Enhancing Teaching and Learning at the University of Venda Utilising Digital Mobile Devices

Ratchel Chikurunhe
Business Information Systems Department,
School of Management Sciences, University of Venda,
South Africa.
rchikurunhe@gmail.com

Armstrong Kadyamatimba
Business Information Systems Department,
School of Management Sciences, University of Venda, South Africa
kadya@univen.ac.za

***Abstract*-The University of Venda(Univen) distributed tablets to students for facilitating and enhancing their studies. However, the provision of tablet PCs to students may not be a panacea for quality learning, especially to technological disadvantaged rural student population. The aim of study was to investigate the use of digital mobile devices for enhancing teaching and learning at the Univen. The research questions focused on determining the current level of use of mobile devices, how they can be used effectively for teaching and learning. Mixed methods approach was applied with data being solicited from a convenient sample of students, lecturers and an IT technician. The results of the study indicated that many students and lecturers are active and have higher perceptions of mobile devices usage. The results of the study are to be used to explicate and advance the integration of the mobile devices for promoting learning and teaching accomplishments. The findings clearly showed that mobile devices have a positive impact on the academic experience. The results also indicate that there is a gradual acceptance of the Learners Management Systems (Blackboard) by both academics and students. The digital mobile devices are eventually enhancing teaching and learning at Univen.**

Key words: **Teaching and Learning, Digital Mobile Devices, Mobile Technologies**

I. INTRODUCTION

Mobile devices are becoming ubiquitous, inexpensive and are within reach of many people in the world today. New and advanced value-added functions have been introduced within these devices. The variety of these advanced functions, results in the improved device user-friendliness to the extent that there is creation of opportunities to offer learning support anywhere, at any time. The rate of students owning these multifunctional mobile devices is exponentially growing [13]. Other developments in wireless communication networks namely the 4G/data card, Wi-Fi, and Long Term Evolution (LTE) further extend the prospect of supporting education for mobile technology users [16]. Wong and Looi [22] stated the advantages mobile technologies such as portable computers, smart phones, or personal digital assistants in Higher Education Institutions (HEI) have on learning activities. Mobile devices were found to have the potential to help teachers understand and develop new literacies, engaging in rich language learning contexts and exploring physical education [1].

According to [23], smartphones emerged as hybrids of mobile phones and brought superb connectivity features, a variety of hardware collection and software-based functionality. Tablets then burst into the market after the release of the first Apple iPad in March 2010 [9]. Martin and Ertzberger [14] explained the tablet PC and smartphone features regarding their relevance to mobile learning. According to [18], tablet PC comes with high powered operating system, variety of design which features various screen shapes, sizes, quality resolutions and various weight which are towards to weightless. Komado[11] explains some of the features of a smartphone such as long battery life, warp-speed processing from powerful micro-processors, quality connectivity and messaging [12].

II. MOBILE LEARNING

The definitions of mobile learning emphasize mobility in learning[1] and also emphasizes on access and situativity[5]. Mobile learning allows academics and learners' global and seamless access to information. It also enables convenience, suitability, and immediacy which are valued by students and teachers and enhances students' learning [1]. Cheon et al., [5] indicated that mobile learning provides chances for individualized, situated, concerted, and informal learning without being restricted to classroom contexts.

A. Infusion of Mobile Devices in Rural Universities

Most research done focused more on urban universities' use of mobile phones to support teaching and learning ([6]; [17]; [19]). While use of it in teaching and learning is a welcome development, this has not come without challenges [15]. Research indicates that different countries and organisations have experienced different perceptions, opportunities and challenges in the adoption of it in their teaching and learning service provisions ([8]; [15]; [24]). The case study of this research is Univen. In 2015, Univen distributing tablets to more than 13 000 students with the aim of enhancing the quality of teaching and learning.

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B. Problem Statement

In South Africa's higher education system, which has both urban and rural components, formally disadvantaged and privileged universities, the use of IT in teaching and learning has its own problems when it comes to infrastructure development and IT skills. Although the Univen had adopted the technology, the question was whether there is the necessary infrastructure to support its uptake? Are the students using the applications for learning? The study, therefore, investigated the prevailing levels of utilisation of mobile technology in teaching and learning at the Univen, the factors and obstacles that affect the use of these technologies in teaching and learning and their impact on teaching and learning. The introduction of tablet PCs may not be a panacea for improving the quality of teaching and learning particularly to a population that is not familiar with the latest technologies. Therefore, there was need to investigate the pedagogical value and use of mobile technologies in teaching and learning.

