



Where learners' and teachers' perceptions on mobile learning meet: A case of Namibian secondary schools in the Khomas region



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ABSTRACT

Globally, most governments have devoted resources to information and communication technology (ICT) development. Their goal is to improve teaching and learning using innovative technology in institutions of learning. This has brought about the formulation of educational ICT policies. These policies are aimed at guiding the implementation processes in schools. Namibia adopted the National ICT policy for Education in 2005 and the National ICT Policy Implementation Plan in 2006. Based on information, since the adoption of the policy, no study has been done to evaluate the implementation process, thereby making it difficult to ascertain the readiness of teachers and learners towards the adoption of these technologies of which mobile learning technology is one of them. This study analyses the perception of teachers and learners towards the adoption of mobile learning in Namibian high schools. The research is a mixed method study, undertaking surveys and interviews with learners and teachers from three schools in the Khomas region. The study uses the UTAUT as a guiding model to analyse teacher and learner perceptions towards mobile learning. Data collected after survey were analyzed using SPSS and excel tools, and then percentage analysis was done to find the key contributors towards adoption of mobile learning in Namibian high schools. The findings were that the majority of teachers and learners in Namibian high schools are mobile ICT literate. Most of teachers and learners own handheld mobile devices, can access the internet, download education material and applications from the internet using mobile devices, use mobile devices as calculators, access social networking sites, search for definitions of words on mobile, send emails, conduct searches for material, read assignments and post comments on blogs. Both teachers and learners were positive that mobile technology would enhance their teaching and learning capabilities, assist in improving learner grades and accomplish teaching and learning activities quickly. Although learners were positive that mobile education should be made compulsory in schools, they feel that the decision lies with policy makers on whether schools should adopt it. Both learners and teachers feel that Namibia has the resources in place to introduce mobile learning without any glitches. These resources are in the form of infrastructure and human resources.

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1. Introduction

It has been noted that one of the main influences on the adoption of new technology is the perception of users [82]. Studies have assessed the factors that influence educators' incorporation of a variety of innovative technologies into the classroom, together with; environment, policies, support, and views [4,27,70,79]. Nonetheless, key elements that center on teachers' adoption of mobile learning, have only been addressed in a small number of

studies [6,47] and [71]. Studies on the perception of teachers' and learners' adoption of mobile learning have largely been ignored, as researchers in the past have inclined to concentrate on learner adoption [81]. The motivation for the research is to analyse how the perceptions among teachers and learners can influence mobile learning adoption in Namibian high schools.

The definitions of mobile learning used by previous studies have varied based on the mobility of the learners, mobile device applications and the relation between mobile learning and E-learning. As observed by Ref. [23], mobile learning depends on the use of wireless mobile devices to facilitate learning anytime, anywhere [56]. defined mobile learning technology as learning which employs wireless devices like smart phone, PDA, iPod, palmtop, laptop

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or even digital camera and USB keys in the learning and teaching process [43], focused on the mobility in the definition of mobile learning technology, defining it as the provision of education and training using PDAs, palmtops, handhelds and smart phones (devices easy to carry and use everywhere and anytime). Keegan eliminated the use of the laptop from mobile learning, thus restricting Mobile learning to those devices which are portable, ubiquitous and flexible in order to provide a wide range of social contexts [63].

2. Problem statement

The Namibian education sector has long been looked at as leader for capacity development in Namibia (ICT Policy, 2005). The education sector has fashioned the ICT Policy for Education to boost the use and development of ICT in service delivery particularly in education and vocational training. It has its development areas as; investigation and development of appropriate ICT solutions, deployment of ICT, maintenance and support of ICT, ICT literacy; and ICT integration [1].

Despite this laudable policy, ICT implementation is slow and the adoption rate of mobile solutions in high schools is also slow notwithstanding the high usage of mobile phones. As at 2012, it was noted that Namibia has more cellular phones than its inhabitants [57]. This high usage has not reflected or affected its use in pedagogy in Namibian high schools as there is no implementation strategy in Namibia aimed at streamlining how mobile learning technology can be used by the teachers and learners in Namibian high schools since the introduction of ICT Policy in 2005 [38,59].

