
A Conceptual Framework for Implementing E-Learning Technologies in Rural Settings

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Abstract

This research work intends to develop a conceptual framework for effective implementation of e-learning technology in the rural settings. E-learning is a form of computer mediated teaching and learning pedagogy that utilizes electronic media, such as web/internet, television, consumer devices and distributed resources to improve the quality of teaching and learning. This kind of teaching and learning methodology is rapidly becoming a force to be associated with because it has recorded a substantial growth and improvement in the education system. However, despite all the numerous benefits of e-learning, its implementation has been hastily conducted in most cases without a clear cut assessment for its viability especially in the rural settings. In most cases, computer vendors simply installed and dumped high costs learning management systems in schools and the rest is history. The effective implementation of e-learning technology has more to do with strategic planning and concretely evaluating factors that can enhance its successful implementation. This calls for the need to develop a more pragmatic framework for evaluating e-learning technology implementation. The conceptual framework being proposed derives from our intuitions and personal experiences and using the rural communities of South Africa as a basis, we propose to develop a pragmatic framework to guide the future implementation of e-learning technology. This will enable the effective utilization of e-learning infrastructures for the provisioning of quality teaching and learning services.

Keywords: Conceptual framework, E-learning framework, E-learning implementation, Learning Management System, Living theory.

1. INTRODUCTION

The emergence of e-learning technology has come with numerous promises to improve the quality of the current education system. It has

gained wide prominence because of its potential to transform education experiences, remove geographical constraints, offer convenience accessibility to educational resources, enable ubiquitous learning, provide cost effective selection of courses, enable course flexibility, generate greater collaboration, provide global opportunities for participations and support diverse teaching and learning modalities, including remote learning, distributed learning, peer-learning and self-directed learning.

The advances in computing infrastructures, software applications and networking gadgets are now leading to new innovative tools for promoting effective teaching and learning. The internet technology is at the forefront of transforming the education system by allowing different modes of interaction among various educational institutions and students to participate in a real-time distributed teaching and learning environment. This advancement in e-learning technology has further brought about the development of diverse innovative tools that can facilitate effective teaching and learning. Varieties of new modalities and pedagogies of teaching and learning are also rapidly emerging and are pushing for new initiatives in the classrooms. Prominent among the list of emerging education initiatives are e-learning, e-education, on-line learning, real-time learning, distance learning and blended learning (Dabbagh & Bannan-Ritland, 2005; Allen, & Seaman, 2008).

The important reasons for the substantial growth in e-learning technology are not far-fetched (Siemens, 2002). All along, personalized learning, learning objects and repositories, prior learning assessment, media formats, work integrated learning, electronic performance supports, knowledge management and technology assimilation with regular instructional activities are often described as the future of learning. But, despite the numerous advantages and opportunities alluded to e-learning, its implementation in most cases has been done hastily without any clear procedure, standard and framework. The current trends in institutions of learning at all levels, put enormous pressure on the existing models of education, learning contents development, life-long learning and research output and continue to render existing learning framework ineffective and subjected to constant review. Implementing e-learning using a particular framework such as being proposed by this study will be a good step in the right direction

(Bates, 1999; Hanna, 2003; Bonk & Graham, 2006; Davis & Fill, 2007; Azcel et al, 2008; Bonk, 2009).

The entire field of education, for example has for a long time relied upon the Vygotskian theory that states that learning occurs through interaction with expert and others (Chi et al, 1989; McDevitt & Ormond, 2004). But recently, through the advent of the internet technology, the Wenger's model of communities of practice advocates that learning is a direct result of collaboration towards a common goal (Wenger, 1998; Wenger et al, 2002). It has being argued that children in a particular virtual community are learning through their participation in the discursive and social practices of the community without the involvement of an expert. Children often learned without an expert, using strategies such as trial and error, discussion and through the construction and transformation of their identities, both in and out of the fictional role-playing context (Thomas, 2005). Ever since the inception of e-learning and evolution of various learning management systems, schools and their governing councils are devising and investing huge amount of money on the procurement of computers, network and web based technologies. Any meaningful e-learning technology needs to be tested in the rural settings and not in the urban environments that are blessed in terms of adequate resources including human expertise.