C. Research Aim and Research Questions of The Study

The aim of the study was to investigate the potential use of digital mobile devices in teaching and learning at the University of Venda. The research questions of the study were to:

- R.Q.1 – What is the level of mobile devices' usage at Univen?
- R.Q.2 - How can mobile devices be effectively used for teaching and learning at Univen?
- R.Q.3 – What are the perceptions of University students and lecturers on mobile devices as tools for teaching and learning?

III. RESEARCH DESIGN AND METHODOLOGY

Articulating from [8] and [25], the researcher used the case study research design. Fig 1 shows the research methodological thinking of this study. Our epistemological position is one of Subjectivism with an Interpretive Approach[7]. The summary of the research methodology applied is shown in Table 1.

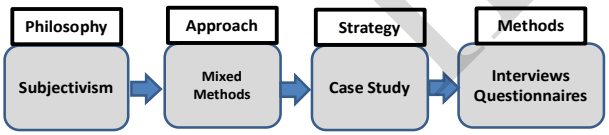


Fig. 1: Research mythodological thinking

Table I: Summary of research methodology.

Research Design	Data Collection Methods	Respondents	Sampling Techniques	Data Analysis Methods
Quantitative research	Questionnaire	Students	(Systematic sampling)	Descriptive analysis
Qualitative research	Semi-structured interviews	IT technician, Lecturers and students' representatives from UNIVEN	(convenience sampling)	Analytic and Thematic qualitative analysis

D. Population and Sampling

The population pertaining to this research was students, lecturers and an IT technician. This study used non probability sampling because it focuses on in-depth information and does not wish to make inferences and generalisations[4]. The quantitative research method sample size [21] consisted of 370 students from all schools and for the qualitative, 8 students' school representatives and 8 lecturers, one from each school.

The 370 respondents were selected using non-probability convenience sampling and 17 interviewees were selected using judgemental sampling which gave us the sample size for quantitative data of the study. UNIVEN students made the sample frame for this study. Of the 370 questionnaires distributed, 300 were returned. On the returned questionnaires, all questions were answered. All 17 interviews were conducted and all questions were answered.

IV. DATA ANALYSIS

Descriptive analysis was used on the quantitative method that is questionnaire responses, whilst thematic analysis was used on the qualitative method that is the semi-structured interview responses. The questionnaire's internal consistency was assessed by calculations of Cronbach Alpha on the SPSS, such that responses of the questionnaire were correlated to each of the questions in the questionnaire.

A. Demographic Presentation

The gender question required respondents to indicate their gender according to the gender items presented. The results are illustrated in Fig 2. Of the 300 students who participated, 51% were female while 49% were male.

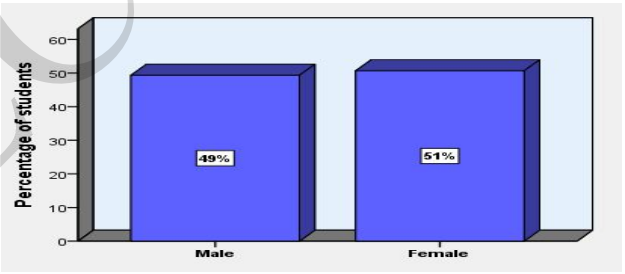


Fig. 2: Percentage of Students' Participants

B. Participants' Age

Respondents were asked to indicate their age in years. The results are shown in Fig 3. The largest percentage of respondents (84%) fell in the 15-25 year age range, followed by the 16% who fell in the 26-35 year age range. There were no respondents in the 36-45 year range. The largest percentage (84%) was because most students who participated are undergraduates and follows within the range of 15-25 years of age.

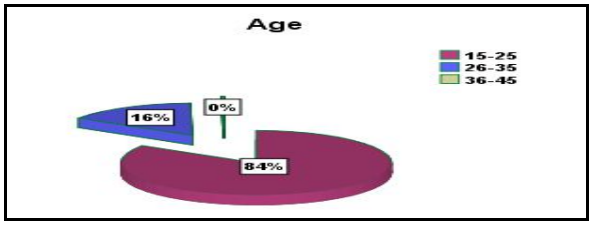


Fig. 3: Percentage of the Participants' Age

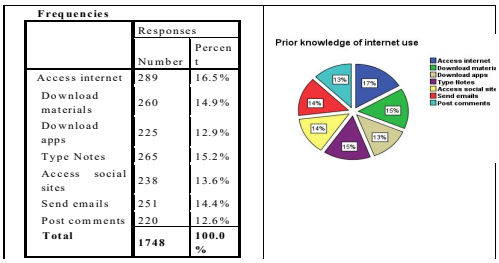
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V. CURRENT MOBILE DEVICES' USE

The researcher sought to determine the current use of mobile devices by students towards learning.

