Inclusion Criteria and Instructional Technology Design - Theories and Application to Electronic Learning Platform Development

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ABSTRACT

This study is a literature review of instructional designs in e-learning. According to literature search there are four dominant areas in e-learning research, these are appropriate technologies, technology acceptance, perception of quality and instructional designs. Studies abound on causes of dropout in e-learning programs, but little attention has been given to instructional design as one of the probable causes of dropout rate. The main goal of this review is to research the theories that guide e-learning instructional designs. The study also clarifies the different terminologies used for e-learning and traces e-learning its development stages. Out of the thirty four literatures that were reviewed only ten met the inclusion criteria of instructional designs and a university setting. This review is limited to those ten research studies. The discussions are along the theories and methodologies used, findings and unanswered questions.

Keywords: E-learning, Tele-Education, Information Communication Technology(ICT), Instructional design.

1. INTRODUCTION

Electronic learning,(E-learning) is integrating information technology into learning and teaching process, using materials delivered on the internet (Glen, 2005). This type of learning offers flexibility to the learner in terms of time and space, as learners can learn at their own pace, anywhere, anytime. Continuing education and training can take place with the use of online resources such as video, audio materials and text delivered real time in an asychronous mode.

Online education can either be full blown where there is no physical contact between the teacher and learner and learner and learner. It can also be blended in which case it is used to supplement traditional face-to-face classroom (Blake, 2009; Ho, 2009). The term E-learning, Web-based , Online education, Distance Education is interchangeably but the concept represents subtle differences.

Online education is through any electronic device where content is readily accessible on a computer with content on the internet or CD or even the Hard disk of the computer, it involves self study and little intervention from a teacher. Distance learning (DL). Distance learning traditionally has provided access to instructional programs for students who are separated by time and/or physical location from an instructor (CDLP 1997).

Other terminologies used to refer to electronic learning are Tele-education (Mbarika, 2004) e-learning, E-learning, e-learning, E-learning. The concepts for all the variations of terminologies involve integrating ICT into teaching and learning process using materials that are delivered over the internet. This review will stick to the use of the word e-learning. The surge in learners demanding higher education and on the job training coupled with innovation in technology and education delivery market conditions has been responsible for the adoption of e-learning by many Universities and training institutions (Concannon et all, 2005).
Evidence abound that existing e-learning systems are not particularly innovative, demonstrate limited quality, have limited integration, tend to limit future possibilities and have high likelihood of failure (Alenxander, 2001; Paulsen, 2002). In traditional learning i.e. the face to face education delivery teachers place a lot of emphasis on instructional design and delivery of instruction. It is only as learning brings about a behavioral change in the learner that learning can be said to have occurred.

E-learning is not different in posture; teachers need to understand the course area and how to deliver it effectively. Majority of web courses are designed using the theory of constructivist educational principles since it allows students to attain higher order of learning (Banget, 2004) but many researchers object to e-learning being founded on a particular learning theory since there are a cluster of related concepts on which e-learning is based (Robin et al, 2006).

One critical component of e-learning therefore is the instructional design (Coomey et al, 2001). In view of online education popularity with university education, this literature review is limited to university instructional design.

2. RESEARCH QUESTIONS

For this study that investigates existing research on instructional designs in e-learning the following questions are asked.

i. What type of research have been conducted on e-learning instructional design?
ii. What research questions were asked?
iii. What theoretical frameworks were used?
iv. What design methodologies were used for the research?
v. What conclusions were drawn?
vi. What questions remain unanswered?

Table 1. Summary of Review

Topic/ Authors	The Research	Theoretical Frameworks	Design Methodologies	Findings	Gaps Identified
E-Learning Developments And Experiences Alexander (2001)	The study proposed a framework for design, development and Implementation of e-learning systems.	Trigwell's model, this is student-centered model which places emphasis on teacher's understanding of learning concept first before strategies. (Student-Centered)	Case studies of 104 e-learning projects.	Faculty who viewed learning as understanding planned and developed instruction that achieved better learning outcomes than faculty that viewed learning as increasing knowledge	Factors militating against learning should be clearly identified and addressed.
The Design of an E-Learning System Beyond The Hype Ismail(2002)	The research is on tasks and activities necessary for building different types of e-learning systems.	The e-learning system of which the Learning content development system is an integral part is based on the Learning Technologies Systems Architecture	Survey of different e-learning systems	No clear and measurable defined objective as well as strategies for a program being offered.	The Learning content management systems (LCMS) a component of the e-learning system need evaluation module to be integrated into it.
Use Of Innovative Technologies On An E-Learning Course Weller et al (2004)	Using technology (blogging, audio conferencing, instant messaging and Rotisserie) in developing course content	The three key questions asked in the study were related to the use of the technology showing Technology Acceptance model was used. (Technology Centered)	Experiment & Interview	The standard asynchronous text-based bulletin board cannot cover all the dialogue in a learning environment. The environment should be viewed as a multi-channelled, with specific tools providing a form of communication matched to the learning outcome of a course.	Is it possible to use other technology apart from blogging for designing all subject areas?
A Maturity Model: Does It Provide A Path For Online Instructional design? Neuhauser (2004)	Using maturity model for assessing instructional design. Effective teaching was used as foundation for technology use and online best practices/	Maturity Model. This model is assessing maturity of processes against set benchmarks. (Process-Centred)	Questionnaire to determine the validity of the model	Online courses must be structured along with graduated technology; the lower technology should be used at the onset while higher technology is used as the course advance. This will ensure success	As responses to the questionnaire may not be objective. The methodology could have been experimental design.
Personalized E-learning System Using	It is usual for learners who use web-based system to encounter	Item Response Theory. This theory considers course material	Experimental design	Results confirm the proposed personalized e-	Research on other courses (Is the IRT subject

