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The Influence of Economic Factors on eLearning Implementation in Botswana Tertiary Institutions: The case of BOCODOL

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Abstract

This paper sought to investigate the extent to which economic factors influence eLearning implementation. The research is a case study of BOCODOL learners, grounded within the Unified Theory of Acceptance and Use of Technology (UTAUT) theoretical framework model. In the Botswana context, the few studies conducted were not adequate, resulting in insufficient empirical evidence upon which tertiary institutions can benchmark for eLearning initiatives. The few studies carried out do not provide the education sector with adequate information to address eLearning misconceptions that may result in adoption of generic solutions (i.e. techno-centric solutions and direct transfer of solutions) that have often notproved to be appropriate approaches to adopt in similar situations.

The mixed methods research involved sixty-six (66) students and forty (40) staff members (Lecturers, Tutors and eLearning Specialists) from BOCODOL. Data were collected from Lecturers, Tutors and students using questionnaires, and a written interview for the eLearning specialists. The Statistical Packages for Social Sciences (SPSS) were used for data analysis. The study concluded that; economic factors had a positive influence on eLearning implementation at tertiary level. Furthermore, this research contributes to the existing body of knowledge by proposing a modified framework for eLearning implementation as an improvement of the theoretical framework used for this study. The results can be used to inform practice regarding how eLearning may be implemented in the context of Botswana tertiary institutions.

Keywords: Technology, eLearning, Economic Factors,

INTRODUCTION

According to Macharia and Nyakwende (2010), the past decade has witnessed extensive use of the Internet and Worldwide Web (www) that has made digital technologies to revolutionize higher education practices at universities and colleges all over the world. However, there have been few studies conducted to investigate the eLearning initiative in Botswana tertiary institutions resulting in inadequate documented evidence of the initiative that institutions can use as a benchmark. Motshegwe (2014) conducted a study on Factors Influencing Integration of ICTs in Teaching at UB as part of fulfillment of his doctoral studies. The study though not yet published, is related to the present study as eLearning is an ICT initiative. The few studies that have been done are not

sufficient, as they do not provide the education sector with enough information to adequately address eLearning challenges that exist locally. This study was, therefore, meant to assist establish how the economic factors influenced the implementation of eLearning at tertiary level in the Botswanaeducation environment.

It is commonly agreed that indeed technology can be used just as effectively to reinforce teaching centered practices as it can be used to create learning centered environments (Abuzaid, 2010). The implementation of eLearning is an involving initiative, which requires mobilizing many resources, which are not always adequately available, especially in many developing countries. Unfortunately, there has not been an adequate theoretical knowledge to guide implementation of eLearning at the tertiary level within the Botswana context. However, in some of the literature, there are a number of factors that keep coming up as being associated with eLearning implementation (Govindasamy, 2002; Anderson, 2008; Buzzetto-More, 2008; Rena, 2008; Istrate, 2009; Batchelor et al., 2010).

In an attempt to transform its teaching and learning, BOCODOL embarked on a journey to take on board the use of Web 2.0 technologies to deliver eLearning to its learners. As a distance learning institution, the College believed thatthe use of technology would be of great benefit to its learners to have access to the latest technological innovations, hence the need for the College to explore the implementation of eLearning in its development and delivery of courses.BOCODOL has been involved with implementing eLearning for nine (9) years hence the need for this study. In September 2006, the College embarked on a project to pilot the use of technology in the provision of learner support services to a group of twenty-five (25) learners. These learners were expected to access Internet services through locally available Internet Cafés (Tladi, 2013). However, this project was not successful due to the prohibitive costs of Internet café rates, because the target group was comprised of secondary school learners who were not employed and had no money to pay for the connectivity.

This research addresses a pertinent question in the eLearning area of the educational technology field, as tertiary institutions continue to strive towards finding ways to improve teaching and learning. eLearning has been considered as a critical tool in developing countries to facilitate an increase in access to higher education by being a cheaper and more flexible alternative, especially for marginalized rural populations (Anderson & Gronlund, 2009).

Problem Statement

While there has been a lot of enthusiasm regarding eLearning implementation at tertiary level in Botswana, there were fewcomprehensive studies conducted to investigate these initiatives to determine the level of influence economic factors had on eLearning implementation in the Botswana context. This research thus sought to investigate the influence of economicfactors onthe implementation of eLearning in Botswana.

