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An evaluation into the implementation of Mobile Learning Models in Zimbabwe's Polytechnics. A case of Zimbabwe's Southern region

Pharaoh Chaka[1], Paul Kaufa[2], Hilton Chikwiriro[3]
[1]Computer Science Department Bindura University of Science Education, Zimbabwe, pchaka01@gmail.com
[2] Computer Science Department Bindura University of Science Education, Zimbabwe, hchikwiriro@gmail.com
[3]Computer Science Department Bindura University of Science Education, Zimbabwe, pkauf@gmail.com

ABSTRACT

The research was carried out to evaluate the implementation of Mobile Learning (M-Learning) Models in tertiary institutions in Zimbabwe's polytechnics a case of Gweru polytechnic. The thrust of the study was to ascertain the extent to which Mobile Learning Models are being used by both students and staff, assess the extent to which Mobile Learning models impact the learning and teaching experience and to ascertain the challenges being experienced in the implementation of Mobile Learning in enhancing teaching and learning in tertiary institutions like polytechnics in Zimbabwe. The study used a mixed research approach, thus exploratory and descriptive research designs were made use of. The estimated target population was four hundred and twenty five (425) which were made up of students, Lecturers and administrators. In this research questionnaires and observations were used to collect data. The results obtained are that students are aware of the existence of M-Learning applications even though they are not utilising some of the applications, students are not highly patronising M-Learning applications to the benefits thereof and implementation of M-Learning is riddled with many challenges such as lack of planning and limited infrastructure. As well as an imbibe of traditional teaching attitudes that discourage use of phones in the classrooms in general while Network administrators continue to block smartphones and other mobile devices from both internet infrastructures or computer laboratories in general.

Key words : M-Learning, mobile devices , internet , Polytechnic

1. INTRODUCTION

Investing in technological resources by Institutes of higher learning is plausible and progressive, However the return on such a move should be evident in a rich teaching and learning environment. Mobile learning (M-learning) is one of the many approaches which is being adopted by many institutions of higher learning in developing nations like Zimbabwe.

M-learning, can be defined as the delivery of learning experiences to students anytime and anywhere through the use of wireless Internet connectivity through mobile devices [16]. Mohamed (2007) [12] would describe mobile learning as the exploitation of ubiquitous handheld technologies, organised with wireless and mobile phone networks to enhance, facilitate, support, and extend the scope of teaching and learning. There seem to be a general observation that mobile learning devices must allow learning "on the go" which around to facilitate learning anytime and anywhere. Dabbagh [6] underscores that m-learning is enabled by the convergence of wireless networks, the internet and e-learning into a packaging referred to as a model that is deployable on mobile device platforms.

1.1. BACKGROUND OF THE STUDY

The Higher Examinations Council (HEXCO) is an examination board responsible for administration and oversight of technical and vocation subjects at a Tertiary level in Zimbabwe. It is directed in the Ministry of Higher and Tertiary Education Science and Technology Development (MHTESD). The Council is geographically distributed into Regions that are chaired by Principals of Polytechnics who in turn compose the National Board of Directors of the Council. The Regions are namely, Mashonaland, Manicaland, Midlands North, Midlands South, Masvingo and Matebeleland.

In turn the Midlands South is a Region of the council that has a number of Centres composed of High Schools, a Polytechnic and Vocational Colleges spanning the Ministry of Primary and Secondary Education (MPSE), Ministry of Higher and Tertiary Education, Science and Development as well as the Ministry of Youth and Women Empowerment respectively. The centres have free role to choose various media and models to use to bridge actual classroom contact times. In that respect Gweru Polytechnic becomes the epitome of the whole region. Not only from an administrative point of view but as a centre of both technology and academic prowess as it enrols

more students and offer a wide range of courses than all other centres. It need not be mentioned that education in a Technical and vocational framework is more hands on than it is theoretical. The system puts more weight to the psychomotor aspects of concepts towards accentuating technical skills. Howbeit with the wide spectrum of mobile learning models available in the market as well as to the disposal of individual lecturers, it is difficult if not impossible to ensure a common learning experience across the Polytechnics. Amiaya and Ranor (2015) [2] defined mobile learning as the delivery of learning and teaching applications on mobile devices such as tablets, mobile phones and Personal Digital Assistants (PDAs).

1.2. RESEARCH OBJECTIVES

1.2.1. Establish the extent to which Mobile Learning Models are being used by both students and staff;
1.2.2. Assess to what extent Mobile Learning models impact the learning and teaching experience;

2. LITERATURE REVIEW

2.0. THEORETICAL FRAMEWORK

Naismith et al (2005) reviewed mobile learning projects and applications to be falling under the umbrellas of behaviourist learning, collaborative learning, constructivist learning, informal learning and situated learning. Kukulska-Hulme and Traxler [15] concurs to the notion by maintaining that mobile technologies can back diverse learning and teaching styles, as well as lending themselves especially to situated, personalised, authentic and informal learning by so doing augment actual contact sessions. The pivotal point of the current research is on how students get to build these experiences in the current technological trend of mobile computing. Any modelling approach should be able to bridge between behaviourist and cognitive learning theories so as to foster attention, memory, and motivation concurs (Garland, Vince Garland, & Vasquez, 2013) [10].

The Social Learning Theory as propounded in Bandura, A. (1986), posits that students learn from one another, by way of observation, imitation, and modelling. Therefore Learning Models seize to be beneficial in prevailing classroom settings if they are not fully mobile. Albeit the Social Learning theory elevates collaborations and peer development of knowledge to the crux of the teaching and learning experience, explains (Dabbagh, 2005) [6].
In a Vocational and Technological context, learning cannot be relegated to the workshops and lecture rooms. However students should be able to readjust and assimilate psychomotor skills from a personally informed standpoint suggests, Belloni, A. (2005). This implies students should not only have access to the Learning models in a format executable on whatever gadget and platform they are using. But should also be able to manipulate concepts at their own pace and time as well as network with peers and tutors on the go Garland et al., 2013 [10].