This research work intends to generate our explanation of the educational influences with the support of living theory methodology as a realistic means to improve on the implementation e-learning technology in rural settings. Living theory is defined as an approach to explaining the educational influences in a person's learning ability (Whitehead & McNiff, 2006; Creswell, 2007). There is the need for caution in e-learning implementation and the use of conceptual framework as proposed by this study is necessary to ensure good return on investment (Alavi,& Leidner, 2001; Rosenberg, 2001; Salmon, 2005; Bates, 2009). The living education theories emerge from the methodological inventiveness of individual genuineness (Creswell, 2007; Samara, 2010).

The living theory provides us with the platform to explain educational influences like e-learning implementation through our personal learning, experience and intuition. The research work will evaluate the importance of

re-aligning the implementation of e-learning technology in rural settings. We believe that our framework will ensure that e-learning implementation plan is neither hastily conducted nor easily derailed. Moreover, the framework is aimed at ensuring that e-learning implementation is completed with detailed considerations and evaluation of its success factors coupled with good return on investment.

2. PROBLEM STATEMENT AND RESEARCH QUESTIONS

The need to improve the current practice of education system calls for new innovative ways to providing quality education services. The e-learning technology is generally accepted as ultimately the next evolution step to improving the quality of education system. The recent and ever increasing technological advancement in e-learning and web-based education is re-defining teaching and learning practices to extend its scope, boundaries and pedagogy (Dabbagh & Bannan-Ritland, 2005).

This research work acknowledges that the general acceptance of e-learning is on the increase daily with no end in sight at least for this time being. However, there are still several issues to be squarely resolved for the successful implementation of e-learning technology as one viable mode of instruction. Capacity building is not a sufficient success factor in e-learning implementation. (Rosenburg, 2001; Govindasamy, 2002; Selim, 2004; Deeson, 2007; White, 2007). Some of these important issues that can significantly contribute to the successful implementation of e-learning are:

- (a) Online training packages should not merely be a replication of stand-up training, but the structure of the delivery mode should take into cognizance the needs and the learning situation of the beneficiaries.
- (b) It should be borne in mind that not all educational institutions can manage to offer learning by digital means due to various constraints.
- (c) Successful implementation of e-learning technology can be dampened by the lack of readiness and unwillingness of individuals to share relevant educational information. The readiness of trainers to design curriculum as key factors that need to

be considered in order for education delivery by technology to succeed is crucial.

- (d) The willingness of school management to invest in state-of-the-art e-learning infrastructures and resources.
- (e) The issues of quality in teaching and learning should be prominent and high in the list of priorities. At the same time, good return on investment should not be jeopardized.
- (f) The evaluation of readiness, the choice for the best suitable mode of delivery, evaluation of sustainability level and implementation of best practices among other factors are important consideration for successful e-learning implementation.

The general challenges of e-learning implementation is more complicated in the rural settings that is often characterized by intermittent power supply, intermittent connectivity, poor means of transportation, variable population density, limited education, underemployment, limited disposable income, lack of secure storage and limited human expertise (Parikh & Lazowska, 2006). The e-learning technology is costly to install and even more costly to maintain. This particularly calls for a framework that will enable cost-effective implementation of e-learning technology in the rural setting. The problem statement for this research work directly leads to the following main research question:

How can e-learning technology offerings in South African urban communities be practically extended to serve the rural communities of South African?

This important question, if well answered will yield cost-effective e-learning technology implementation framework as we can rely on existing solutions to discover a novel solution instead of re-inventing the wheel. Derived from this main research question are four important specific research sub-questions. The first sub-question raises the awareness that e-learning readiness assessment of rural communities can have significant effects on its successful implementation. This hypothesis is premised on the various challenges of the rural settings.

(a) What is the readiness status of the rural communities in South African to adopt e-learning technology for fostering quality teaching and learning?

Moreover, because of the peculiar nature and unique challenges of rural settings, technologies that were developed and tested for urban settings might not directly be applicable in the rural community contexts. With this information in mind, the second research sub-question is stated as:

(b) Which existing e-learning technology delivery mode framework can best be suited for implementation in rural communities of South Africa?

The e-learning implementation framework obviously needs to be evaluated so as to demonstrate its usefulness and to guarantee its sustainability. This important consideration therefore, leads to the following third research sub-question:

(c) What is the best possible way to evaluate e-learning framework to enhance effective teaching and learning beyond the immediate present into the future and beyond?

