

M-Learning in the Face of Unstable Information Technological Support: Assessing the Viability and Effectiveness of M-Learning in Distance Education

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Abstract

Whilst the information and technological support of m-learning could be well developed in institutions of higher learning in many developed countries, in developing countries and indeed at the Zimbabwe Open University, m-learning has limitations and students still face a number of challenges. The study explored the use of m-learning focusing on assessing its viability and effectiveness in the face of unstable information technological support. A qualitative descriptive survey was used to gather data from a convenient sample of 120 students at the Zimbabwe Open University. Results indicated that students are excited to use m-learning technologies because of their synchronous and asynchronous nature. M-learning is not disruptive to students' personal and academic life and is flexible in terms of learning timetables. On the other hand, m-learning has limitations in terms of access, availability, affordability, connectivity, among other factors. For this reason, this paper raises awareness to all institutions of distance learning in developing countries and indeed at the Zimbabwe Open University, of seeing the need to constantly monitor and assess the viability and effectiveness of m-learning to ensure students' success and retention.

Keywords: *M-learning; information technology; developing countries; viability and effectiveness; synchronous and asynchronous nature; retention*

1. Introduction

The study explored the use of m-learning or mobile learning and teaching strategies at the Zimbabwe Open University (ZOU), as well as assessing their viability and effectiveness in the face of unstable information and technological support. To have more insight into the subject, it is important to understand where ZOU is coming from as an institution operating in Zimbabwe, a developing country.

Since its inception in 1993 as a centre for Distance Education, the Zimbabwe Open University (ZOU) adopted an open and distance type of education system as its philosophy guiding the provision of teaching and learning services to its students. Ogidan (2010) describes open and distance learning as primarily a goal or educational policy that allows the provision of learning in a flexible manner built around the geographical, social and time constraints of individual learners, rather than those of an educational institution (Cooksen, 2002). For this reason, distance education, according to the Commonwealth of Learning (COL, 2003), is one means to that end and is characterised by three elements namely accessibility, flexibility and learner-centeredness. This means, learners should be able to access education: from wherever they are without limitations of place and time; in a flexible manner, that is, at a distance from the originator of the teaching material, at their own pace and place of choice; as well as in a learner-centred context without necessarily a face to face contact with the teacher (Bates, 1995).

Theoretical Framework

Given the above background, it is apparent that this study draws its theoretical framework from two angles. First, the study draws on the concept of Open and Distance Learning (ODL) as an ideology (Bates, 1995, Ogidan, 2010), and second, it focuses on the learner, grounded on the theory of constructivism (COL, 2003; Marcal and Caetano, 2010). As an ideology, the strength of ODL lies on its concepts of ‘openness’ and ‘distance’ (Bates, 1995) and these two concepts have their meaning expressed by learning guided by the three principles of accessibility; flexibility; and learner-centredness (COL, 2003). This means every instructional strategy that is employed should try to meet at least part or the whole of the demands of this ideology. On the other hand, learner-centredness is based on the psychological theory of constructivism (Marcal and Caetano, 2010). In the context of this study, it means given the correct and appropriate support of the technological platform, the learner should be able to construct his/her own knowledge and determine the direction and benefits accrued in learning using mobile devices.

Contextualizing M-learning at the ZOU

The arrival of m-learning services, particularly the introduction of mobile and wireless technologies, has transformed the landscape of educational activities at ZOU, considering that meeting the demands of educational transactions at a distance is dependent upon communication technologies that provide frequent and regular interaction between tutors and students and among students themselves (Motlik, 2008). Literature has provided several definitions of the term m-learning. Zambodla and Adams (2008) describe mobile technologies as those that include devices connected to wireless technologies such as hand-held PC'S, mobile phones and other similar devices considered as suitable for learner support. Whattananarong (2005) cited by Motlik (2008) views m-learning as wireless-enabled learning strategies and processes across the entire gamut of instructional delivery. Looking at these two definitions, it appears that they have emphasis on m-learning associated with devices only connected to a wireless. But should the definition of m-learning have emphasis on wireless connected devices only, or should it have emphasis on portable technologies (including some which are not wireless connected) that allow unlimited mobility for the learner? This study would prefer a broader definition of m-learning, one that embraces all types of learning that occurs when the learner is not at a fixed, predetermined location. This is the sort of definition that fits the context of ZOU because, as Sharples (2000) argue, mobile technologies should fulfil the basic requirements needed to support contextual life-long learning by virtue of its being highly portable, unobtrusive and adaptable to the content of learning and the learners' evolving skills and knowledge. Hence, it is from this understanding that this study viewed mobile learning devices at the ZOU.