Research Hypotheses Statements

Based on the research question, the study proposed the following hypotheses statement informed by the literature review and also guided by the theoretical framework.

H_1 - Economic factors have significant positive influence on eLearning implementation

Research Justification

There has not been adequate research done to identify and discuss factors that influence implementation of eLearning at Tertiary Level in Botswana. At BOCODOL this was the first and only eLearning research conducted to investigateeLearning implementation.This research is relevant to practitioners and researchers, since it focused on addressing a current educational technology discourse. The findings of the study would provide empirical evidence and guidance to assist tertiary institutions address some existing eLearning implementation challenges.

Ethical Considerations

Allethical considerations were fully adhered to, in order to ensure ethical compliance. Participants were informed verbally and in writing about their rights to voluntary participation, informed consent, safety in participation, privacy, confidentiality, anonymity, trust, and withdrawal at any stage of the study if they so wished.

THEORETICAL FRAMEWORK

After considering a number of Diffusion of Technology models, the Unified Theory of Acceptance and Use of Technology (UTAUT) theoretical model was adopted for this study. The UTAUT model is the most widely used in the field of Information and communications technology acceptance modeling (Jairak, Praneetpolgrang&Mekhabunchakij, 2009).

LITERATURE REVIEW

Role of Technology in Teaching and Learning

There is no doubt that technological evolution has a role to play in as far as eLearning developments and ICT uptake in general actually takes place. Over the last thirty (30) years, computers and other ICTs have increasingly been adopted for use in Open and Distance Learning (ODL) programmesparticularly at Tertiary level (Du Vivier, 2009). Students today are facing an entirely different world than generations before because this generation of students has more access to technology than previous generations (Fouts, 2000; Eugene, et al., 2004). In most rural areas of developing countries this at times might be the only available option for learners to access any form of training as they normally would have very little or no time to attend school due to various social commitments, provided there is a functional ICT infrastructure available and accessible to them.

Challenges Facing eLearning Implementation

The successful implementation of eLearning should be reflected in terms of the return oninvestment (ROI). Istrate (2009) has indicated that there is an emerging body of evidence suggesting that eLearning can deliver substantial positive returns. Whereas in the developed world, there is ample evidence to suggest that economic advantages are as a result of technological innovations, the same cannot be said about developing countries where realized benefits have been less and the effects of the Digital Divide continue to exist. Incidentally, the ease at which today's young adults and learners have access to connectivity with improved bandwidth and offering very high speed connectivity has seen a creation of a new generation of users. Hamilton and O'Duffy (2009) refer to this generation as the 'Online Natives'.Furuholt and Kristiansen (2007) conducted research about the use of Internet Cafés in two developing countries, Indonesia (Asia) and Tanzania (Africa). The main objective of that research was to determine the degree to which Internet Cafés were used to facilitate training for human resource development. The research findings indicated that fewer females visited the Internet Cafés than males. Internet Café users in Tanzania spent three (3) times more money than Indonesians. However, research found that they actually tended to spend less time per visit but the reason for this variation was not established. This is an area that could be explored for further research.

Within Botswana, few eLearning research studies have beenconducted, mostly at University of Botswana. Among these researchers are Mafote (2007), Butale (2008), Nleya (2009), Uziak (2009) to mention a few. However none of these studies had any focus on the issue relating to the effect of economic factors on eLearning implementation, which this study focuses on.

Knowledge Gap

Most of the literature examined indicates that many studies have gone into researching about eLearning implementation in developed countries such as the US and UK to mention but a few.This paucity of research output creates a knowledge gap, especially in Botswana tertiary education landscape that this study will contribute significantly in creating knowledge needed to fill.

RESEARCH DESIGN AND METHODOLOGY

Amixed methods approach leaning more towards quantitative (positivist) paradigm was used to inform the design of this study for triangulation and complementarity purposes. A mixed methods case study research design was found to be more appropriate and a preferred research approach because of the researcher's interest toeasily collectlarge quantities of data from the learners and staff using questionnaires as well as using written interviews to acquire an in-depth understanding of the eLearning implementation situation. The process of selecting a sample was determined by

the aim of the study. The size of the sample was determined by the optimum number necessary to enable valid inferences to be made about the population.