Contrary to criticisms by some educators, constructivism does not dismiss the active role of the teacher or the value of expert knowledge. Constructivism modifies that role, so that teachers help students to construct knowledge rather than to reproduce a series of facts, argues Govaerts et al., [11]. The constructivist teacher provides tools such as problem-solving and inquiry-based learning activities that place students at the core of the learning experience. The constructivist students is thus equipped to formulate and test their ideas,

Constructive learning gives a learning experience that trains students to hypothesize, test theories, and ultimately draw conclusions from their experiences. Otherwise learning environments will just churn out students that regurgitate and recycle facts that have little application in their real world, also observes Dabbagh [6]. One can therefore appreciate that Mobile Learning models afford timeless opportunity for students to manipulate and experiment with skills and technology in the areas of their vocation adequately.

Critics say that constructivism and other "progressive" educational theories have been most successful with children from privileged backgrounds who are fortunate in having outstanding teachers, committed parents, and rich technology, [10]. They argue that disadvantaged children, lacking such resources, benefit more from more explicit instruction. However the trends in technology have reduced the price and accessibility of technology such that a rich learning environment can be simulated in any other third world context, reasons Mohamed [12].

However students are administrators and controllers of their own learning environment in the context of Mobile Learning models. It is typically impossible for student bullying as collaborators are selected by the students themselves and participation is also voluntary, Govaerts et al., [11] reasons as an attempt to thwart critics to this approach to learning. Mobile learning models thus jig saw with progressive teaching methodologies that campaign for participatory learning. They accord students with beyond timetabled slots to discover and construct their own learning experiences. Mobile learning models are thus a valuable vehicle to not only integrate students to a warehouse of knowledge but becomes a centre for the students to be innovative.

2.1. Mobile Learning Models concept

Amiaya and Ranor (2015) [2] defined mobile learning as the delivery of learning support of learning and teaching applications on mobile devices such as tablets, mobile phones and Personal Digital Assistants (PDAs). This is supported by Sarrab et al (2012) when they defined mobile learning as referring to the use of mobile and handheld IT devices, such as laptops, mobile telephones, PDAs and tablet PC technologies in training, learning and teaching. There seems

to be an agreement on the particular mobile learning gadgets that are involved in Mobile Learning (m- learning) amongst different authors. According to Litchfield et al (2007), m-learning is the facilitation of learning and access to educational materials for students using mobile devices via a wireless medium. Leung and Chan (2003) concurs by adding more flesh to the concept when they described mobile learning as the point at which electronic learning and mobile computing intersect to produce anytime, anywhere learning experience.

2.2. Forms in which m-Learning can be modeled

Kravcik et al. (2005) agrees with the line of thought by suggesting that intelligent educational systems can be partitioned into the following three, historically and architecturally distinctive classes;

2.2.1 Intelligent Tutoring Systems

An Intelligent Tutoring System (ITS) is an educational software containing an artificial intelligence component. The software tracks students' work, tailoring feedback and hints along the way. By collecting information on a particular student's performance, the software can make inferences about strengths and weaknesses, and can suggest additional work for student tutoring, (Foti, Drive, & Ave, 2014) [9]. The initial designs were completely server based without streaming capabilities. Chatti, Jarke, and Specht, [5] also cite that the developmental trends of ITs was towards self-contained mobile applications that cover specific subjects. The major drawback of such a framework is that they can only support a single user, without offering collaborative learning and online participation further, Kravcik et al. (2005).

2.2.2 Educational Hypermedia

It can thus be defined as all hypertext and hypermedia systems which reflect some features of the user in the learning model. These cover blogs, podcasts and wikis. Chatti, Jarke, & Specht, [5] further suggest that in educational hypermedia a variety of research work about questions on how to adapt curricula and learning content to individual differences as well as group dynamics is significant. However most scholars still feel that the prevailing models discussed are yet to be made compatible to mobile device platforms c.

Therefore as peer involvement is a significant element in the Constructivist student-centred learning framework, Hypermedia systems are also crucial in that they present content in multimedia details as Mohamed [12] also explains. This facilitates for student engagement with learning concepts not only in the audio-visual senses but also engages the psychomotor senses as data is presentable in audio, video, text, pictures and other graphical formats.

2.2.3 Web Based Systems

According to De Bra (2002), most adaptive educational Web-based systems can be classified as both ITS and AHS, strongly reflecting the hypertext nature of the Web. Typically, the domain of an adaptive educational Web-based system is represented by a hierarchy of concepts, and the learning model stores a numeric value for each concept in the hierarchy indicating to what extent the learner has mastered the topic, also explains Kravcik et al (2005).

The phenomena has continued to evolve as these facilities interface with Social networks and Cloud storage facilities [5]. To that end it is crucial that the model chosen be able to operate not only on mobile devices but be compatible with both the Android and iOS mobile operating systems. The extent to which the applied model infuse collaborations and student peer participation is also a high area of concern to the current study.

2.3. Impact of M-learning in teaching and learning.

Hussein and Cronje (2010) observed that mobile learning is spreading rapidly and likely to become one of the most efficient ways of delivering higher education instruction in the future. According to Amiaya and Ranor (2015) [2], electronic learning has provided the ability for traditional learning to break out of the classroom setting and for students to learn at home. [1] also highlights that the biggest advantage of mobile learning technologies is that they can be used anytime, anywhere and adopt mobile learning systems with the purpose of improving communication and enriching students' learning experiences while offering distance and open learning. Amiaya and Ranor (2015) [2], concurs by stressing that M-learning shares the same benefits with E-learning as well as affords the learner extra flexibility of studying at any time, anyhow and anywhere with the use of portable wireless technologies.