With this understanding, and since its inception, ZOU undertook to deliver teaching and learning to its students through a module. A module consists of whole course content in a programme, of which the information is compacted and bound in form of a text book that can be carried and used anywhere, anytime by the students. This characteristic makes the module fit very well within the definition of mobile devices because Vavoula and Sharples (2002) argue that there are only three ways in which learning can be considered mobile, that is, it should occur regardless of time, regardless of space and in different areas of life. It is this flexibility and the synchronous and asynchronous nature of the module that the ZOU puts it in the context of a mobile device because it is suitable for use by the distance learner who is removed in both time and space from the tutors (Ogidan, 2010).

During the period 2008 to 2009 Zimbabwe experienced an economic meltdown that saw the production cost of modules rise beyond reach. The rise in production costs of module meant that the ZOU, just like any institution at that time, was now operating in very high inflationary environment and therefore there was need for an alternative source of information or another mobile device to replace or complement the module but this device had also to carry the characteristics of being highly portable, accessible, affordable and flexible. That mobile device was the Compact Disk (CD). Just like the module, the soft ware for the whole course content was transmitted through a CD which could be used anywhere anytime, as long as

there was access to a computer. At first, both students and administrators were excited about the CD because the whole examination results, for example, of a Regional Campus, could be distributed through a CD and each student could download his/her results from a computer. Course content could also be transmitted through a CD and students could either read the whole module on a computer screen or they could download the material from the computer into print. However, as time went on, the CD appeared to have perpetuated the 'digital divide' by making those students with access to computers benefitting more than those without.

In early 2009, Zimbabwe was still operating in an unstable environment and this necessitated the change of currency from the local Zimbabwean dollar to the American dollar (\$US). The use of a US dollar as currency strengthened the purchasing power of the consumers and everything seemed possible. To this effect, various manufacturing companies took advantage of the economic leverage and a local company with a brand name 'Nhava' introduced a small hand-held laptop with wireless connections and it also took the brand name 'Nhava'. In the local indigenous (Shona) language, the word 'Nhava' means a small pocket that could be used by the elders to carry food or any small items for immediate use when they were on their hunting trips. Thus, the name 'Nhava, connotes portability and accessibility by its users. For this reason, the ZOU authorities inaugurated 'Nhava' as one of its mobile devices that could be used in the teaching and learning contexts by both tutors and students. For those connected to internet, they could also enjoy internet services and students could communicate with their tutors through e-mailing and vice versa. Of late, a few students and tutors have begun enjoying the Skipe services which allow video telephoning and students can enjoy a face-to-face talk or human interface with their tutors as well as having peer-to-peer discussions.

However, behind all these developments of m-learning, it was and it is still the mobile phone or cell phone that acts as a backbone in terms of providing educational communication services to both tutors and students. The cell phone takes precedence over all other forms of mobile devices because of a number of factors. Firstly, cell phones are relatively low cost, powerful, small and lightweight, and they can perform well in difficult environments because of very little power required for the internal battery which can be recharged using inexpensive solar panels (Sharples, 2000; 2006).

According to Motlik (2008) the use of cell phones is more affordable; learners are more familiar with it, and with proper instructional design it promises educational opportunities with an increased flexibility for learners, satisfying the anytime /anywhere component of distance education for thousands, if not millions of learners. Volta (2001) adds by saying mobile phones are becoming ubiquitous in the developing world that almost everyone can get access to simple voice and Short Message Services (SMS) texts. As for Wright, Dhanarajan and Regu (2009), the devices are socially acceptable in all strata of society. Kolb (2008) winds up this debate by forecasting that the use of cell phones would overtake or replace the use of PC's or internet access –where the use of a cell phone can do almost everything in the classroom from reading a book to surfing a web.

Indeed at the ZOU, the use of cell phones has taken everyone by storm. With almost everyone possessing a cell phone, the learners can use it for direct telephoning to the tutors or administrators, when seeking solutions to their queries, asking for deadlines for assignments submissions, or enquiring about results or weekend school dates. The same can happen with tutors and administrators. They may use the cell phone, particularly the SMS facility, to invite students for meetings at the Campus, to change or cancel dates for weekend school tutorials, providing lists for extra reading materials, and above all through this interaction, closing the gap between institution and the learners who are often lonely and isolated by geographical dispersion. All this makes it possible for communication to happen anytime, anywhere, that is, in the streets, on the bus (Kolb, 2010) or even at party or church gatherings, and in ZOU's words and philosophy underpinning world class attainment, "it is taking education to the learners' doorsteps and making students enjoy educational activities in the comfort of their bedrooms."