Currently in Namibia, there is insufficient evidence based on information about how mobile learning can be adopted in high schools, [59]. A guiding approach that could be followed in implementing emerging technologies particularly in low resource areas is lacking. This is why it is worthwhile to conduct an assessment in both urban and rural areas on how mobile learning technology can be adopted in Namibian high schools. This study proposes the use The *Unified Theory of Acceptance and Use of Technology (UTAUT)* model [82] as a guiding framework to analyse the teachers and learners perception toward the adoption of mobile learning in Namibian high schools.

2.1. Research objectives

The main objective is to analyse teachers and learners perception on the adoption of mobile learning in Namibian high schools. They are outlined as follows:

- To evaluate the usage of mobile learning among teachers and learners in Namibian high schools
- To assess the factors influencing teachers and learners perception towards mobile learning adoption in Namibian High schools

2.2. Research question

The main research question is, “Do teachers and learners perceptions impact on the adoption of mobile learning in Namibian high schools”. To achieve the objectives, the following questions are posed:

- What are the factors that influence teachers' and learners' perceptions on the adoption of mobile learning in Namibian high schools?

- What are the current mobile learning usage and trends in Namibian High schools

3. Methodology

The research design employs a mixed method approach, comprising the baseline survey, and interviews. [76] noted that while it is necessary to obtain quantifiable data with regards to current use, perceptions and adoption, qualitative data will also help triangulation of data to offer a better understanding of the topics explored. Qualitative data is obtained through an open-ended response question on the survey instrument. The survey questionnaire is based on the survey instrument formulated by Refs. [82] and [85]. The UTAUT instrument has been utilized by several researchers [5] [54] and [85] and is made up of questions adapted from previous information System (IS) surveys used to measure the constructs included in the model [82] and [85].

The survey instrument was modified so as to make the questions suitable to the context of mobile learning and the participating population. For instance the words “mobile learning” replaces the word “system”. The sample of the study is participants from three (3) high schools in Khomas region. A sample of high school teachers and learners was drawn from 3 schools. The learners were selected primarily from grades (11) and twelve (12). Twenty (20) learners were randomly drawn from each school, of which 10 are female and 10 are male.

The questionnaire is aligned to the research objectives, the theories and models established in the literature survey and tested questions from the guiding theory (UTAUT). As in the original UTAUT survey instrument, Likert scales (1–5) with anchors ranging from “strongly disagree” to “strongly agree” were used for all construct items [82]. The data was then be analysed for descriptive and inferential statistics using the latest version of a statistical software package called Statistical Package for the Social Sciences (SPSS).

4. Related work on teachers' and learners' perceptions on mobile learning

Research undertaken in the area of attitude and attitude development specifies that attitudes and beliefs are linked, and attitudes and behaviors are interrelated; besides, attitudes are principally divided into likes (positive) and dislikes (negative) [73]. With the comprehensive growth of ICT in education these past years, many research studies have explored the attitudes of users (teachers and learners) towards the incorporation of ICT in education [22].

Teachers' and learners' attitudes towards mobile learning have been identified as critical to the success of mobile learning [8]. found that in developing countries the most essential factors were related to increasing technology awareness and improving attitude toward mobile learning, enhancing basic technology knowledge and skills, improving learning content, requiring computer training, motivating users to utilize mobile learning systems, and requiring a high level of support. In addition, attributes used to evaluate the attitudes towards ICT of learners, teachers and principals have been categorized in two groups: demographics (age and gender) and computer knowledge (training, years of using computer, ownership of computer, access to a computer, intensity of computer use) [34] and [64].

One of the main concerns around introducing technology into schools has been teachers' levels of knowledge and self-confidence. An appraisal of about 2500 American tutors found that they were generally very positive about technology but that there were concerns about Mobile devices, the internet and social media (Purcell,

Heaps et al., 2013). 92% of teachers agreed that the internet has had a major impact on their ability to access material for their teaching and 69% said it had had a major impact on their ability to share ideas with other teachers. However, 75% of teachers felt that the increase in access to technology had added new demands to their profession and increased the range of skills they must acquire. The survey further showed that mobile learning technology is becoming increasingly popular in the classroom and 43% of teachers said they or their learners use tablets in school. The survey also revealed differences in confidence in using technology. Older ones were more likely to say that their learners knew more about technology than them, while the younger ones were more likely to share ideas and discuss how they use technology with other teachers.