Mobile learning is said to provide good support to micro-learning, an effective and new way of individual learning. They furthermore observed that people can learn more effectively if ‘information’ was broken down into smaller, more easy-to-comprehend units. Amiaya and Ranor (2015) [2] also recognises that mobile learning technology enables the learner to take advantage of short breaks such as lunch times to beef up on their content knowledge while taking advantage of free cloud storage. M-learning systems should enable users to choose what they want to learn, control their learning progress, and record their learning progress and performance [16]. M-learning supports the much advocated for interactive learning which embraces the proposals of major educational theorist spanning both constructivism and behaviourism. Kukulska-Hulme and Traxler [15] concurs by maintaining that mobile technologies can back diverse learning and teaching styles, as well as

lending themselves especially to situated, personalised, authentic and informal learning. Points of view that are indispensable in a TVET set up especially in response to Science, Technology, Engineering and Maths orientation demands.

2.4. Challenges experienced in the operationalization of M-learning.

Amiaya and Ranor (2015) [2], highlighted that the implementation of mobile learning was not identical in all the countries due to disparities in the availability of infrastructure, level of awareness of the technology, the expertise in the new technology as well as the complacence of the users to implement and use the technology. This seem to be supported by Stockwell (2010) who highlighted that pedagogical, technological, psychological and or even environmental barriers usually prevent learners from choosing mobile devices such as smartphones for learning activities meant to develop vocabulary, regardless of having a positive opinion of mobile learning. Typical challenges are therefore analysed in the following passages.

2.5. Lack of training in the usage of mobile learning models

According to Foulger et al (2013), mobile learning should be meaningfully integrated into all teacher education courses and not only in technology courses. Integration of mobile devices is also supported by Herro et al (2013) who underscored that limited and unclear best practices concerning preparation of teachers is a definite barrier for the integration of mobile devices. One chief critical challenge identified concerning integration of mobile learning into in-service teacher education is the barring of cell phone use within the actual classroom. The conditioning also influence the teachers' attitudes towards mobile learning usage in their own classes or inhibit them from creating any efforts towards encouraging their own students to take advantage of the power of smartphones in the actual learning experience (Ismail et al, 2013).

Husbye and Elsener (2013) observed that teacher educators had noted that mobile devices should be provided to pre-service teachers to ensure digital equity. Baran [3], highlighted that the accessibility of mobile devices is another challenge. Mobile learning to be successfully implemented, all in-service and pre-service teachers should have access to mobile devices as a component of their training (Gado et al, 2006; Cushing, 2011; McCaughtry and Dillon, 2008). Lack of expertise integrating mobile technologies was a challenge to effective integration of mobile learning in teacher education (Valtonen et al, 2011; Foulger et al, 2013). They seem to be an agreement that lack of expertise by teachers was hindering effective integration of mobile devices in teaching and learning. Husbye and Elsener (2013) seem to support this position by suggesting that mobile technologies should be used as tools for improving pre-service teachers' experiences and not just an accompanying integration of technology for its own sake.

2.6. Curriculum challenge

If mobile tools are to be integrated effectively into classrooms, curricular issues also need to be taken into consideration [3]. This is supported by Price et al (2014) who noted that pre-service teacher' ideas about integration into science classes could be supported by teacher education programs, but their implementation into an incompatible and non-existing curriculum is clearly an obstacle. Looi et al (2014) discovered that there was limited research on the examination of teachers' curricular based applications of mobile devices and learning. There was limited research informing the use of such tools (mobile devices) in higher education (Kessler, 2012). Dabbagh, 2005 [6] seems to be of the same opinion when he propounds that teaching and learning is buttressed in the principle of creating the appropriate environment for modelling correct skills, attitudes and reasoning as students assimilate new experiences. Therefore in general terms there is a curricula gap in providing for the use of mobile technology across the economic divide.

2.7. Compatibility challenge

The effective development and design of mobile learning experiences and applications, their evaluation are still essential activities where specialist expertise, initiatives and insights of teachers and learners have significant roles to play [15]. El-Hussein and Cronje [8] cited that the undertaking of designing activities and suitable learner support is challenging and complex. Guralnich (2008) suggests that the designer would be better served if they considered the entire learning or teaching context in which learners will use particular m-learning models. However, current designers are often criticised for borrowing design ideas from their e-learning experience (El-Hussein and Cronje 2010) [8]. El-Hussein and Cronje [8] observed that the success of mobile learning depends on the designers' ability to apply the suitable forms of instruction that will make this mode of learning an essential tool in the delivery of TVET education. According to Sarrab et al (2012), both students and teachers require a handy and proper system to interact with each other and aid the teaching and learning environment. Therefore the design of the mobile learning model is a crucial factor in the success of such an implementation.

2.8. Limited access

Motiwalla (2007) states that although it is unavoidable that m-learning will soon emerge as an important extension of e-learning however the change will not occur overnight. This is acknowledged by El-Hussein and Cronje [8] who highlighted that immediate access to learning in many places and at any time will visibly be very beneficial to learners, however, only to a privileged few up and until wireless

technology turn out to be widely available and more efficient. Internet connectivity and the cost of data bundles remain a crucial inhibition to the full realisation of the implementation of mobile learning models.