However, in view of all this, the question still to ask is: "Does the social, and economic environments at institutions in developing countries, indeed in Zimbabwe, give adequate and sustainable technological support for m-learning developments to take place effectively?" Wright, Dhanarajan and Regu (2009) observe that the lack of sustainable and accessible electrical and telecommunications infrastructure inhibits m-learning developments. Merl (2009) suggests a paradigm shift whereby companies and indeed higher education learning institutions should move away from just getting too excited about technology on its own; but should focus instead on performance. Taliesin (2010) suggests that the solutions to all these challenges would be to assess where m-learning contributes to educational goals, and where it falls short, in order to chart a better course forward. This was the essence of the present study. It sought to interrogate and assess the viability and effectiveness of m-learning in the face of unstable social, economic and technological environments at the ZOU through the lenses of the learners themselves. At the moment, there appears to be a paucity of research on the effectiveness of m-learning technologies at institutions of higher learning offering distance education in Zimbabwe. The bulk of related research seems to be focusing more on e-learning in general (Gudza, 2010)

Statement of the Problem

Generally, ZOU as an institution of Open and Distance Learning (ODL) has made several attempts to make students benefit from m-learning technologies at their disposal. Some research may have been conducted to provide institutional reports on the utility of these devices, but very little has been done by way of giving a consolidated and holistic view of the developments of m-learning technologies and their effectiveness in the teaching and learning contexts. Given that distance learners operate from different areas of which technological support may be unreliable and unsustainable due to a number of factors, the present study sought to interrogate the development of m-learning in the face of unstable information and technological support at the Zimbabwe Open University.

2. Methodology

Instruments

The study used both quantitative and qualitative descriptive surveys that allowed the use of both closed and open-ended items (Hoepfl, 2009) soliciting information pertaining to current status of the existing mobile devices and challenges that might be impacting on the effectiveness and use of these devices by students and tutors. Unstructured interviews were also used to augment data gathered through questionnaires. The study focused on four m-learning devices namely the module, the compact disks, the laptop and the cell phone,

Population

The target population was all the returning students in the second semester of 2010 at Masvingo Regional Campus, Zimbabwe Open University.

Sample

A convenient sample of 120 returning students comprising 65 females and 55 males with a mean age of 31 years, participated in the study. Convenient sampling was preferred because the researcher chose to use subjects that were easily available (Siegle, 2002). Thus, the researcher took advantage of the returning students who were visiting the University for service-related activities pertaining to their studies. Each of the participants was assumed to be familiar with the use of a number of mobile devices that were arrayed as pedagogical strategies at the ZOU.

Procedures

As the participants called at the reception of the regional campus during the months of September to December, 2010, the research assistant, who was the receptionist at the time, asked the prospective subject to go through the researcher's office. In the office, explanation of the research objectives was

done after which consent was sought. Participants were asked to fill in the questionnaire on the spot. Unstructured interviews were used to ask participants about the effectiveness of the mobile devices and the challenges they (students) were facing in using the devices, as well as how best those facilities could be improved.

Data Analysis

Responses from closed items on the questionnaire were converted into percentages and those from open-ended items and from unstructured interviews were recorded and coded according to themes that emerged. Data was analysed according to these themes and findings and conclusions were arrived at.

3. Results and Discussion

The objective of the study was to re-examine the current status of the various m-learning devices used at the Zimbabwe Open University. This was done in the wake of the rapid development of the m-learning technologies which are already in use at the university. The following m-learning devices were assessed from the student perspective; use of the module; use of CDs; use of hand-held laptops and most of all the use of the cell phone.

The Use of the Module

When students were asked to rate the effectiveness of the module, responses indicated that generally, students were satisfied by the use of the module. Participants said that the module was informative, user-friendly and interactive because of the questions asked at the end of each unit. The majority of the students applauded the availability, accessibility and mobility of the module and commented that during these times when there is erratic inflow of electricity, the print media in the form of the module was the best. Even those students, who stay in urban areas where e-learning facilities can be found, indicated that they could not do without the module. Indeed Hawkrigge and Wheeler (2010) admitted that even if institutions have gone electric, they still have to rely on print media that can be carried anywhere and anytime by students who study at home.

