

Application of Mobile Computing In Tertiary Institutions: Case Study of Midlands State University

Paul Mupfiga , Margaret Chirimumimba
Midlands State University

ABSTRACT

Mobile devices are already being used by educational institutions in many countries. Technology has an impact on students and teachers and the learning process. Regardless of many brilliant anecdotes about using mobile devices in education, mobile devices after all are ICT devices that contain fragile electronic components, need power to operate and connectivity for access. This paper provides an overview of how mobile computing is been applied in the education sector in Zimbabwe tertiary institutions , I will focus my research on Midlands State University .This paper will also explores the opportunities and issues in regards to using mobile devices in education.

Keywords: eLearning, m-Learning, m-Education, mobile devices in education

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I. INTRODUCTION

Information Communication Technology (ICT) is increasingly becoming more wide spread throughout University education worldwide. This is in line with UNESCO's policy paper for Change and Development in Higher Education which urges Higher Education institutions to make greater use of the advantages offered by the advancement of communication technology to improve the provision and quality of their education. Many universities around the world are turning to the use of ICT, now generally referred to as e learning, as a complement to teacher led tuition on campus (Hazemi and Hailes, 2002).

What is mobile computing?

Mobile computing is a generic term used to refer to a variety of devices that allow people to access data and information from where ever they are. James bucki (2011). Mobile computing, is the use of portable computing devices (such as laptop and handheld computers) in conjunction with mobile communications technologies to enable users to access the Internet and data on their home or work computers from anywhere in the world Margaret Rouse (2007) .

From the definitions above mobile computing enables access to digital content without restriction on time or place .Mobile devices include laptops, netbooks, tablet computers, smartphones, media players and mobile games consoles. The main advantage of mobile computing is portability. There is no restriction to one location in order for you to access anything for example one can access email on the go or students can access their results or materials at any location not just the campus only. mobile computing enables one to save documents on an online server and this service is known is cloud computing .the documents can be accessed anytime and anywhere when you have a connection to the internet .

In the past years computers have begun to migrate from the corporate world to the classroom. Technological changes and mobile computing are resulting in increasing transformations of the educational world. Advancement in computer and technology has made the education system more organized and systemic than before. Mobile phones have gone past being mere phones to email platforms , tools for text messaging , music and video players , entertainment for example gaming ,digital cameras and so much more .ownership of mobile devices is on the increasing .People now own smart phones ,notebooks , tablets being on the rise . Mobile computing is becoming part of everyday life as reflected by the ownership rates of mobile devices and the rate at which they are being used on campuses .Mobile computing is being adopted in education mainly for teaching and learning and also administration and research .

Elearning

E-learning in its broadest sense can be defined as instruction delivered via an electronic media including the Internet, Intranets, extranets, satellite broadcast, audio/videotapes, interactive TV and CD-ROM (Rosenberg, 2001, Garrison & Anderson 2000, Carry & Willis, 2001, Hall and Snider, 2000).. Electronic learning in

education refers to the use of information communication technology (ICT) and electronic media in learning and teaching. This involves the use of a computer in learning anything be it a skill, task or process. Elearning can be implemented in the classroom or outside the classroom. It is best suited for distance learning but it can also be used together with face to face learning. Students have access to course materials online anytime and in any place and they can work at their own pace.

Mlearning

Mobile learning is the term used to describe any form of training that uses mobile devices such as mobile phones. Hand held devices are used in mlearning. The eLearning Guild describe m-learning as "any activity that allows individuals to be more productive when consuming, interacting with, or creating information, mediated through a compact digital portable device that the individual carries on a regular basis, has reliable connectivity, and fits in a pocket or purse." Technological changes are driving the use of mobile devices in education. Students own mobile device and use them at a higher rate than the older generation. With mlearning there is convenience, students can access content including quizzes and other assessments, balance sheets and other data, learning games, and other content delivered via different applications from anywhere. Students can collaborate and share and get immediate tips and feedback from others

II. BACKGROUND OF STUDY

According to Von Solms (2006), many universities have started moving towards leveraging ICT systems as delivery platforms in educational, teaching and assessment programs. Based on the technological developments in tertiary institutions, the researcher noted that there is a huge reliance and dependency on IT services due to the size of the investments that has been made over years. According to Chitanana, et al (2008), state universities in Zimbabwe have invested a lot of financial and human resources in information technology since the year 2000 and most of them have computerised their administrative functions and processes, such as, learning methods, student registration, student records and employee records. A university's electronic information assets are amongst its most important and crucial assets. These electronic information assets are constantly exposed to threats during storage, processing and transmission, that is, unauthorized access, unauthorized changes and loss, which, if they materialize, can result in potential damage of the electronic information assets and have serious consequences for the university.