The sampling technique used in this study included a mixture of random selection and purposeful selection techniques because the study adopted a combination of quantitative and qualitative research methodologies for purposes of triangulation and in-depth understanding of the research problem. Additionally, the study also employed the use of purposeful sampling techniques to identify participants for interviews and also try to make the sample representative of male and female participants.The research sample wascalculated using an online sample size calculator from Creative Research Systems. The population size was calculated based on a ninety-five percent (95%) Confidence Level and a Confidence Interval of ten (10).The selection of respondents was drawn from a population size based on only eLearning students from the groups of learners involved in studying through the Tele-Education Project of the Pan-African eNetwork Partnership as well as a group of learners enrolled in the BOCODOL Certificate for Distance Education Practitioners course. In both these initiatives, delivery of teaching and learning takes place completely online. The total number of students comprising the sample size for this group was two hundred and seven(207) learners. Using the sample calculator, at a confidence level of 95% and confidence interval of ten (10), a population of two hundred and seven (207)gave a sample size of sixty-six (66). The students' selection was done such that each group had a sample of ten (10) learners per class, gender balanced with five (5) Males and five (5) Females where possible. All participants in the study were informed of their rights in line with proper ethical standards and expectations.

For staff, the sample population was drawn from all Academic and Support staff including, Programme Development Coordinators, Lecturers, Tutors and Student support services involved in the delivery of the eLearning courses. Data was also collected from the two (2) eLearning technical experts from the Multimedia and Production department through a written interview.

DATA ANALYSIS AND INTERPRETATION OF RESULTS

According to Cohen,Manionand Morrison (2007), there is no single or correct way to analyze and present qualitative data.How one does it, should be guided by the issue of 'fitness for purpose'. According to BogdanandBiklen (2003), data interpretation is about developing ideas from the findings and relating them to the literature and broader concepts of the research.Data analysis was mainly quantitative, using frequency distributions and data emerging from the analysis was presented in tables and graphs. The findings were arrived at from an analysis of the responses of the questionnaires from students and staff. The data was analyzed using Statistical Package for Social Sciences (SPSS). Open-ended written interviews were administered to eLearning specialists and the qualitative data collected from the eLearning specialists was analyzed using common themes for the responses to be compared with those from the questionnaires for purposes of

triangulation and complementarity (quantitative and qualitative). There were only two (2) eLearning specialists, and both of them submitted responses. The data was presented and analyzed under staff and students. This approach enabled the researcher to analyze each group and also be able to compare the results between staff and students for similarities and differences.

Response Rate

Table 1 presents the response rates for staff and students in raw scores as well as percentages. The table shows that the sample size for Students was sixty-six (66) and a total of thirty-seven (37) (59.64%) responses were received.The sample size for staff was forty (40) and a total of thirty-seven (37) (92.5%) responses were received.

Table 1: Response Rate for both staff and students

Category	Sample Size	Responses	Response Rate %
Staff	40	37	92.5
Students	66	37	59.64

These sample sizes for staff was found to be adequate for the purpose of this study, because Cohen andManion (1994) argue that:

> *There is no clear cut answer, for the correct sample size depends upon the purpose of the study and the nature of the population under scrutiny.A sample size of thirty is held by many to be the minimum number if researchers plan to use some form of statistical analysis on their data (p. 90).*

Additionally, the written interviews by eLearning Specialists also provided complementary data used for triangulation and complementarity purposes.

Demographic Characteristics

Table 2 and Table3 provide the demographic data for students who responded to the questionnaires in this study. Table 2 presents data on student responses by Gender, whereas Table 3 presents them by Age group. Table 2 indicates that a total of thirty-seven (37) responses were collected. Table 3 shows that the majority of learners were in the age range of Below 30 and 31- 40, totaling 81.1%.

Table 2: Student Respondents Distribution by Gender

Gender		
Male	Female	**Total**
13	24	**37**

Table 3: Student Respondents by Age Groups

	Below 30	31 - 40	41 - 50	51 - 60	Missing	**Total**
f	19	11	5	2	0	**37**
%	51.4	29.7	13.5	5.4	0	**100**

Students Data on Economic Factors Affecting eLearning

Table 4 indicates that 45.9% of students believed that eLearning infrastructure was not expensive, 32.4% said it was expensive while 18.9% indicated that they were not sure. Table 5 indicated that 37.8 % of students believed that online connectivity costs were not affordable.