When asked to indicate what they thought was the best advantage of the module over other forms of m-learning facilities, the respondents expressed the ease of carrying the module home and the flexibility involved in terms of time and space., that is, both synchronous and asynchronous elements (Lynch and Dembo,2004) are taken care of when one uses the module. The value of the module in enabling the reader to move forward and backwards without losing track and concentration, in addition to other advantages, was expressed by the following comments from students:

- I can move forward and backwards without loss of concentration.
- I can read the module any time, during the day, at night even in my bedroom
- Its easy to use the module during group discussion
- The questions asked at the end of a unit are very useful

With regards to challenges faced when using the module, the majority of the responses pointed to the fact that modules were expensive, making their fees go beyond what they could afford. At the ZOU, modules alone consume about one fifth of the total fees of the student and students interviewed said that it was rather too expensive considering that the majority of them are civil servants getting very low salaries by any standards. In some cases, particularly in newly introduced courses, modules may not be available and they singled out this to be the biggest challenge they were facing. When asked to indicate how the problem of cost can be solved or minimised, the following were the responses from the participants:

- University should purchase its own printing equipment instead of contracting.
- Students should be allowed to buy or borrow old modules from the alumni and

cost deducted on payment of fees,
Find cheaper material for printing.

Indeed currently, the university is trying to look for strategies of how best the cost of modules can be addressed. One way to ease the problem of cost is to stagger fees payment, that is, making students pay by instalments. The idea of the University procuring its own printing equipment is in the pipeline. Alumni can be incorporated in university activities and one of those strategies is to mobilise and re-engage the alumni so that they are ready to assist in sharing technological devices with the students.

The Use of CDs

At one stage the university popularised the use of the CDs to the extent of suggesting that it was going to replace the module. This study asked students to express their opinions on the effectiveness of using the CD's. Results showed that students were sceptical about the benefits accrued from using the CD's. Generally, indications were that the CD was cheaper on the part of administrators but not on the part of the students. Nevertheless, they liked the idea of ease of storage and access. On the whole, the disadvantages expressed outweighed the advantages. Students expressed dissatisfaction about the lack of electricity and the difficult and cost involved when downloading the material from the software into print. One big message was that if ODL was for all people regardless of where they are and times they need to study, then the use of CD's needed to be well supported by other technological appliances for it to be effective. For this reason they suggested that CDs should not be the main source of information delivery but should complement other m-learning devices.

The Hand-held Laptops-Nhava

The ZOU popularised the use of the laptops (Nhava) by first of all creating an opportunity for every tutor to have one. Students were impressed by the usefulness of the laptop especially that it is portable and could be carried anywhere in small bags. Even though the laptops use electricity students reported that the battery could go on working for almost three hours and this enable the students to use the laptop even in areas far away from sources of electricity. In areas connected to internet services students reported that they are enjoying internet services whereby they are now receiving communication from tutors through e-mailing. They are now sending enquiries about their assignments and study materials via the facility. However the biggest challenge about using the laptop is access and affordability. By the time this study was carried out only 5% of the students in the sample had the laptops. 80% said they could not afford purchasing the laptops and 15% were in the process of procuring the laptop. Apart from cost, students said even if they could afford to buy the laptops, 65% of them said they were staying in areas without electricity connections let alone internet services. Despite all these drawbacks, 30% of the sample said they were benefitting from the laptops through collaborative learning. This means that one student with the laptop could go and search information on the internet and carry this information back to colleagues for discussions.

Given this scenario, it shows that a number of factors are militating against the effectiveness of teaching and learning through the laptops. Students are not benefitting much because for m-learning to be effective, it requires a robust technological related support in terms of access to electricity, access to wireless and internet connectivity, as well as access to hardware, of which developing countries such as Zimbabwe are finding it difficult meeting the demands particularly in ensuring that at least every location is not very far away from the electric power supply.

Use of Mobile Phones or Cell Phones

In ODL, students are separated from the service provider by distance and therefore the very reason why every student should have a communication device that should maximise every possible opportunity available for communicating with the service providers. The mobile phone could be that device. This was confirmed by the results of the study which revealed that each of the participants in the study (100%) possessed a cell phone for purposes of social, business, and educational communications. When asked to

say why they preferred the cell phone to other mobile devices, students confirmed Motlik's observations (Motlik, 2008) that cell phone handsets and network lines included were abundantly available at the market, and reasonably cheaper compared with other devices. The small size of the cell phone handset makes it possible to be carried anywhere anytime (Sharples, 2000), thus fulfilling the essence of m-learning. In addition, cell phones deliver first hand information with speed and accuracy at least when network connectivity is normal.