Midlands State University was established in 2000 The mandate of the institution was contained in its broad objects which are the advancement of knowledge, the diffusion and extension of arts, science and learning, the preservation, dissemination and enhancement of knowledge that is relevant for the development of the people of Zimbabwe through teaching and research and, so far as is consistent with the objects, the nurturing of the intellectual, aesthetic, social and moral growth of the students at the University. The vision of the university is to be to be a unique, development oriented, pace-setting and stakeholder driven University that produces innovative and enterprising graduates. The ultimate goal of MSU is to establish a University with ten faculties by 2015. To date the University offers degree programmes in seven faculties. These are Arts, Commerce, Education, Law, Natural Resources Management and Agriculture, Science and Technology and Social Sciences. One of the university mission is Commitment to the use of Information Communication Technology (ICT) and the virtual classroom, as principal teaching and training modes of delivery and research. This has led the university to invest in technology in the past years.

Technological developments at Midlands State University

Midlands State University is using information technology as a principal teaching and training mode of delivery and for research. MSU has computerized all its administrative functions and MSU uses fiber optic, a development which was initiated by its ITS department and Powertel its internet access provider (IAP), as MSU aims to adopt virtual classrooms as principal teaching and training modes of delivery and research. Prior to that MSU implemented V-SAT technology which is a satellite network service with little down times but limited upload and download speeds. MSU uses its website for any alerts and updates, each and every employee has an email address managed by the ITS department for easy communication, students can also communicate with their lecturers and also download learning materials through the e-learning facility and lectures can also be conducted online. MSU is using a record keeping IT system, that is, CHANGAMIRE which is a comprehensive database system which was developed and is being used within the university using local resources and personnel. The ITS department strengthened the internet network accessibility through the installation of the internet network wireless connection, a development that has enhanced and increased internet access to computers around its campuses, reported the September 2010 MSU Newsletter. MSU introduced a compulsory IT module called Introduction to Information Technology (HCS 115) at first year, it gives students the appreciation of computers and library skills that expose them to various study skills including library navigation

skills. MSU has setup fifteen computer laboratories on its campuses and through a strategic partnerships with Computer Aid International a non-governmental organization which has seen the acquisition of over 1 500 desktops. This acquisition helped to reduce the student to computer ratio at MSU. The computer laboratories are opened every day from 8am to 10.30pm so as help students and lectures do their researches. In future MSU intends to convert the Great Hall into an electronic research centre which will be hosting 2 500 computers. MSU's objective of dissemination of knowledge keeps growing and staying abreast with global standards, this was evidenced when the department of tourism and hospitality management adopted the technologically laden problem based learning (PBL).The PBL was implemented in 2009, lecturers post learning problems to students through the internet and students send solutions to lecturers via email and the lecturers in turn put to test the learning objectives set by the students then eventually send out their own standards which the students then use to benchmark their performances, reported the September 2010 MSU Newsletter. MSU is moving towards an e-library facility through the acquisition of e-journals and e-books which require extensive knowledge of the library information literacy. MSU subscribes to over 500 000 e-books and has access to over 972 electronic journals databases. To that effect MSU has 16 computer laboratories which serve as electronic research centres, reported the MSU Librarian.

III. RESEARCH METHODOLOGY

This study investigated the application of mobile computing in tertiary institution focusing the research on Midlands State University. The study allowed the collection of useful information and data in relation to this new mode of teaching, learning, administration and research. The researcher issued questionnaires and got responses from 87 students out of a sample of 100 who were randomly selected. Questionnaires were also issued out to 50 lecturers and 32 responses were received .The researcher also conducted interviews with the MSU IT director, Deputy Librarian and 3 faculty administrators. The questionnaire for the lecturers was designed to collect data on, the availability of mobile devices, WIFI connectivity, their level of computer expertise as well as the challenges they are facing in using mobile computing. The questionnaire had both closed and open end questions. The questionnaire for the students was designed to collect data on rate of ownership of mobile device, rate of usage of these gargets as well as Wi-Fi connectivity issues .The face validity of the questionnaires was established by giving the questionnaire to experts to comment on its validity. The questionnaires were administered in person to 50 university lecturers by the researchers and 100 MSU students.

Interview with the ITS director was conducted to clarify certain issues raised in the questionnaire. The Deputy Librarian was also interviewed to collect data pertaining the usage of the eLibrary and eResources. The faculty administrators were also interviewed so as to identify areas the administration is applying mobile computing besides teaching and learning.

IV. RESULTS

Infrastructure: The data collected shows that there is still need for infrastructure development in the university. The number of WiFi access points is too low a limited number of students are able to use the WiFi .It was also noted that at the Graduate school of business leadership campus WiFi is not a problem even though they have the same number of access points

Access to computers: Each campus has a computer laboratory but most of the computers are not working, some are obsolete and some have problems .The data collected also shows that there is a computer to student ratio of 1.5 which is a bit too high as all students now depend on the internet for their studies and researches. Most of the students bring their personal laptops and tablets at school. 88% of the student population access the internet through the use of their smartphones and notebooks. Learning has been made easy with technology .Students now record lectures with their phones. They have discussion groups on social networks and whatsapp where they share information. 90% of the lecturers respondents indicated that they had access to computers in their offices most of them being personal laptops. Sixty-nine percent (45%) indicated that they used computers to plan their lectures and deliver lectures too. The rate is still too low main because these lecturers have been using the traditional methods for a very long time and they are being resistant to the technological changes .Others sited that the whole faculty share one projector and therefore most of the time they tried to access it , it was being utilized by someone else. There was a lecturers laptops scheme with a company called Firstel in January 2013 were lecturers where offered laptops on credit. The laptops would be paid over 6months and the lecturers would get the laptop without even paying anything .61 percent of our academic staff acquired laptops from Firstel on this scheme and this improved lecture delivery. Lecturers could now deliver their lectures through the usage of projectors.