Table 4: Student Responses on Cost of eLearning Infrastructure

		eLearning infrastructure is not expensive						
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Missing	**Total**
Students	f	7	10	7	8	4	1	**37**
	%	18.9	27.0	18.9	21.6	10.8	2.7	**100**

Table 5: Student Responses on Online Connectivity Costs

	Online Connectivity costs affordable						
	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Missing	**Total**
f	1	9	12	12	2	1	**37**
%	2.7	24.3	32.4	32.4	5.4	2.7	**100**

Table 6: Student Responses on IT Equipment Costs

	IT equipment is affordable for all Students						
	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Missing	**Total**
f	2	5	14	10	5	1	**37**
%	5.4	13.5	37.8	27.0	13.5	2.7	**100**

Table 6 shows that only 18.9% of students believed that IT equipment was affordable for all students, 37.8% were not sure and a majority of 40.5% said it was expensive.

Table 7: Student Responses on Cost of Developing Quality eLearning Material

	Cheap to develop quality eLearning material						
	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Missing	**Total**
f	2	11	12	10	1	1	**37**
%	5.4	29.7	32.4	27	2.7	2.7	**100**

Table 7 indicated that 35.1% of students believed that it was cheap to develop quality eLearning material, 29.7% students disagreed while 32.4% were not sure. Table 8 indicated that 51.3% of students agreed that training of staff on eLearning was expensive.

Table 8: Student Responses on Cost of Training Staff on eLearning

	Staff eLearning Training expensive						
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Missing	**Total**
	f	5	14	14	3	0	1	**37**
	%	13.5	37.8	37.8	8.1	0	2.7	**100**

The students' responses indicated that providing eLearning infrastructure was expensive. Connectivity and equipment costs were highfor both the institution and the students. However they believed that providing study material in electronic form reduced printing costs. Additionally,training staff and students to ensure that they had the necessary skills to use eLearning was expensive, and this had a negative impact on implementation. These results suggest that economic factors had a positive influence on eLearning implementation as postulated in H1.

Staff Data on Economic Factors Affecting eLearning

The results from Table 9 indicate that only 8.1% of staff believed that eLearning infrastructure was not expensive. Majority of staff (67.5%) were of the view that provision of the necessary infrastructure was expensive.

Table 9: Staff Responses on whether eLearning Infrastructure was not expensive

Options	Frequency	Percent (%)
Strongly Agree	1	2.7
Agree	2	5.4
Not Sure	9	24.3
Disagree	17	45.9
Strongly Disagree	8	21.6
Missing	0	0
Total	**37**	**100.0**

In support of the staff views, the eLearning Specialists opinion on the effect of cost on eLearning implementation based on infrastructure were:

Specialists Responses:

Excerpt 1: "Infrastructure needed costs a lot of money to set-up."

Table 10: Staff Responses on whether Online Connectivity Costs were affordable

Options		Frequency	Percent (%)
	Strongly Agree	2	5.4
	Agree	5	13.5
	Not Sure	13	35.1
	Disagree	14	37.8
	Strongly Disagree	3	8.1
	Missing	0	0
	Total	**37**	**100.0**

Table 10 indicates that only a small number of staff (18.9%) believed that online connectivity costs were affordable. A total of 45.9% of staff were of the opinion that connectivity costs were very expensive. The responsefrom the eLearning Specialists indicated that they also shared the view that connectivity costs were expensive.

Specialists Responses:

Excerpt 2: "The expectation is that the arrival of the undersea cables will lower the high cost of connectivity."

Staff members were asked to indicate their opinion whether IT equipment was affordable to all Students. Table 11 shows that a very small number of staff (5.4%), believe that cost of IT equipment was affordable for all students, while 78.4% were of the view that it was not affordable. The eLearning Specialists opinion was also in agreement with the views of staff.

Table 11: Staff Responses on Cost of IT Equipment for Students

IT equipment was affordable to students			
Options		Frequency	Percent (%)
	Strongly Agree	0	0
	Agree	2	5.4
	Not Sure	6	16.2
	Disagree	23	62.2
	Strongly Disagree	6	16.2
	Missing	0	0
	Total	**37**	**100.0**

Specialists Responses:

Excerpt 3: "There is an increasing range of ICTs equipment as technology keeps changing and it costs money to keep up with new technology."

On whether it was cheap to develop quality eLearning material compared to print, Table 12 indicates that 35.1% of staff believed that it was cheap to develop quality eLearning material while 35.1% were not sure and 29.7% believed it was not cheap.