2.9. Lack of interest

Banks (2008) cited that most of the things we are observing today, thus generally out of the classroom but increasingly in it were technology driven, but this technology is not universally accessible to all. Despite the significance of mobile wireless technological devices as the only provider or as an additional provider of technology education in the near future, there are still those who refuse to recognise the potential of this emerging form of educational delivery (El-Hussein and Cronje, 2010) [8]. To generate an interest Wang et al [4] recommended that M-learning providers must enhance the user friendliness and ease of use of m-learning systems in order to attract more users to use m-learning. Furthermore, Wang et al [4] highlighted that the success of m-learning may depend on whether or not students and lecturers alike are willing to adopt the new technology that is different from what they have used in the past.

2.10. Technical limitations

Additional technical barriers included low bandwidth on wireless networks, insufficient memory capacities, small screen size, and limited software (Newhouse et al, 2006; Franklin et al, 2007). This is also captured by Motiwalla (2007) who argued that the opportunities being provided by m-learning are new, yet there are many challenges facing m-learning, such as small screen sizes, connectivity, restricted input capabilities and limited processing power. This is confirmed by Wang et al [4] who noted that regardless of the remarkable growth and potential of the mobile devices and networks, m-learning and wireless e-learning are still in their embryonic stage or infancy.

2.11. Attitudes of lecturers and students towards mobile learning

Osang et al [13] cited that one important issue that will determine the success of the implementation of mobile learning models usage of the technology for teaching and learning is the learners or teachers readiness and acceptance to use the new technology. Osang et al [13] highlighted that most studies had revealed that the students were not necessarily prepared to fully embrace the mobile space for their coursework but rather usually spent time on the internet for listening to music, instant messaging as well as other social networking activities.

Amiaya and Ranor (2015) [2], argued that whether or not mobile learning was to be adopted and sustained by students or lecturers would greatly rest on how efficient and necessary they consider the features and services. According to Kim et al [14], many students and teachers resist change in teaching and learning with new technology because they do not think of themselves as part of a new learning culture. In addition, technology-oriented trainings and resources may not meet the needs of individuals in understanding the nature of learning. Teachers even though accepting the benefits of mobile learning have raised many concerns about possible ethical issues such as privacy, cyber-bullying, sharing classroom experiences and artefacts, archiving and record keeping, parental and student informed consent as well as e-safety (Cushing, 2011; Aubusson et al, 2009). Kim et al [14] asserts that if future teachers have positive experiences using mobile technologies while they are students, they will be more likely to use those mobile technologies when they become classroom teachers.

3 RESEARCH DESIGN

Both exploratory and descriptive research design were used in carrying out the study under hand. Exploratory research design was used which enabled the researchers to obtain an in-depth understanding of the topic under study, whilst the descriptive research design assisted the researchers to draw certain magnitudes of a relationship in the general population.

3.1 THE RESEARCH POPULATION

The study at hand involved all members of the IST Department at Gweru Polytechnic composed of National certificate and diploma students and Administrators from the three Sections that compose the Department. The estimated population size was one hundred and seventy three (163). The estimated sample population is represented by table 3.1 below;

Table 3.1: population of the study

Description	Population size
Students	160
Administrators	3
Lecturers	7
Total	**170**

3.1.1 Sample Size

As the intended Specialist consumers of any Mobile Learning model implemented at Gweru Polytechnic, Lecturers in the IST department are principal in triangulating the data acquired from the students. To that end, observing the members in action is crucial to act as a validation and verification process of the data acquired from the students' questionnaires. The table below aims to detail the research sample;

Table 1.2 Sample size

Description	Population size	Sample Size
Students	160	45
Lecturers	7	3
Administrators	3	2
Total	**170**	**50**

3.2 DATA GATHERING TECHNIQUES

A research instrument is defined as any tool and strategy used to collect information and data required to reach meaningful conclusions to solve problems, [3]. The researchers settled for surveys and observation.

An opportunity was presented to students to fill in questionnaires freely at their own pace and convenience. Both close-ended and open-ended questions were included in the questionnaire. Personal interviews were conducted to Lecturers and Administrators in the IST department. Interviews went a long way to afford comprehensive data to the research pertaining the various metrics affecting the implementation of Mobile Learning Models at Polytechnics. The researchers personally observed the student fraternity as they engaged in personal studies, group discussions as well researches for various assignments on the use of Mobile Learning Models. Observations were also done on targeted Lecturers as they applied themselves in their day to day activities in the Polytechnic. Deliberate attention was given to their attitudes and demand for students to adopt the various Models they were implementing for the Subjects they taught. It is important to note that various models offer inbuilt Audit-trail reports that were also analysed to observe use, update and participatory rates not only from Lecturers but among peer students. Microsoft Excel and SPSS to tabulate and analyse the data collected.

4.0 RESULTS

4.1 RESPONSE RATE

The point of departure for this analysis is to ascertain the response rate of respondents to the questionnaire which were administered to students. Ta below presents the findings.

Table 4.1 Table showing Response rate

Respondents	No of administered questionnaire	No of returned questionnaire	Percentage of respondents
Students	45	35	77.8%

4.2 The extent to which M-learning models are used in enhancing teaching and learning.

4.2.1 Awareness of students on M-learning models.

The study sought to ascertain the extent to which students are conversant of Mobile Learning Models in teaching and learning. The following table present the responses to the question.

Table 4.2 Students' awareness of M-learning

Response	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Whether students are aware of M-learning models	28	80%	7	20%

Table 4.2 above shows responses on the awareness of students to the existence of M-Learning models. Out of the thirty five (35) students, 80% of the students said YES whilst 20% said NO. The responses imply that a high population of the respondents are aware about the existence of Mobile learning Models.

