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A Framework for the Use of Interactive Whiteboard Technology as an e-Learning Tool in Namibian Higher Institutions: A Case of NUST

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Abstract: ***Many developing countries recognise the importance of Information and Communication Technology (ICT) in education for teaching and learning. In Namibia however, the use of ICT and its integration in the classroom remains inadequate. The purpose of this study is to assess the extent to which interactive whiteboard technology (IWB) is used as an e-Learning tool at the Namibia University of Science and Technology (NUST). This study is based on the unified theory of acceptance and use of technology (UTAUT). To attain the main objective, a mixed method approach consisting on both qualitative and quantitative analyses will be used to collect data among lecturers and students of NUST through the use of interviews and survey questionnaires. Data will be analysed using the statistical package for social sciences (SPSS) and ATLAS.ti. The findings of this study will inform the management of higher education institutions on the extent to which their students and lecturers are using interactive whiteboards as an e-Learning tool across higher education institutions in Namibia.***

Keywords: Interactive whiteboard, e-Learning, UTAUT

1. Introduction

Many developing countries (e.g., South Africa, Kenya, Ghana, and Nigeria) have adopted ICT in education, with the belief that it will add value to both teaching and learning in the classrooms (Draper, 2010; Hennessy, Harrison & Wamakote, 2010). Due to the fluctuating environment (diversifying demand for higher education institutions, rapid competition and globalisation), higher education institutions need to state comprehensive ICT strategies and make considerable choices about the markets they wish to serve and which type of technology to use (Collis & van der Wende, 2002).

William (2017) stated that student engagement is a critical factor that affects teaching and learning and that students need motivation to learn from their higher education institutions. He further added that when students are uninterested in learning, it creates a barrier. He finally concluded that another method of bringing instructions that may promote engaging students in the e-Learning process is the use of interactive whiteboards (IWB). Several studies have indicated that IWBs strengthen students' inspiration and commitment; IWB have features that attract student's attention and increase concentration (Marzano, 2009; Schmid, 2008; Slay et al., 2008; Smith, Higgins, Wall & Miller, 2005).

The adoption of interactive whiteboards (IWBs) as an e-Learning tool in classrooms at all education levels has increased significantly in the modern era (Lai, 2010) and this is no exception for NUST.

2. Problem Statement

Since the integration of IWB as an e-Learning tool for teaching and learning, the researcher has not identified any study conducted to assess how IWB is being used and its real impact at NUST. Research concentrated only largely on the use of ICT for distance learning (Kloppers, 2014) and that technology enables distraction in the classrooms (Muyingi, 2014).

Information from a pilot study indicates that lecturers are not trained on the use of IWB, which exposes that possibility of not understanding the features of IWB and do not have the ability to use it. On the other hand, motivation to use IWB relies heavily on lecturers' technological skills and most importantly, the ability to plan their lesson activities using IWB (Glover, Miller, Averis, & Door, 2007; Holmes, 2009; Torff & Tirotta, 2010).

Higher education institutions like NUST have spent a lot of money investing in the purchase and installation of these e-Learning tools, which includes interactive white boards (Wambui & Black, 2014), and it has been noticed by the researcher through a pilot study that it has not been properly maintained. This is due to the fact (as gathered from the pilot study conducted) that there is no guideline or framework on how this innovative technology can be used in terms of training of lecturers, maintenance and sustainability of the technology. Moreover, there is no database of research on the effective use of IWB for e-Learning at NUST (NUST Repository, 2017). This study therefore intends to develop a sustainable framework that will guide the use, maintenance and sustainability of IWB at NUST

3. Research Aim and Objectives

This section is on the research aim, objectives and questions

3.1 The research aim and objectives

The aim of this research is to:

- Develop a sustainable framework for the use of interactive whiteboard technology as an e-Learning tool

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in Namibian higher institutions with NUST as a case study.

The objectives of the research are to:

- Investigate the factors inhibiting usage of interactive whiteboards for e-Learning at NUST
- Examine the ICT skills and competencies among lecturers and students at NUST that can facilitate the use of interactive whiteboards.
- Develop a framework that to enhance use and sustenance of interactive whiteboards as an e-Learning tool at NUST.

3.2 Research questions

The main research question is:

- How can a sustainable framework for use of interactive whiteboard technology as an e-Learning tool in Namibian higher institutions be developed

The objectives of the research are to:

- What are the factors that inhibit the usage of interactive whiteboards for e-Learning at NUST?
- What are the ICT skills and competencies among lecturers and students at NUST that can facilitate the use of interactive whiteboards?
- How can a sustainable framework that will enhance use and sustenance of interactive whiteboards as an e-Learning tool at NUST be developed?

