficult. This may cause the students to get frustrated and give up. Thirdly, students must have ability to manage computer files and online learning software. Without good computer organizational skills students may lose or misplace reports causing them to be late in submitting assignments.

RECOMMENDATIONS

The implementation of engaging e-learning in teaching and learning can be supported by e-learning tools. Regardless of the available tools, engaging e-learning can be implemented by focusing student activity on how to achieve the learning outcomes. However, when instructors and other students are not meeting face-to-face

it is possible to misinterpret course objectives. Hence, e-learning need to be supported by the routine structures of a traditional class. The students who may get lost or confused about course activities and deadlines can get lecturer and peer assistance thus impeding the student to fail or do poorly.

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