Item Response Theory Chen et al (2005)	information overload, to overcome this the study uses item response to design the course for a web-based course.	difficulty and learner ability in order to provide individual learning paths (Student-Centered)		learning system can recommend appropriate course materials to learners based on individual ability.	specific?)
An Evaluation of Open Source E-Learning Platforms Stressing Adaptation Issues Graf and List(2005)	Evaluation of open source e-learning platforms, its adaptation and functionality.	Qualitative weight and sum (QWS) approach. This approach assigns criteria to areas of a software and give weights to those criteria (The QWS approach was selected because it gives differentiated results, which highlight the strengths and limitations of each platform. (Technology-Centered)	Questionnaire and experimental design	Moodle was found to be the best of the platforms, with strengths in communication tools, tracking of data, creation and administration of learning objects as well as comprehensive didactic concepts.	The platform is not targeted at the individual leaner rather it was to a class i.e. a group
A Theoretical Framework for Effective Online Instructional design Chin & Williams (2006)	Development of a framework consisting a number of overlapping "sub environments" which provide the scaffolding essential for construction of a total learning environment.	Social Constructivist Theory of learning. The knowledge was presented such that learner construct the knowledge in a social interaction and collaborative environment.(Student-Centered)	A graduate study course as Case Study	The program of study that has used the framework proved to be popular.	The research should be conducted for e-learning of undergraduate studies in a traditional university setting. This is to take care of age differential.
Addressing The Context of E-Learning. Benson & Samarawickre ma (2009)	Including the context of learning and teaching as an aspect of e-learning design using a conceptual approach.	Transactional Distance Theory .(Since distance between teacher and learner and learners) and the Social Constructivist theory of learning to take care of collaborative effect. (Student-Centered)	Two universities as case studies	The concept of transactional distance is not measurerable, thevariable on which it is measured are intutively relevant to teaching, so findings are dependent on characteristics and context of the learner	Study the context of transactional distance from the teaching institution's policy as this has a dominant contextual influence on learning.
LIA: An Intelligent Advisor For E-Learning. Capuano et al, (2009)	Discussions on improved models and related methodologies of an intelligent tutoring engine- Learning Intelligent Advisor(LIA).	The theory used was based on teaching/learning theory using the relationship between the following constructs learning objectives, pre-existing knowledge, learning preferences and course sequencing (Student-Centered)	Experimental Design	Students who used the IWT+LIA progressed better in their learning experience compared to those who used only IWT. 65% of respondents were satisfied with LIA navigation and interaction capabilities.	It should be carried out on a larger scale with wider representatives. The experiment was carried out on a small scale with only 28 learners, 7 personnel from companies involved in the project, 1 teacher and one expert involved in the domain model creation.
Collaborative Web-Based E-Learning Environment. Wei et al, (2009).	Design of a curriculum-specific e-learning environment by integrating interactive and collaborative	Social Constructivist Theory of learning where the more knowledgeable assist the less knowledgeable to construct knowledge. (Student-Centered)	Experimental and Interview design. The design prompts questions from students based on the	Students were satisfied with the method and the design was successful in practice.	A comparative anaylsis of this method with traditional method of learning.

	methods into the design		curriculum.		

3. DISCUSSIONS

Our discussion is delineated along the sections identified in the Table above.   Ppersonalized instructions with learners cooperating amongst themselves were found to dominate most research. The other design consideration was institutional strategy in the use of technology as a critical success factors. The theoretical framework guiding the research rotated between student centered, technology acceptance and process centered concepts. The most dominant being student centered concept, which proved best in terms of learners' learning outcome. However most work use the student centered in conjunction with technology and process. Case Studies topped the list of designs followed by experimental and questionnaire. In case study and experimental designs there were better clarity in the findings, than in questionnaire whose findings were not conclusive, except for cases where it was blended with experimental design. Questions that continue to beg for answers in instructional designs are the impact of the following on quality of design;

- Cost of accessing education,
- emerging technology ,
- quality of processes,
- theoretical framework

This call for more research in these areas, as instructional design is the key to any successful e-learning. In the words of Chin &Williams (2006) "A key, overarching goal for any committed educator is to ensure that the learner has a meaningful and memorable learning experience while achieving the desired learning outcomes".

4. CONCLUSION

A grand, unifying theory of e-learning thus remains elusive and e-learning practitioners continue to operate largely on the basis of trial and error (Chin &Williams, 2006). This literature review has tried to identify the concept guiding online instructional designs. All questions set out in the reviewed have been answered with unanswered questions listed above. One concept discovered to permeate the various studies is the learner centered designed, with more emphasis shifting to individualized personalized instruction. It is hoped that this review will be helpful to researchers and practitioners of e-learning

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Author's Brief

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