4. Preliminary Literature Review

The literature review will present literature relevant to ICT use in the education sector particularly e-Learning strategies and present the current knowledge available that is relevant to the aim of the study and research questions outlined in the above chapter. Firstly, the section will cover the status of ICTs at NUST, interactive whiteboards as an e-Learning tool and the guiding theory of the research.

4.1 Status of ICTs in Namibian higher institutions

ICTs have benefited industries throughout Africa and it is noted that ICTs have a huge potential to galvanise tertiary education (Beebe, 2002). Namibia is one of the world's developing countries that are determined to integrate computer technology and ICT at large into the education sector. The Namibian government formulated an ICT Policy for Education in 2005 after international case studies on ICT integration that have specified the necessity of a comprehensive national policy on ICT in education to be a catalyst for ICT integration and training (Hesselmark & Miller, 2003). The Namibian ICT Policy for Education defined six goals that practically stress the pedagogical use of ICT as an integration tool for teaching and learning process at all educational levels.

The drive to integrate e-Learning throughout many developing countries is supported at national and regional levels; particularly in Namibia. Tertiary institutions such as the NUST support implementation of e-Learning through their five-year strategic plans and the overall national coordinating entity, which is NOLNET (Beukes-Amiss, 2006). The Namibia University of Science and Technology (NUST) recognizes that e-Learning is shifting the way we teach and learn. NUST is responsive to the higher education development of Namibia as to the world. Therefore, NUST distinguishes the need for ICT to be an integral part of learning and teaching (Polytechnic of Namibia, 2010). However, it is important to note that such goals are challenged by lack of resources, technical support and Internet accessibility (Wambui & Black, 2014).

4.2 Interactive whiteboards as an E-learning tool

An IWB system is an ICT tool, which aims to support teaching and learning. "An IWB set-up involves an image generated by a computer being projected onto a touch-sensitive screen the size of a conventional whiteboard, where the touch of a pen is the equivalent to a mouse click" (Kent, 2006). Koenraad (2008) continues that IWBs support teaching functions, in demonstrating, presenting and instructing. He then added that IWB encourage teacher-centered teaching. Furthermore, challenging and effective education indicates independent learning as well as (co)building of knowledge (Koenraad ,2008). e-Learning supports diversity, personalized learning and tele-collaboration.

Writer (2017) stated that there is no doubt that traditional whiteboard limits collaboration and when using traditional whiteboards existing information has to be removed in order to create new content. One of the main characteristics that differentiates IWBs from other e-Learning tools is interactivity. IWBs are not only a presentation tool, but also an interactive tool. Koenraad, (2008) added that IWB can bring effective whole-class teaching.

Beauchamp and Parkinson (2005) differentiated between the benefits of IWB for students and the benefits of IWB to lecturers. IWB technology offers opportunities for students to participate and collaborate in technological tools, promotes meta-cognition, facilitates the re-use of materials, and deepens learning (Beauchamp &Parkinson, 2005). The IWB allows lecturers to show visual elements, digital photographs, and video clips and make the use of visually rich, web-based games and activities (DeMonte, 2013). DeMonte (2013) added that students with visual impairments can also benefit from IWB by the use of auditory elements and touch actions which helps them learn lessons that are taught visually.

4.3 Guiding theory of research

A guiding theory is a framework for existing theories and concepts that can be used to serve as a structure for a new research study (Labaree, 2013). The theoretical framework for this research is based on the unified theory of acceptance and use of technology (UTAUT). Venkatesh et al (2003) formulated UTAUT, and it consists of four concepts, i.e. Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). The above four concepts are independent variables, which influence dependent variables i.e. behavioral change and usage, gender, age, experience, and voluntariness of system

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use. Behavioral intention is therefore a critical predictor for technology use (Venkatesh, Morris, Davis, & Davis, 2003).

This research focuses on lecturers' and students' acceptance and use of technology in the Namibian higher education institutions in an effort to link the results with the original UTAUT findings and discover whether context specific to Namibia should be added to the UTAUT theory.

5. Significance of the Study

The study is important for many reasons.

- The findings will inform the higher education institutions in Namibia on the extent students and lecturers are using interactive whiteboards as an e-Learning tool across the curricula.
- It will create awareness on the use of IWB as an e-Learning tool in Namibia
- The study will give an understanding of the way in which e-Learning tools such as interactive whiteboard technology is being used around the world especially in developing countries.