Table 12: Staff Responses on Cost of Developing Quality eLearning Material

It was cheap to develop quality eLearning material		
Options	Frequency	Percent (%)
Strongly Agree	0	0
Agree	13	35.1
Not Sure	13	35.1
Disagree	8	21.6
Strongly Disagree	3	8.1
Missing	0	0
Total	**37**	**100.0**

On whether training of staff on eLearning was expensive, Table 13 indicates that 27% of staff agreed that training of staff on eLearning was expensive, 43.2% were not sure if training of staff was expensive while 29.7% were of the opinion that it was not expensive.

Table 13

Staff Responses on Cost of Training Staff on eLearning

Training staff on eLearning is expensive		
Options	Frequency	Percent (%)
Strongly Agree	1	2.7
Agree	9	24.3
Not Sure	16	43.2
Disagree	10	27.0
Strongly Disagree	1	2.7
Missing	0	0
Total	**37**	**100.0**

The responses from the eLearning specialists agreed with the staff views that eLearning was expensive to implement and there was need to provide adequate financial resources for infrastructure and equipment to facilitate eLearning implementation. Also agreed that staff

members needed to be equipped with appropriate knowledge and skills required to make them competent and confident in driving the eLearning initiative.Theserequire money to facilitate. These results suggest that economic factors have a positive influence on eLearning implementation as postulated in H1.

DISCUSSIONSAND CONCLUSIONS

Research is the foundation of educational growth and development and hence education should be a research-active profession (Nenty&Adedoyin, 2010). It is on this basis that the study suggests that the activity of research on this new and rapidly evolving aspect of modern teaching and learning technologies needs to be continuously undertaken. The resultsdoes not only inform implementation, but will alsoguide thought processes to assist tertiary institutions tofind ways of improving the way they can facilitate and support students in their learning endeavors using available 21st Century ICT resources.

The findings of the study revealed that Economic issues speak to cost of infrastructure, acquisition and access to IT equipment, connectivity, training of both staff and students, and development and delivery of materials. Issues related to quality of material and interactivity of the tools used to support learners had implications on pedagogical practices as they had direct influence on the teaching and learning process (Batchelor et al., 2010; Elango et al., 2008; and Richardson, 2009). The results will be useful to the Botswana Education Sector as they provide empirical findings that would go a long way in turning around the fortunes of tertiary institutions on eLearning implementation. This has potential to yield positive educational outcomes that can facilitate an improvement in the performance of Batswana.The results showed that eLearning specialists, staff and students suggested that staff members needed to be equipped with appropriate knowledge and skills required to make them competent and confident in driving the eLearning initiative.

Implementation of eLearning creates a need for institutions to undergo some form of structural change to accommodate the new way of doing things (O'Neill et al., 2004). Unfortunately, this change comes with a lot of financial implications that need to be addressed for successful implementation. Economic Factors have a significant positive influence on eLearning Implementation. The issues of cost cut across all other areas, starting from infrastructure, equipment, material development and delivery support, connectivity, as well aspolicy development and implementation. It was therefore critical that cost issues be addressed adequately to facilitate success in eLearning initiatives.

RECOMMENDATIONS

The research findings indicated that economic factors had significant positive influence on eLearning Implementation. This came out clearly from responses from students, staff and eLearning experts across the institution Issues of cost associated with equipment, connectivity, training and material development were raised by the research as a critical challenge affecting implementation. There was need for provision of adequate financial resources to facilitate the implementation of eLearning at tertiary level in Botswana as suggested by the results of this study. The need for adequate funding has been highlighted in findings of the study. Respondents have indicated that infrastructure, equipment, connectivity, and training were costly, and that is the reason why economic factors had significant positive influence on eLearning implementation. The following recommendations are made for consideration in order to facilitate and improve the implementation of eLearning in tertiary institutions, and specifically at BOCODOL.

1. Consideration should be made to provide adequate funds to invest in development of basic ICT infrastructure for effective provision of eLearning
2. Management should take a keen interest in providing the necessary resources (Human, Financial, Infrastructure and equipment) support for effective implementation of eLearning Initiatives.
3. Training of staff and students should be a priority to capacitate them with the necessary skills to implement eLearning efficaciously.

Areas for Further Research

The findings of this study have raised areas in which further studies could be undertaken to establish deeper understanding in some specific issues impacting eLearning implementation in Botswana tertiary institutions (conventional and ODL):

1. Research could also be undertaken to investigate how age and gender for both students and staff influence eLearning implementation.
2. Research could be conducted to establish how the Technical factors such as ICT infrastructure, Internet access and IT equipment, influenced eLearning implementation.

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