Additionally, e-learning implementation has been on the increase since its inception. As a possible alternative delivery mode to traditional classroom education, it is redefining educational teaching learning beyond its scope and pedagogy with various institutions adapting this initiative. The proliferation is a prime concern and thus leads to the fourth research sub question:

(d) What are the possible best practice options available for rural communities to adopt to foster quality e-learning delivery?

3. GOAL AND OBJECTIVES OF THE RESEARCH WORK

The prime goal of this work is to develop a conceptual framework to guide the future implementation of e-learning technology in the rural world. In order to achieve this goal, we setup the following research objectives:

- (a) To develop the guiding principles for evaluating e-learning readiness assessment in rural world.
- (b) To develop guidelines for the selection of best suited e-learning delivery modality for rural world.
- (c) To develop guidelines for the effective evaluation of e-learning framework after implementation.
- (d) To develop the guiding principles of e-learning best practices for rural world.

4. PREVIOUS RESEARCH

Over the years, various researchers have tried to document the power of technology enhanced learning otherwise called e-learning, notable among them are (Ross & Schulz, 1999; Hontron, 2000; Judith & Rosenberg, 2001; Dabbagh & Bannan-Ritland, 2005; McCurdy & Schroeder, 2006). E-learning is defined as a learning that takes place as a result of experiences and interaction in an internet-based environment (Campbell 2001; Phelps & Papaefthimiou 2003). The interaction is not restricted and confined to a regular school day activities and can take place in a variety of locations including homes, schools, libraries and internet cafes. The modern day classroom is now seen as a virtual learning environment in which learning is no longer bounded by space, time and geographical location (Franklin & Peat, 2001; Brown, 2004; Liaw, 2008).

The e-learning framework as proposed by Phelps & Papaefthimiou (2003) subdivided e-learning implementation approach to four distinct classifications of administration, e-enhanced, e-enabled and e-essential. In our opinion, the e-learning framework would be better used in benchmarking and selection of an appropriate Learning Management System (LMS) for e-learning implementation. It highlights the basic requirements and tools for consideration before acquiring LMS that can enable the transfer of knowledge, skills, participation, understanding and interaction. We argue that there are no considerations of evaluation of e-learning readiness and the type of e-learning delivery strategies that would be best suited for a particular context such as rural settings. A substantial consideration for e-learning implementation in the rural setting that takes into account their level of digital divides is therefore imperative.

Moreover, the triangular model, a theory based design framework for e-learning as proposed by Dabbagh, (2005) postulates interaction of three main components as major keys that enhance teaching and learning in e-learning implementation. On one angle is pedagogical model or constructs like open/flexible learning, distributed learning and knowledge building communities. The other angle presents instructional strategies like collaboration, articulation, reflection, role-playing, exploration, problem solving and learning technologies like asynchronous and synchronous communication modes, hypermedia and multimedia tools and course management tools. We further argue that the model did not evaluate the e-learning readiness, determine the sustainability prospect and establish the best practice options available. All of which are important factors in determining successful e-learning implementation in rural settings.

The institutional framework for an e-learning implementation posited by Zuvic-Butorac, et al (2011) advocates for more responsiveness and greater flexibility and environmental friendliness in institutionally strategically planned e-learning implementation. The institutional e-learning framework overall design comprises of University committee for e-learning charged with formulation of policies and implementation follow ups, University e-learning center helps with facilities like (e-learning platforms and tools, content development and multimedia support) and faculty e-learning team with functions like (institutional activities, contact with users, information and dissemination). Other visible department of the overall design include University center for quality that quality assures the whole process and lastly, University Information Technology (IT) academics that further research into education for e-learning, education for Information and Communication Technology (ICT) skills and competencies.

Although the institutional framework has good intentions by bringing together some stakeholders to facilitate a responsive e-learning framework, but nothing or less consideration was placed on the students and evaluation of e-learning implementation strategies that may suit them and their particular contexts. Equally, the framework seems to do quality assurance on the outcomes and throughputs. However, we submit that it may flourish now, but the future looks bleak without the evaluation of how to

sustain the process in the nearest future. It is our view that the conceptual framework being proposed will have gone a long way to facilitate their policy, assist in establishing the choice of LMS and quality assures the whole process.