The ITS director highlighted in the interview that the university administration is making efforts to improve on the infrastructure. On the 14th of October 2013 the networking team was installing a wavion which is a wifi access point. This will improve on wifi connectivity as the wavion broadcast up to fifteen SSID.

Learning management system: The administrators highlighted that MSU developed its own in-house learning management system (CHANGAMIRE) software. The system manages all the student profiles and lecturers can upload materials for their students to access. The system can view their profiles, results and check for their timetables on their elearning accounts. The changamire system provides a platform for discussions and sharing of information. This therefore implies that at MSU mobile learning has been adopted. The data collected indicate that there is limited utilisation of e-learning resources in teaching and learning at MSU.

eLibrary: The deputy librarian highlighted that the university provides students with access to online library facilities such as e-journals, e-books, online catalogues and databases. However the usage rate of these resources is still very low. It was noted that the students do not utilize these resources as they are not aware of how to use them. The deputy librarian said they introduced ILS at first year level so as to insure that all students know how to access these eResources.

Administration side: All seminar rooms have wifi access points. This was in a bid to carry out paperless meetings. The academic board is now conducted using computers, there is no longer need to carry files. Updates and changes are done in real time. Overall communication has improved as everyone has access to his or her email all the time.

V. DISCUSSION

The study revealed that most e-learning activities are limited to administrative functions, such as, placement of time tables, semester results, and announcements on the internet. The ICT infrastructure that the university invested in is not being utilized fully. Teaching and learning usage is limited to placement of course outlines, handouts, website links at the expense of utilisation of interactive tools like discussion forums, chat rooms and other interactive activities. The e-learning activities carried out reflect its use as a support tool to the traditional face to face teaching. Although mobile computing is being adopted in universities, utilization of the resources available seem to be the reason for lagging behind. The focus of the university should be now on improving in their teaching and student learning through the use of e-learning and mlearning. The results of this study show that this is being done at a slow pace. Although e-learning has not yet revolutionised university teaching and learning, it has changed how some businesses are carried out in the universities as well as providing easier access to administrative information. E-learning has had some impact on administration services such as admissions, registration and fee payment. The registration process at MSU is now done online. Other systems also like accommodation, SRC voting system are also now done online. However, it is clear that this is a limited approach to the adoption of e-learning, since e-learning is supposed to benefit the student in the teaching and learning process.

A university cannot successfully implement e-learning without proper attributes of its infrastructure. In this study, the computer-student ratio is very low and there is need to invest in more computers. As Cuban (2001) observes, limited computer access results in limited computer aided learning application. The slow take up of e-learning by lecturers may partly be due to their ignorance in technology and some lack of awareness of e-learning facilities. This can be a result of poor coordination of stakeholders in the universities during the launch and implementation of e-learning programmes. The results indicate that the university never offered training and continuing professional development for learning and teaching staff to enhance their skills, knowledge and competencies for the provision of high quality e-learning.

VI. CONCLUSIONS AND RECOMMENDATIONS

The findings of this research seem to indicate that there is slow adoption of the use of mobile computing by tertiary institutions. The use of e-learning in universities is not been fully embedded into the University's teaching culture and practice and as a result the devices and infrastructure is there but nothing is being done to fully utilize them.

It is recommended that an e-learning development and support team including IT members and department based staff be established. Resistance to change is therefore likely to be overcome if academic staff is fully involved or have full ownership in the design, development and implementation of these changes. Academic staff has to have an understanding of their new roles and the results eventually produced are truly ascertainable (Welsh & Metcalf, 2003; Rockwell et al., 2000; Lewis, 1998). If MSU fully utilises the infrastructure and resources the following can be achieved

1. Access documents or document libraries
2. Access quizzes and self-assessment as question or games
3. Participate in lessons and tutorials
4. Receive lectures archived or broadcasted live
5. Access to video clip or audio libraries
6. Read asynchronous postings
7. Exhibit student work
8. Participate in virtual learning communities on the go
9. Interact with apps that are engaging and immersive

Although application of mobile computing in education has its advantages there are also issues of concern such as quality of connectivity .Mobile devices will need either WiFi connectivity or mobile network connectivity such as GPRS, 3G and in some countries even 4G connectivity if you are not near any of these connections your access to the internet is very limited. There are security concerns associated with the use of mobile devices .Mobile VPNs are unsafe to connect to, and also syncing devices might also lead to security concerns. Accessing a WiFi network can also be risky because WPA and WEP security can be bypassed easily. Power Consumption is also another issue. Due to the use of batteries in these devices, these do not tend to last long, if in a situation where there is no source of power for charging then that will certainly be a letdown.

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