[44] noted that with the aid of these devices, learners learn faster outside the classroom by having swift access to the internet and easy retrieval of required medical and health learning resources while teachers also keep abreast of current developments as it affects their teaching and research needs. Mobile devices are redefining the way almost everything is done in the academic environment. Although PDAs have been around for years, the introduction of the iPhone, iPad, and other smartphones and tablets has changed the type of information that can be accessed easily on these devices [10].

Also, research has shown that a large portion of teachers still resists the integration of technology into the classroom [7]. Two aspects, specifically, have been constantly found to impact teachers' adoption of technology. The first aspect shown to affect the adoption of new technology is the views held by the teachers [39]. Specifically, it is the perceived significance of the new technology and perceived effort needed to learn to use the new technology were established as playing a major role in the adoption of technology. The second key aspect seen to influence adoption is the skill of teachers to use digital technology (usually referred to as digital literacy) and the skill needed to integrate it into their teaching (teaching self-efficacy).

Digital literacy is the measure of an individual's ability to use digital technological devices, communication devices, or networks to access, manage and integrate digital resources. Therefore, the measure of a person's literacy in technology centers on their relative skill to use a range of technologies. For teachers it is becoming increasingly more important to be digitally literate [65]. stressed that teachers need to be digitally literate. Through their own literacy they are able to instil in their learners the skills and knowledge needed in a technology dominated world. Technology has become wholly incorporated into the workplaces, consequently education needs to reflect and support learners to survive in a progressively connected world. To do this, teachers must be confident and able to utilize the wide range of technologies at their disposal.

Together with digital literacy, the teachers' attitude to technology will also play a determining role on their adoption of technology. For instance, one of the key factors in the resistance to new technology has been identified to be apprehension [12]. For some people, the thought of using Information Communication Technology (ICT) has been found to generate high levels of anxiety [61]). ICT anxiety is a negative emotive reaction typically ensuing from a fear that the use of the technology may have a negative effect. The negative outcome could be anything from the fear that the user may damage the equipment to looking foolish in front of their mates. Anxiety about ICT usage has been presented to have a strong negative impact on the prospect in the use of ICT.

As technology continues to develop, it also brings change. Teachers can be either motivated or limited by the new innovations in the use of technology. In other words, teachers may develop a

negative or positive attitude towards the use of mobile technology in the teaching and learning activities because of their belief. Some studies [25] argue that teacher's attitudes and inherent resistance to change are substantial barriers to the implementation of mobile technology in the schools. This means that there will be no change in education without a transformation in the attitude of teachers. If, for example, teachers are triggered by the use of new technology in the teaching and learning situations, they might be able to influence the teaching activities at large at their schools by adopting the use of mobile technology in the classroom or for personal uses or vice-versa. Positive attitudes towards mobile technology on teaching and learning will not spontaneously lead to the uptake of mobile technology or innovative teaching practice.

[31] examined the role learning institutes play in improving learners learning via mobile technology since it facilitates the easy transmission and delivery of rich content without being restricted by time or geographical boundaries. They argued that people are involved in mobile learning everyday as long as they use their mobile phones to check for date and time, call someone to ask for direction or get information or use the phone as a calculator. Hence, the issue is not whether education is formal or informal. The issue to be addressed is the challenge of improving the capability of the poor through education, which has to be delivered faster and more affordably.

5. Findings of research from self-generated questions

For learner perceptions, three schools participated in the study. Of these, one is private, one is a public school from a low income area and the third is a public school from a middle income area. 20 Grade 11 and 12 learners were the study sample from each school, of which 10 were male and 10 were female. They all fall into the 15–19 age category which is the average age of Grade 11 and 12 learners. In total therefore, there were 60 learners of which 20 were from the private school and 40 were from the public schools. In total the sample has 30 male and 30 female learners.