The proposed conceptual framework for implementing e-learning technology in rural setting will be scoped around four phases or activities that will evaluate the level of readiness of a particular institution to adopt e-learning and make recommendations based on the evaluation of level of readiness using criteria including Business, Stake holders, Technologies (which include LMS and alternate power source), Content Management, Training Process, Culture and Financial Readiness. The second phase will deal with evaluation and selection of best suitable e-learning delivery mode for the rural settings. In this specific phase, we are taking into accounts the specific nature of rural setting and the effects of digital divide without having to impose any mode of delivery on the communities.

The third phase presents the evaluation of factors to sustain and nurture the e-learning from immediate present state into the future. We emphasize and highly stressed the importance of this stage because any derailment will point towards significant loss on investment and all efforts may suffer huge setback. The consequences might be devastating on future e-learning development as well as the budget. The fourth phase establishes the use of best practices to ensure that acceptable level of standard are strictly adhered to in our conceptual framework for e-learning implementation. The potential benefits of designing a Conceptual framework as proposed in this research work include the following:

- (a) The possible establishment of a clearly defined standard and implementation principles to guide successful e-learning implementation.
- (b) The availability of implementation checklists at various levels of the implementation stages.
- (c) The e-learning implementation in this case will yield favorable return on investment and value for the money spent.
- (d) The design of conceptual framework as being proposed in this work will foster

greater e-learning implementation collaboration and participation.

- (e) The implementation of the proposed framework will facilitate the reviews of institution e-learning implementation strategies and policies.

5. RESEARCH METHODOLOGY

The methodology of this work is based on living theory approach to build a pragmatic framework for e-learning technology implementation in rural settings. A living theory is an explanation produced by individuals for their educational influence in their own learning, in the learning of others and in the learning of the social formation in which they live and work (Whitehead, 1989; 2006; 2009; Cresswell, 2007). Living theory methodology can be seen in a practical sense as either narrative or phenomenological or grounded theory or Ethnographic or case study or as an action research plus the living "I".

The theory places emphasizes on the uniqueness, inventiveness, self-study and creativity of individual in devising educational theories based on their own intuition, observations, practices, studies, influences and experiences toward improving knowledge and general practice from within historical and social-cultural perspective of our daily walks of life and work (Whitehead, & McNiff, 2006; Cresswell, 2007; Whitehead, 2009; Samara 2010). The living theory methodology presents the action researcher with platform such as action reflection cycle to explain their claim or educational problems, why and how they intend solving the problems using the living theory approach.

This research work was highly motivated after we noted with concern the inability of our faculty located in the deep rural community of Soshanguve to kick start some course instructional offering on-line despite the availability of the technology and equipment. It means that equipment and technology are inevitably being constantly underutilized resulting in unprecedented low returns on investment. We began to wonder and ask ourselves some basic questions of whether there was any form of evaluation into our e-learning readiness or was there any evaluation of the best suitable e-learning delivery model for our students taking into account? We equally queried, what are the best practices? In the light of all these problems, we probed further to note there are no plans for e-

learning implementation sustainability as it continuously unfolds itself as a future mode of learning.

In line with the living theory methodology, we started preferring some possible solutions, devising plans and putting some acts together toward solving or improving on the problems as highlighted. The proposed conceptual framework regards each problem and concern as a phase in itself. Each phase is evaluated for possible outcomes and actions. Because we expect that the concerns and values proposed in our conceptual framework are cultivated into e-learning implementation and practice, efforts were made towards iterative phases. This in our opinion will allow for modifying of concerns, ideas and actions as the evaluation take place. We posit that the proposed living theory framework will facilitate quality assurance of e-learning implementation in rural setting with the prospect of improving the returns on investment and ensuring best practices with a high level of sustainability.

Figure 1 summarizes the proposed living theory framework for evaluating e-learning implementation in the rural settings. The framework provides four main non-sequential components of e-learning readiness evaluation that must be first considered before e-learning delivery model evaluation, which can further instantiate re-readiness evaluation. Then evaluation of e-learning sustainability is then considered, which can trigger further e-learning delivery mode evaluation. The fourth component emphasizes on the importance of e-learning implementation and best practices before the e-learning is offered at the last stage. Implementation of e-learning best practices can lead to reconsideration of sustainability evaluation, evaluation of e-learning delivery mode and readiness evaluation.