6. Research Methodology

This section is on the research methodology and is subdivided into the research design, data collection methods, research population and sample and data analysis.

6.1 Research design

According to (Slawomir Klos, 2008), research design is defined as the plan used by a scholar to obtain research participants and to collect information. The research design of this study will be exploratory research. An exploratory design is well-defined as a study conducted on a research problem when there are little or no earlier studies to refer to or predict an outcome. The emphasis of an exploratory study is gaining insights and familiarity for investigation or it is undertaken when research problems are in the initial stage of investigation. Exploratory design will be useful for this study because it will explore the use of interactive whiteboard technology in higher education institutions as an e-Learning tool. No such studies have been conducted to identify new knowledge and understanding the way IWB are used in the top three Namibian higher education institutions (Brink & Wood 1998:312; Brink 1996:11). The study will employ a mixed approach to collect the data, which is a mixture of quantitative (surveys) and qualitative (interviews) research.

6.2 Data collection methods

The researcher will hold informal and formal interviews with participants, and explain the research objectives, conduct interviews and distribute the questionnaires per faculty. This will be done with an aim of establishing good relations with participants and minimise rejection.

6.3 Research population

Polit and Hungler (1999:37) refer to the population as an aggregate or totality of all the objects, subjects or members that conform to a set of specifications. The population of the study will be identified as students and lecturers from the six (6) faculties of NUST.

6.4 Research sample

The process of selecting a portion of the population to represent the entire population is known as sampling the sample of the study will be 80 students and 40 lecturers. The sample will be identified through simple random sampling to ensure that an optimum number of participants is reached to ensure the quality of the research.

6.5 Data Analysis

Data analysis is when data that is collected in a non-standardized and complex form is condensed, summarized, grouped and restructured to become more meaningful information (Lewis, Thornhill, & Saunders, 2012). Data will be analysed using the statistical package for social sciences (SPSS) and ATLAS.ti.

7. Limitations of the Study

The following are likely limitations of the study.

- Since the number of lecturers and students from NUST who will be selected for the study is small compared to the population of all Namibian lecturers and students from other institutions, the findings cannot be generalised to all the other Namibian higher education institutions countrywide. The findings will however present an overall understanding of perceptions of the use of interactive whiteboards in Namibian higher institutions. Such knowledge can be used to advise similar practices from different contexts.
- The researcher will be limited by the short time constraint of the research study. This means that every phase of the project needs to be completed on time and submitted to the supervisor in accordance with the set timeline.
- There are multiple stakeholders involved in the use of IWB in the higher institutions i.e. top management, policy makers, Deans, Faculty Heads, lecturers, students, etc. It is beyond the scope of this research to conduct a study, which involves all these stakeholders as it takes a lot of time and resources to contact and collect data. For this research, only lecturers and students are selected for the study.

8. Assumptions

The following assumptions are made:

- NUST uses interactive whiteboards
- Interactive whiteboards improve teaching and learning as an e-Learning tool
- NUST is interested in the study

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9. Ethical Considerations

The researcher will obtain research clearance from the NUST Research Ethics Committee. The researcher will obtain consent from all the institutions in which data will be collected. According to Beheshti (2006), when a scholar is conducting research, she /he is responsible to fellow researchers, respondents, society as well as to herself/ himself to maintain confidentiality.

Therefore, the researcher is obliged to:

- Obtain informed consent from all the participants. With the use of the cover letter from the Namibian University of Science and Technology, the scholar will provide adequate information regarding the purpose of the study and about the rights of the participants.
- Secondary data by other authors will be referenced and cited in the research.

10. Conclusion

The primary purpose of this research study is to assess the extent to which interactive whiteboards are used as an e-Learning tool at NUST. To achieve this purpose, a primary question was formulated that is, "How is the current use of interactive whiteboards as an e-Learning tool at NUST?" In order to find answers to the research question, a conceptual framework called the unified theory of acceptance and use of technology (UTAUT) will be the basis for conducting the research. From literature, certain sub topics will be studied to identify the extent to which NUST are using interactive whiteboards as an e-Learning tool for teaching and learning. NUST will be used as cases for the study and a mixture of qualitative and quantitative methods will be used to collect data, using a stratified and purposive sampling. Certain factors such as resources, period and financial constraints will limit the study. The study is important in that it will raise awareness on the use of ICT in the Namibian educational sector. Assumptions such as NUST use interactive whiteboards have been noted.

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