4.2.2 Availability of mobile devices

The study sought to determine whether students have access to mobile devices to facilitate the use of M-Learning models in enhancing teaching and learning. The findings from respondents are shown by table 4.3 below.

Table 4.3 Students' access to mobile devices

Response	Frequency	Percentage
Smartphone	32	91.4 %
Laptop	25	71.4 %
Tablet	6	17.1 %
IPad	3	8.6 %

Table 4.3 shows responses on the accessibility of mobile learning devices to students. Out of the thirty five (35) students, ninety one point four (91.4 %) have access to smartphones whilst seventy one point four (71.4%) of the students had access to a laptop. A significant seventeen point one percent (17.1%) own tablets and eight point six percent (8.6 %) do possess an IPad.

The findings imply that a greater number of the students with a frequency of 91.4% depend widely on their smartphones. This is followed by 71.4% of the students with access to laptops in accessing mobile learning products or solutions. The variance can be attributed to the fact that smartphones are

generally cheaper as compared to laptops. With the proliferation of local brands such as from Astro, GTel and Econet accessibility to smartphones is significantly improving.

A lower spread of tablets with a frequency of 17.1% as well as IPads with 2.8% cannot be disregarded. This as can be noted from the cumulative frequency infer that respondents have access to a variety of mobile device options. The findings are confirmed by Wang et al [4] who noted that regardless of the remarkable growth and potential of the mobile devices and networks, m-learning and wireless e-learning are still in their embryonic stage.

4.2.3 Usage of M-Learning models in the IST Department of Gweru Polytechnic

The study sought to ascertain the M-Learning models which were being used by students in their learning. Table 4.4 below represents the findings.

Table 4.4 Models used by the Students

Response	Frequency	Percentage
Google Android Subject App	16	45.7%
Gweru Polytechnic Classroom App	25	71.4%
Gweru Polytechnic Website LMS	18	51.4%
Other	3	8.6%

Table 4.4 shows the type of M-Learning models being used by students in their learning. Out of the thirty five (35) students as well as options availed to them, forty five percent (45%) of the students purport to have downloaded a subject specific Application from the Google store for their Smartphone. While seventy one point four percent (71.4%) report that they have joined an online Class run by Gweru Polytechnic from the Google Classroom Platform. Whereas fifty one point four percent (51.4%) claim to have visited the e-learning Platform from Gweru Polytechnic website. While the eight point six percent (8.6%) may represent students that use iOS compatible devices and thus may not have accessed the android driven models.

It can thus be inferred from the findings that although most students may own a smartphone they are not taking full advantage of it to enhance their learning as noted from the percentage using Subject specific Google Apps. However a higher frequency of 71.4% report the use of the Gweru Polytechnic administered Classroom Google App as compared to the Institution's own web based e-learning platform. This finding confirms argument by Motiwalla (2007) that even though it is unavoidable that m-learning will soon emerge as an important extension of e-learning however the change will not occur overnight. It has also been argued by authorities that the effectiveness of any learning model requires promotion by building intrinsic motivation through the availing helpful and relevant resources on the platform that go a long way to foster use and reuse of the learning models by students [1].

4.2.4 The rate of usage of M-Learning models.

The study sought to determine the rate at which mobile learning models are being utilised by students in their learning. The findings obtained are represented by Fig 4.1 below.

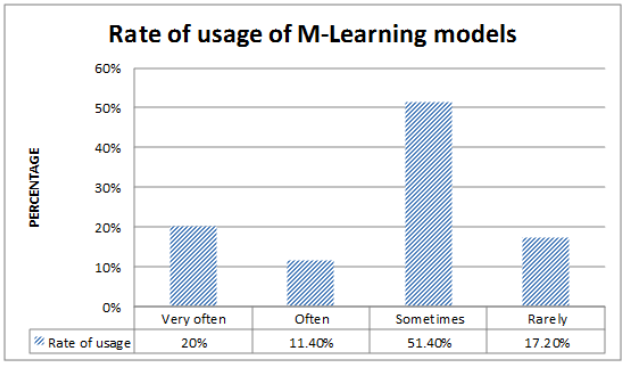

Figure 4.1 Graph Showing rate of usage of M - Learning Models

Figure 4.1 above, shows the rate at which students make use of mobile learning models in their studies. Out of the thirty five (35) respondents, twenty percent (20%) accessed mobile learning applications very often, eleven point four percent (11.4%) accessed them often, whereas fifty one four percent (51.4%) make use of the mobile learning models some of the times while seventeen point two (17.2%) rarely accessed mobile learning applications. The findings imply that there is generally low uptake in the usage of M-learning models in learning by the students despite of the abundance in mobile devices. REVISIT

4.3 Ascertaining the impact of M-Learning models in the teaching and learning.

4.3.1 M-learning allow students to revisit concepts at their own time

The study sought to find out the extent that students revisit learnt concepts at their own time and space through mobile learning applications. Fig 4.2 below represents the findings.

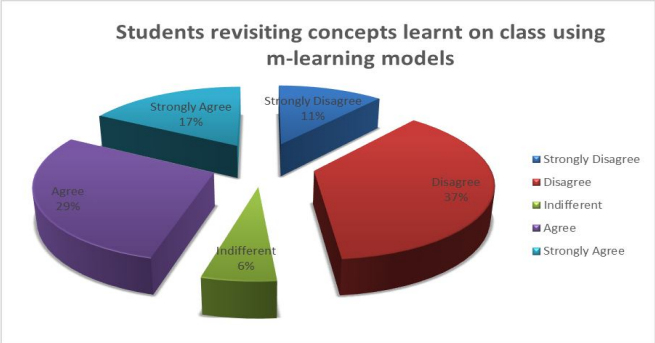

Figure 4.2 Pie chart showing Responses if Students use the models to revisit learnt Concepts

Fig 4.2 show the responses on whether students are using M-Learning models to revisit learnt concepts. Out of the thirty five (35) respondents, eleven point four percent (11.4%) strongly disagreed, thirty seven point one percent (37.1%) disagreed, five point seven percent (5.7%) were indifferent whilst twenty eight point six percent (28.6%) agreed and seventeen point one percent (17.1%) strongly agreed that they were using M-Learning application to revisit and research on learnt concepts.