As a result, the conceptual framework being proposed is a cyclic or iterative action plan evaluation framework. At each stage of an action taken, we need to do some kind of evaluation to ensure that the best decision is made before the final e-learning implementation. The evaluation does not stop after e-learning offering as the cycle continues to ensure maintainability and sustainability of the e-learning implementation.

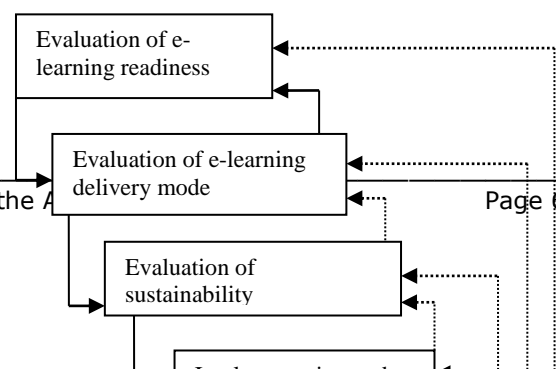


Figure 1: Proposed living theory framework for e-learning implementation in rural settings

A very important aspect of a living theory methodology is the process of validation (Whitehead, 2008). The best way to find out how a system meets the requirements and the expectations of the users is to ask the users. It is therefore, important that we receive feedbacks from various users regarding our e-learning implementation framework (Dix *et al*, 1998). The proposed conceptual framework will be validated using a user-based evaluation technique. The users (student and lecturers) in this research will be employed to work through the framework and their feedbacks will be used to validate the process as proposed in the living theory methodology. Clarifying their responses, concerns and criticisms will go a long way in generating knowledge towards improving educational influences in our efforts to devise the proposed conceptual framework. It is important that we mention at this stage that a survey (a set of questionnaires) method will be used as the query technique to obtain feedback from users to validate the framework.

The survey will target the students currently being taught in the classroom and also using the Blackboard and myTuTor LMSs to complement their studies. Lecturers who use these LMS applications in performing their duties and Labs technicians maintain the laboratory and equipment will also be surveyed. The population for this survey will also include management staff involved in decision making process as we consider their feedback significant to measure level of improvement that our framework generate.

6. CONCLUSION

This research work was not intended as a process to re-invent the wheel but was borne out of the concerns, zeal and present state of e-learning in our institution. Up till now, the e-learning facilities and technology though are well in place but are heavily under utilized which in turns resulted in low or zero return on investment. We are fully aware of the general belief in e-learning as the next evolutionary mode of teaching and learning as well as the gains offers by e-learning as an instructional model. We feel some kind of responsibility on how to improve on the present practice to rake in the e-learning large economies of scale.

This research is our collective effort to place value and ensure significant returns on e-learning investment based on our intuition, knowledge and experience. The conceptual framework for e-learning implementation in rural settings as proposed by this study prefers that an evaluation and investigation of our e-learning state of readiness must be carried out prior to any e-learning investment or commitment. It means there's no point buying equipment and Information Communication Technology (ICT) accessories knowing fully well that most required factors are not in place. This is a case to justify proper accountability for money spent on e-learning equipment and assurance the facilities will be properly utilized when in placed.

We are strongly against the idea of imposing a particular e-learning delivery strategy on any institution, we proposed that the best suitable e-learning delivery mode should be evaluated and implemented taking cognizance of the challenges of the student as most are from the previously disadvantage background. We support the gradual introduction of e-learning with hybrid delivery mode.

The challenges of implementing e-learning in the rural settings are demanding and call for caution when embarking and investing on a capital intensive project as e-learning. We would appreciate that these challenges are evaluated for sustainability before the institution commit itself on this project. We propose that concrete supports must be put in place to nurture the e-learning from its present state as our future instructional mode and that e-learning should not be embarked upon when there is no guarantee that it can and will be sustained in the future. This singular effort will ensure good prospect on favorable return on investment.

The conceptual framework proposed in this study takes full cognizance of the dynamic nature of e-learning and includes the implementation of e-learning and their best practices as parts of its phases. This is to ensure that we do not lag behind in our efforts to incorporate the best practices in the present of numerous challenges and constraints. We propose that there must be constant benchmarking of our e-learning activities and practices to ensure that it is a best fit to numerous best practices around the world. This further assures the framework in terms of quality and maximizes optimal utilization.

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