A. *Prior Knowledge of internet use*

The results in Figure 4 indicate that most students are aware of the stated internet activities. Of the 300 returned questionnaires, the responses showed that 289 can access the internet, 260 can download materials, 225 can download applications, 265 can type notes on their mobile devices, 238 knows how to access social media sites, 251 send emails and 220 can post comments on blogs. These results are an indication that students can use their mobile devices for learning as students have access on internet using their mobile gadgets. The few students who indicated otherwise probably are those with phones that cannot connect to the internet..



Frequencies

	Responses	
	Number	Percent
Access internet	289	16.5%
Download materials	260	14.9%
Download apps	225	12.9%
Type Notes	265	15.2%
Access social sites	238	13.6%
Send emails	251	14.4%
Post comments	220	12.6%
Total	1748	100.0 %

Fig. 4: Percentages of Internet Use

B. *Mobile learning usefulness*

Participants were asked to indicate if learning is now fun through mobile devices' use and if mobile devices are not a distraction in class. The 1st pie chart on Fig 5 shows that 73% of the respondents were enjoying learning using their mobile devices. Only 4% do not agree with the idea due to reasons such as 'tablet PC is no longer working' or 'not in possession of a smartphone'. 19% of the respondents were neutral which implies that this small group might be those students who are resistant to change and not decisive of the better learning method from the traditional one. This pie chart shows that the students agree that learning is now fun.

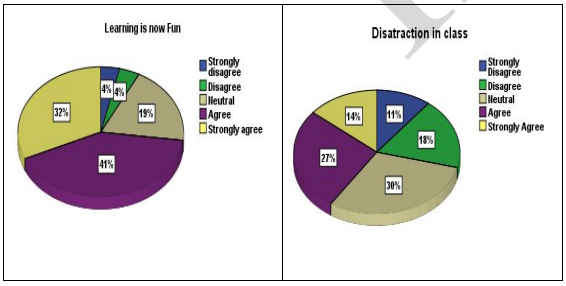


Fig. 5: Use of M-learning In Class

The 2nd pie chart displays the results on whether mobile devices' use would not be a distraction in class. 41% of the respondents said that mobile gadgets would not distract students in class whereas 25% said the devices would distract them in class. This implies that some students are not aware of how they can utilise their devices in class whereas some have knowledge on how to put their devices to good use. Basset and Kelly (2013) explained that lack of detailed educational plans or guidance both for teachers and students on how to use their personal devices for educational purposes may also prohibit mobile learning activities.

C. *Communication Improvement*

Figure 6 shows the outcome in which 1st bar graph shows that a greater percentage of 54% agrees that mobile devises' use improves student to lecturer communication. Only 22% of the respondents disagreed with this statement. On 2nd bar graph, 70% of the respondents agree that the use of mobile gadgets improves student to student communication whereas 13% disagreed. These results imply that mobile devices effectively improve both student to student and student to lecturer communication.

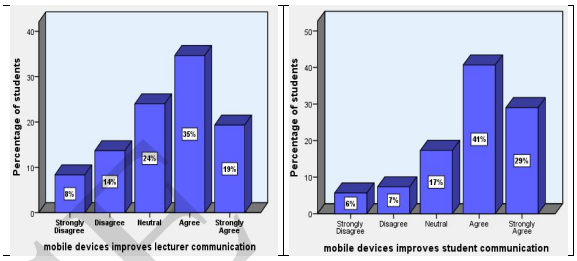


Fig. 6: Communication Improvement

D. *Traditional Learning vs mobile learning*

Mobile learning has its advantages on teaching and learning. Figure 7 shows what respondents think about traditional learning. 45 % and 34% of the students who participated in the study indicated that traditional learning is not as effective as mobile learning. This is because with traditional learning, communication is made easy, learning can be done anywhere, study materials can be accessed anywhere, and discussions can be done as well recording lectures. Only 5% of the respondents are on the view that traditional learning has the same effect with mobile learning.

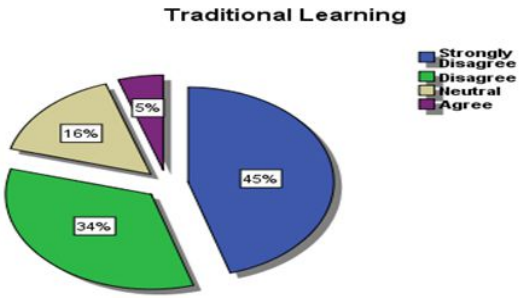


Fig. 7: Traditional Learning vs Mobile Learning

VI. CAPABILITIES ENHANCING STUDENTS' LEARNING

It was important to consider the perceptions of the students on mobile learning. Therefore, this sub-section incorporates the expectations of students and their capabilities towards learning.