It can therefore be inferred from the findings that the majority of the students do not see the need to revisit the m- learning models for revision and reinforce of learnt concepts. This contrary to popular thought that technology can bridge and enhance contact sessions, Foti et al., 2014 [9] leaves the teaching and learning environment in the IST department largely traditional and teacher centred. While the few students that have been making use of the models compose an insignificant seventeen percent. REVISIT

4.3.2 M-Learning promoting collaboration and peer tutoring amongst students

The research meant to discover also the extent to which the students rate M-Learning applications in terms of their contribution to collaborative learning and peer tutoring. The findings from respondents are shown by the table 4.5 below.

Table 4.5 Shows student's opinion on whether m - learning encourages peer and collaborative Learning

Response	Frequency	Percentage
Strongly disagree	3	8.5%
Disagree	11	31.4%
Indifferent	16	45.7%
Agree	5	14.3%
Strongly agree	0	0%

Table 4.5 shows responses on the extent to which M-Learning models contributing to collaborative and peer tutoring in enhancing their learning. Out of the thirty five (35) respondents, eight point five percent (8.5%) strongly disagreed, while thirty one point four percent (31.4%) disagreed. A significant forty five point seven percent (45.7%) were indifferent as compared to only fourteen point three percent (14.3%) of the students agreeing that M-Learning applications were promoting collaborative learning and peer tutoring. This finding imply that a cumulative eighty five point seven percent (85.7%) of students have not realised the benefits of collaborative learning and peer tutoring which are credited with the use of M-Learning applications in teaching and learning as alluded to by Dias et al., [7]

4.3.3 M-Learning as a platform for further tutoring

The study sought to ascertain the extent to which Mobile learning applications are contributing towards further tutoring in enhancing teaching and learning. The table 4.6 below represents the findings from respondents.

Table 4.6 Showing responses on whether M - Learning models promote further tutoring

Response	Frequency	Percentage
Strongly disagree	9	25.7%
Disagree	11	31.4%
Indifferent	3	8.6%
Agree	8	22.9%
Strongly agree	4	11.4%

Table 4.6 shows responses on the extent respondents perceive the M-Learning applications to be promoting further tutoring in enhancing their learning. Out of thirty five (35) respondents, 25.7% strongly disagreed, 31.4% disagreed, 8.6% were indifferent and 22.9% agreed whilst 11.4% strongly agreed that M-Learning applications were providing further tutoring to students. This finding seem to infer that M-Learning applications are not widely being used by students as platform for further tutoring in the teaching and learning.

4.4 Challenges experienced in implementing M-Learning applications in teaching and learning.

4.4.1 Challenges in the use of M-Learning models in teaching and learning.

The study sought to establish the challenges militating against the effective use of M-Learning in the teaching and learning process in the IST Department. Table 4.7 below presents the responses of the students,

Table 4.7 Shows the Challenge experienced in using the M -learning models

Response	Frequency	Percentage
Poor network connection	26	74.3%
Lack of access to mobile devices	4	11.4%
Limited device power	19	54.3%
Incompatibility of devices and M-learning applications	11	31.4%
Content uploaded being less useful	21	60%
The applications being	7	20%

complicated to use		
Too little content uploaded	25	71.4%

Table 4.7 shows responses on the potential challenges existing at Gweru Polytechnic which might militate against effective use of M-learning applications. Out of thirty five (35) respondents, seventy four pint three percent (74.3%) of the respondents cited that they faced poor network connection, eleven point four percent (11.4%) cited the lack of mobile devices, while fifty four point three percent (54.3%) identify limited device power of the Smartphones as a challenge.

Thirty one point four percent (31.4%) cited incompatibility of devices to the m-learning models, while sixty percent (60%) of the students felt that the content uploaded on the models to be less useful and relevant to their learning needs. Twenty percent (20%) view the applications to be complicated to use whilst a very large fraction of the students of up to seventy one point four percent (71.4%) cited that too little to no content was being uploaded on some of the m-learning models. These findings are graphically presented below;

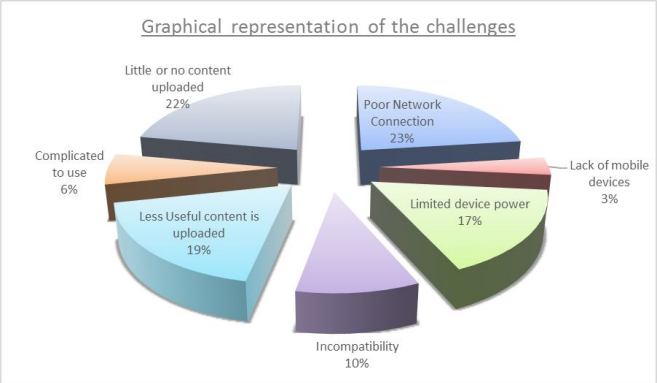

Figure 4.3 Shows responses to the Potential Challenges faced in using M- Learning models

The finding reveal that the chief challenges noted include poor network connection with 74.3% and too little content uploaded with 71.4%. The findings also show that limited device power and content uploaded being less useful are some of the noted challenges with 54.3% and 60% respectively. As established from Garland et al., [10] users of mobile learning models make use of he consistently such that content becomes stale more frequently than on other platforms. It is also noted that both Lecturers and Web administrators should follow up classroom contact sessions and evaluations by providing immediate interventions to learning difficulties in the models by so doing the relevancy of the content can be related to classroom experiences.