Results also revealed that when compared with other interactions done through the cell phone, educational interactions were rated on average, 30% of the total interactions per any given time, business 5%, and social, 65%. These figures indicated that there was still room to capitalize the potential of cell phone usage for educational purposes and also take advantage of the intrinsic motivation of adult learners in wanting to communicate among themselves. When asked during the interviews why educational interactions were lower than social, interactions, 80% of the students revealed that they did not have contact numbers of the key consultants at the Regional campus who happen to be the Regional Campus Director, the Student Advisor, the Programme Coordinator and the Regional Administrator. This revelation was surprising because this was something taken for granted for years but impacting negatively on m-learning.

In terms of technical skills of operating the cell phone, it was pleasing to note that all the participants in the study had basic skills of operating the cell phone. Students said that they were able to record and save the data, to search information, to recharge the cell phone and to call and receive the information, and one needed very little effort to learn these skills once one had a phone. Nowadays, many cell phones have a multiplicity of functions and the extent to which these functions are explored depends on the technical skills of the user. Nevertheless, the basic skills are important because these are the ones that set the m-learning platform in motion.

For educational purposes, students indicated that they commonly use direct phoning and SMS text messaging for communication. The nature of the communication is commonly characterised by: asking about assignment dates and submission deadlines, information about dates and venues for weekend school tutorials, clarification on certain issues on assignment topics, courses on offer for that semester, issues about registration and fees payment procedures and also issues about the research studies and supervision. Students confirmed, as observed by Volta (2002) that SMS was cheaper and more convenient to them than other means of communication. In distance education, this communication is very important because if one misses deadlines, or examination dates, then one is delayed by a semester or by the whole year leading to the student dropping out of the system.

Challenges

The major challenges that are stifling m-learning through the use of mobile phones as indicated by the students are network connectivity and congestion on the network lines. 45% of the students indicated that they stay in areas which are difficult to get connected to a network. Zimbabwe has three service providers namely; Econet, Netone and Telecel. Despite effort made by these providers to connect every part of the country with at least one network, evidence on the ground shows that there are still vast areas still having difficulty in network connectivity and this hinders developments in m-learning. Even if one is in a networked area, the lines are often heavily congested and this slows down speed at which information is delivered. Several unsuccessful attempts in trying to phone will end up with the user giving up and eventually no longer interested in phoning. Lack of electricity and electricity power cuts for recharging their phone batteries were also indicated as major challenges.

Participants also indicated that the cost for pre-paid cell phone services limit the rate and time for which one would want to use the phone. To show concern about cost the following is the comment made by one of the participants:

Its a matter of prioritising whether to use a dollar for buying a loaf of bread for my kids or buy a recharge card for the cell phone.

The above statement emphasizes the problems bedevilling the cell phone users in developing nations such as Zimbabwe that eventually impact negatively on educational activities. Thus, in as much as m-learning can be considered to be a very important factor in distance education institutions in developing countries, a number of factors militate against the proper and effective use of mobile devices.

Students also lamented about the one-sided nature of communications. All the participants (100%) indicated that the bulk of the communications were from students to university authorities and not the other way round. Although the ZOU supports m-learning by providing its staff with cell phone allowances, cell phones have not been put on the same status with CDs and the module. This means cell phones have not been officially constituted as teaching and learning tools in the manner CDs and modules are. Therefore communication using cell phone from the university to the students is haphazard and not planned.

When asked to suggest solutions, the students suggested that notwithstanding all the challenges cited, it is high time that the university should initiate and send all important communications to the students through SMS text messages, for example, assignment due dates, dates for weekend school tutorials, and changes of time tables among other important issues concerning students. In this way communication is fast and it reaches many students at the same time.

4. Conclusion

The study highlighted issues pertaining to the use and development of m-learning at the ZOU. The study showed that m-learning devices, particularly the use of mobile phones are a very important component of distance education. Students benefit a great deal when they use mobile devices to enhance communication and for teaching and learning purposes. However, there are a number of factors that are slowing down the wheel of progress for m-learning development among which are poor network connectivity in some areas, lack of electrical infrastructure, and lack of initiative on the part of the university to make cell phone a teaching and learning tool. When looked from a distance, this scenario shows that m-learning is operating in an environment not well supported by a robust technological and social base and therefore until such time that the m-learning platform is well supported, can the ZOU and indeed institutions in developing countries realise full benefits of m-learning in the teaching and learning of distance learners.

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