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E. Promoting mobile learning in class

Fig 8 displays the results in which (42+22 =64%) of the respondents agreed that they would want mobile learning in classes. This would help them in catching up with lectures which they did not understand. 7% do not agree with this statement. This could be a group of students who did not fully understand the question or those who resist change. Although it can be argued that mobile devices can distract student in class, to a greater extent, interactive classroom activities simplify teaching and learning (Wallace, 2014).

B. Ways of using mobile devices

Participants were asked to indicate how they want smartphones and tablet PCs to be used in learning. Fig 9 shows the outcome in which 79% of the respondents indicated that they would want to receive course materials. Moreover, 59% would also want group participation. This is also helpful when the class has a group whereby anyone who needs assistance will be assisted through the class group anytime anywhere. 49% would want to record lectures.

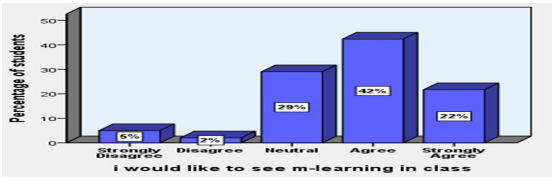


Fig. 8: Mobile Learning In Class

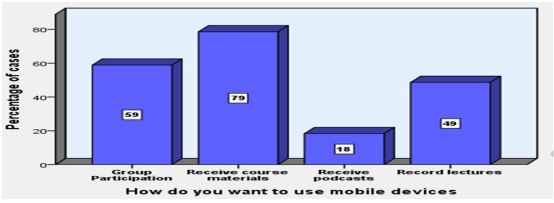


Fig. 9: Ways of Using Mobile Devices

This is also important in the sense that students would be able to go through the recorded lecture in their own free time and they would gain clarity on the topic. 18% would want to receive podcasts. The smaller percentage might be because those students do not know what podcasts are and have never used them.

VII. TABLET PC AS A LEARNING TOOL

86% of the respondents indicated that tablet PCs are a worthy investment. Investing in tablet PCs is enhancing teaching and learning at the University. However, 14% do not think it is a good idea. This could be the group of students who still think mobile learning is just as effective as traditional learning.

F. Students Limitations in use of mobile devices

Table 10 shows the responses of the participants of which the highest percentage of 33.4% indicated that their tablet PCs are no longer working which is a limitation to mobile learning. 7.9% of the respondents cannot download study materials on their devices.

This could be the group of students who are using their smartphones and not the tablet PC due to many reasons like tablet PC not working or small smartphone size. 25.5% are not using their mobile devices because of connection problems. Some students cannot connect to Wi-Fi on campus due to low bandwidth. 2.4% of the students do not know how to use mobile devices for school work while 30.8% do not have any limitation of using their mobile learning towards learning.

Table II: Students' Limitations In Using Mobile Devices

	Responses		
	Number	Percent	Percent of Cases
Cannot download	30	7.9%	10.2%
Connection speed	97	25.5%	33.1%
Tablet PC not working	127	33.4%	43.3%
Do not know how to use	9	2.4%	3.1%
None	117	30.8%	39.9%
Total	380	100.0%	129.7%

G. Lecturers Perceptions on Mobile Technologies

The researcher was interested in exploring lecturers' perceptions on the motivation and usefulness of the mobile devices in their educational experience. Below is the analysis of data from lecturer interviews.

H. Technology Experience in Teaching

100% of the interviewed respondents admitted that they all used technology in teaching. The results showed that most lecturers are making use of technology for teaching plus communication.This response means that lecturers are aware that using technology in teaching enhances teaching and learning. Mobile devices' use therefore, makes the experience of technology use viable because students are able to access information from anywhere anytime.

I. Mobile learning Activities

85% admitted that they incorporate mobile learning activities in class. Lecturers are excited with the introduction of tablet PCs as they can help many students in accessing learning materials. Facebook groups were created and lecturers were posting learning materials and discussing school related issues with students via Facebook.

J. Tablet PCs in Class

70% of the respondents (lecturers) agreed that they still see their students with the tablet PCs and using these tablet PCs as means of recording lectures. They even ask them to bring them in clsses.