4.4.2 Lecturers encouraging use of M-Learning applications

The study also sought to ascertain the extent to which lecturers were encouraging pupils to use M-Learning applications in their learning. The responses from respondents are shown in Chart below;

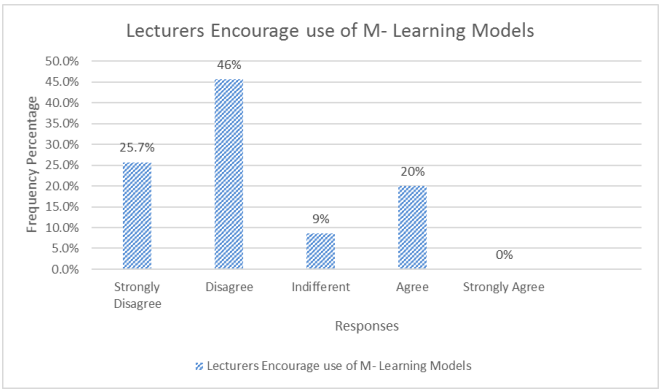

Figure 4.4 Graph showing responses to Whether Lecturers encourage use of M-Learning Models

Figure 4.5 shows responses on the extent to which respondents perceive their lecturers to be encouraging the use of M-Learning applications in enhancing teaching and learning. Out of thirty five (35) respondents, twenty five point seven percent (25.7%) strongly disagreed, forty five point seven percent (45.7%) disagreed, with eight point six percent (8.6%) being indifferent whilst just twenty percent (20%) felt that their lecturers were encouraging the use of M-Learning models by the students in their learning as well as teaching. This finding implies that a total of eighty percent (80%) of the students felt that their Lecturers were not doing much as to encourage the use of the M-Learning models in the teaching and learning environment. This validates Kim et al [14] proposals that the lecturers will encourage their students to traverse routes they have travelled themselves. It is therefore crucial to ensure that the Lecturers themselves become users of the m-learning models so that they can spur their students intrinsically from their own experiences, (Dias et al., 2008) [7].

4.4.3 Provision of training and technical support in the use of M-Learning applications.

The study also sought to determine the extent to which training and technical support was being provided to students to ensure effective use of M-Learning applications. Table 4.9 below represented the findings.

Table 2.8 Showing the Responses on whether adequate training and technical support was provided

Responses	Frequency	Percentage
Strongly disagree	19	54.3%
Disagree	9	25.7%
Indifferent	0	0%
Agree	3	8.6%
Strongly agree	4	11.4%

Table 4.8 shows responses on the extent respondents perceive the institution to be providing the much needed training and technical support in capacitating students to use M-Learning applications in enhancing their learning. Out of thirty five (35) respondents, 54.3% strongly disagreed, 25.7% disagreed, whilst 14.3% agreed and 11.4% strongly agreed that training and technical support is being instituted to allow students to effective use M-Learning applications.

This finding imply that 80% of the students perceive Gweru Polytechnic to be lacking training and provision of technical support to facilitate for easy usage of mobile devices and M-Learning applications in enhancing teaching and learning. The finding concurs with contribution by Osang et al [13] when they suggest that the attitudes of both students and lecturers are shaped by their adeptness in the use and easy of navigating around the model, otherwise it grows into a white elephant.

4.4.4 Availability of infrastructure

The research was also meant to establish the extent to which students rate the level of infrastructure availability to facilitate for the usage of M-Learning applications. The findings are represented by the table 4.10 below.

Table 4.9 Showing responses on the availability of Infrastructure to back M – Learning

Responses	Frequency	Percentage
Strongly disagree	12	34.3%
Disagree	15	42.8%
Indifferent	3	8.6%
Agree	3	8.6%
Strongly agree	2	5.7%

Table 4.9 shows responses on the extent respondents rate the availability of infrastructure to support M-Learning models in enhancing the teaching and learning environment in the IST Department. Out of thirty five (35) respondents, thirty four point three percent (34.3%) strongly disagreed, while forty two point eight percent (42.8%) disagreed. The same percentage of eight point six (8.6%) were both indifferent and agreed that infrastructure was availed. Whilst only five point seven percent (5.7%) strongly agreed that infrastructure was adequate to support M-Learning applications.

This finding reveals that seventy seven point one percent (77.1%) of the respondents as compared to a mere fourteen point three percent (14.3%) considers available infrastructure to be inadequate to effectively support M-Learning models in enhancing teaching and learning. It has been outlined that internet connectivity and student freedom controls in the lectures can reach inhibition points that militate against use of mobile learning models, (El-hussein & Cronje,) [8]. Therefore administrators should begin to support a variety of mobile devices while lecturers should stop shutting down the devices in the lectures but encourage the students to make effective and relevant use of the mobile devices as part of the teaching and learning process, (Foti et al., 2014) [9].

4.5 Measures to enhance teaching and learning through M-Learning application.

4.5.1 Need for training.

The study aimed to ascertain the extent to which students perceive training was significant in enhancing teaching and learning through M-Learning. The findings from respondents is shown by table 4.10 below.

Table 4.10 Showing responses on the need to conduct training to enhance use of M-Learning models

Responses	Frequency
Strongly disagree	1
Disagree	2
Indifferent	0
Agree	14
Strongly agree	18

Table 4.10 shows responses on the extent to which respondents perceive the need for training in the usage of M-Learning applications. The responses are summarised in the chart below;

From the graphical representation it can be deduced that a total of ninety one point four percent (91.4%) of the respondents value training as instrumental in ensuring effective utilisation of M-Learning applications in enhancing teaching and learning in comparison to a flimsy eight point six percent. This concurs with the idea that both designers and users of the models should reach an operational breaking point. A midpoint that can only be reached through training of all stakeholders involved, [11].

4.5.2 Collaboration between users and designers of M-Learning applications.

The study also ascertain the extent to which respondents value the involvement of the consumers of M-Learning applications in designing them. The responses of respondents are represented by table 4.11 below.

Table 4.11 Showing respondents' perception on the need to involve users in the design and implementation process

Responses	Frequency	Percentage
Strongly disagree	0	0%
Disagree	0	0%
Indifferent	1	2.9%
Agree	13	37.1%
Strongly agree	21	60%

Table 4.11 shows responses on the extent respondents embrace the need to involve users in the design and implementation of M-Learning models. Out of thirty five (35) respondents, two point nine percent (2.9%) were indifferent whilst thirty seven point one percent (37.1%) agreed and sixty percent (60%) strongly agreed that users should be involved in the design and implementation of M-Learning models so that they are compatible with their learning needs.

This finding of ninety seven point one percent (97.1%) of the respondents agreeing to the involvement of users infer that all stakeholders must be involved in the designing of M-Learning applications. This is supported by Govaerts et al., [11] when he suggests that students tend to ignore any system impose on them, but usage of a model should grow inherently.

4.5.3 Enhancing internet connectivity.

The research also sought to determine the extent to which respondents perceive the need to increase internet connectivity. Table 4.12 below provided the findings from respondents.

Table 3.12 Showing Responses on whether internet connectivity should be enhanced

Responses	Frequency	Percentage
Strongly disagree	0	0%
Disagree	0	0%
Indifferent	2	5.7%
Agree	7	20%
Strongly agree	26	74.3

Table 4.12 shows responses on the extent to which respondents perceive the need to increase internet connectivity in augmenting M-Learning applications. Out of thirty five (35) respondents, five point seven (5.7%) were indifferent, while twenty percent (20%) agreed with seventy four point three percent (74.3%) strongly agreeing that there was need to increase internet connectivity to support M-Learning applications.

This finding imply that ninety four point three percent (94.3%) support the increase in internet connectivity in a bid to increase access to M-Learning applications so as to enhance teaching and learning. This concurs with wide observations that most Institutions are reluctant to support Smartphones and other mobile devices besides laptops, Dabbagh, [6]. While most lecturers even instruct students to turn off their smartphones during lectures, (Foti et al., 2014) [9].

4.5.4 Need to educate students on the benefits of M-Learning applications.

The study also sought to ascertain the extent to which respondents rate the need to educate students on the benefits of using M-Learning applications in a bid to enhance teaching and learning. The findings from respondents are represented by the chart below

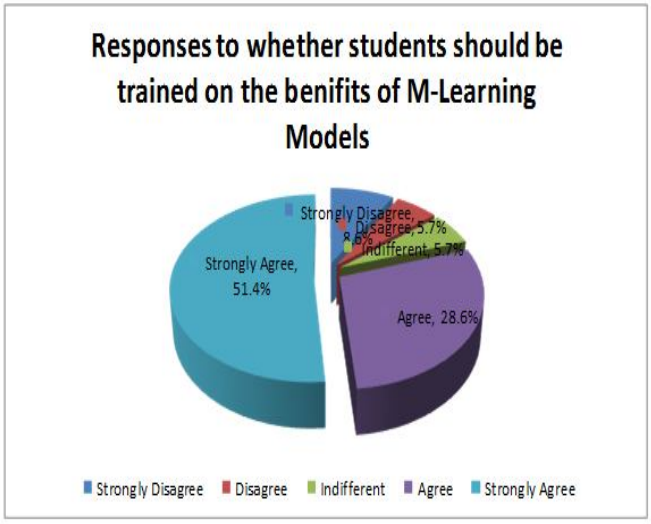

Figure 4.5 Pie Chart Showing respondents perception on whether students should be trained on the benefits of mobile learning models

Figure 4.5 above shows responses on the extent to which respondents rate the need to educate students on the benefits of M-Learning application in bid to encourage pupils to patronize M-Learning to enhancing their learning. Out of thirty five (35) respondents, eight point six percent (8.6%) strongly disagreed, while the same frequency of five point seven percent (5.7%) disagreed as well as were indifferent whilst 28.6% agreed and 51.4% strongly agreed that students be educated on the benefits of M-Learning applications.

This finding reveal that a total of seventy nine percent (79%) of respondents' support the need to educate them on the benefits of M-Learning applications in teaching and learning so that students can widely adopt and use them to enhance their learning. Kim et al, [14] propounds that without realising the benefits students will adopt the models very late. It is only by maximising the beneficiation levels of a model that the targeted users may buy into it faster and more comfortably, [14]

5.0 CONCLUSIONS

This research showed that users are an inherent part of the design and implementation process of any successful M-Learning model. In that respect there should not only be involved but infrastructure should be put in place to support the mobile devices they are using, while policies should be made enabling to allow students to use not only their laptops but any other mobile devices to access learning content not only after but also during the learning and teaching process. It was also concluded that Gweru Polytechnic needs to do more in the form of training of both students and lecturers so that the benefits of mobile learning models can be realised through the improved usage rates of the models only then can be the investment made in the implementation of these models can be justified. The research also opened gap to inquire more on the limitations of mobile learning models as a mode of teaching and learning, as well as the innovation of low storage models that are implementable across mobile devices.

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