K. Communicating with Mobile devices

35% of respondents stated that they encourage students to make use of their mobile devices in class for class purposes. This assists students in that they will revise their work at home while listening to the recorded audio from the lecturer which helps them understand the module better.

L. Incorporating mobile learning in Class

Participants were asked about any ideas for incorporating mobile learning in the classroom. It appears that all the respondents grasped the mobile learning concept well. They

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supported it and recommended that other lecturers should also make use of mobile devices as long as students are using them for school work.

M. Lecturers' perceptions of mobile learning in education

There were different perceptions about the effectiveness of mobile devices for student learning in education among the respondents. All the respondents shared a common view that there is need to educate teachers and students to use mobile devices in order to improve their teaching and learning. 60% stated that mobile devices could be used for more than just communication. Social networks permit students to form in groups forming which will enable them to distribute and add together their knowledge and share information with ease (Ericson, 2013).

N. Tablet PC as a learning tool

Interaction with the respondents also has led to an understanding that the distributed tablet PCs play a positive role in enhancing teaching and learning at UNIVEN. All the respondents expressed their views on whether tablet PCs are a worthy investment. They explained that tablet PCs are assisting many students as some students come from poor backgrounds and could not afford tablet PCs themselves. Participants further highlighted the issue of time.

O. Students' views on communications with mobile devices

All the respondents stated that they were communicating using their devices. 40% of the respondents used the blackboard for communication.

However, 60% of the respondents said they do not know about the Blackboard and how they can make use of it.

P. Study time management

All the respondents mentioned that it is not easy to manage study time because of the social networks. They said that social networks were a big distraction to their learning but were trying their best to put their school work first and complete their assignments on time. Mobile devices such as Tablet PCs and smartphones are one of the essential tools which can be used as a platform for social networking at the University. It is crucial to convert the social networking platforms into Edu-networking platforms.

Q. Perceptions of mobile learning in education

Respondents gave their perspectives on the effectiveness of tablet Pcs and smartphones in their learning. All the respondents expressed their gratitude to the University for the distribution of tablet PCs to the students and the Wi-Fi on campus. 80% of the respondents complemented the University for encouraging mobile learning.

R. Tablet PC as a leaning tool

A question was asked on whether the University should keep distributing tablet PCs to students. All the respondents explained that the University should keep distributing the tablet PCs as they are helping many students who could not afford these devices yet they are needed in the learning experience. All the respondents recommended that the University should keep distributing tablet PCs.

VIII. DISCUSSION OF FINDINGS

The major findings from the study indicated that students and lecturers consider mobile devices as useful tools for teaching and learning. It was also revealed that mobile devices improve communication between lecturers and students, which informed meant that the environment where they are useful for learning is not in the classroom only, but both in and out of classroom. The findings clearly showed that mobile devices have a positive impact on the academic experience. The results also indicate that there is a gradual acceptance of the LMS by both academics and students if training on its usage is given to academics and students respectively.

IX. RECOMMENDATIONS

Based on the results of this study, the following recommendations to management, lecturers, students and further studies are offered to support the effective use of mobile technology in learning:

i. It is recommended that the management do more background check on the brand of the devices so that they can purchase quality tablet PCs as students use them intensively.
ii. Training on mobile technologies' use is highly recommended
iii. It is recommended that lecturers should encourage their students to use their mobile devices for school.
iv. Lecturers are recommended to use different mobile platforms to communicate with their students.
v. Lecturers should attend training on the capabilities of mobile technology (blackboard) and its potential use in and outside of the classroom including applications that are available that is the blackboard.

X. CONCLUSION

In conclusion, a conducive platform for mobile learning such as training for both students and lecturers should have been put in place before issuing tablet PCs. Students and lecturers should have been informed about the incorporation of mobile learning before being given the devices. This could have helped them to know that the tablet PCs were there for educational purposes. The study helped to identify the current use and perceptions of mobile learning at UNIVEN. It was shown that students and lecturers accepted mobile devices as tools for teaching and learning, and that the use of mobile devices is improving their educational experiences. It was found from the study that students like interacting with their peers using mobile devices. However, some students only have vague knowledge of how mobile devices can support learning; they simply perceive the 9.7" touch screen tablet as an electronic version of their text books, convenient for chatting with their peers and for looking up information on the

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internet. Results suggested that digital mobile devices are enhancing teaching and learning at UNIVEN.

ACKNOWLEDGMENT

We thank the Business Information Systems Department of University of Venda, for allowing us to carry-out this Research. Many thanks are due to the National Research Foundation, South Africa for affording me funds to study.

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