For teacher perceptions, the same three schools participated in the study. 4 teachers from each of the three schools participated in the study, making it a total of 6 males and 6 females. For age variance, 10 were from the 25–29 age group, while 2 were from the 30–34 age group. In terms of years of service, two had served for less than two years and 10 had served for between six and ten years.

The following were the findings of the research:

5.1. Access to the internet from a mobile device

From the learners sample, 20% have never accessed the internet from a mobile phone, while 80% have had access. The reason is that the 20% do not have access to smartphones, and as a result no access to the internet and this will make them not to be technologically ready. The rapid growth of access to mobile phones has a potential of improving teaching, learning and institutional efficiencies to enable national education system transformation [80].

From the teacher sample 81.8% have accessed the internet from a mobile device while 18.2% have not had access. This means that the majority of the teachers and learners are mobile ICT literate. This also means that the majority of teachers and learners have the potential to adopt mobile learning/teaching should it be in the schools' or ministry's ICT policies. This is because in education, mobile phones have led to the evolution of new paradigm known as mobile learning (Muyinda et al., 2007).

5.2. *Owning a smart phone that can access the internet*

Of the learners, only 5% said they don't own a smartphone and don't plan to purchase one, while 36.7% said they don't own a cell phone and plan to purchase one in the future, and 58.3% said they do own smartphones. On the other hand, with teachers, 16.7% do not own a smartphone and do not plan to purchase one, while 50% do not own a smartphone and plan to purchase one in the future and 33.3% own smartphones. The 50% of the teachers means they have used it, sometimes from close people. The 33.3% who own cell phones is too low for people who are in the economic bracket such as teachers. This is about prioritisation at the end of it all. Receiving and making calls may just be enough for some of these teachers. The question is, "Do the teachers and learners who do not own cell phones know of the potential benefits of such a device in education?" Ferry, (2009) describes that modern mobile phones can be used to help learners to access web based contents, remix it, share it, collaborate with others and create media rich deliverable for the classroom teachers as well as global audience.

The 5% of learners and 16.7% of teachers who do not own a cell phone and do not plan to purchase one in the near future may certainly not be aware of the potential of mobile education.

5.3. *Brand of device*

For the learners that own a tablet/smartphone, Apple ipads are owned by 16.7% while Android devices are owned by 83.3%. Android phones are much cheaper than Apple ipad. It is costs therefore that determine the type of mobile device. The same picture is true for the teachers, with 18.2% owning an Apple ipad, while 81.8% own an Android phone. It is important then that the brand of mobile device that is recommended for schools be low cost, available and usable. This is because if the cost of the phone is high it could be prohibitive and many learners and teachers may shy away from getting one [18].

5.4. *Downloading educational materials onto a mobile device*

The downloading features of mobile phones can be easily used by learners and teachers to download various kinds of materials through their mobile phones and if they are properly used will enhance their learning capabilities [45]. 26.7% of the learners cannot/have not downloaded educational material onto a mobile device in their lives. This means that although 20% do not have access to smart phones there is an additional 6.7% of those with smartphones who can't download either. This group of learners are not in a position to download educational materials from mobile devices should the need arise. In short, this means they are not doing any mobile learning. It is also possible that they use the phones to download other things besides educational material probably.

On the other hand teachers according to [45] can download video through their mobile phones and present them to learners through a TV set available in the classrooms. 75% of the teachers know how to download educational material onto mobile devices while 25% cannot. A high number of teachers have the potential to conduct mobile teaching in a formal environment if they can take advantage of the material they can download. Does it mean that these teachers are using these downloaded material in their classroom already?

5.5. *Downloading applications onto a mobile device*

Mobile applications help coordinate learning resources and learners, and may also help to improve the educational activities

that are part of this process [20]. While 74.6% of the learners can download applications, 25.4% of the learners cannot download educational applications onto their mobile devices either. This matches the 26.7% of learners who cannot download education materials onto mobile devices. Although 20% of learners do not have access to smartphones, the additional 5.4% learners who have smartphones still cannot download educational applications onto their mobile devices. They can still play educational games on the cell phones since ordinary cell phones come with games which they don't need to download.

On the other hand, 72.7% of the teachers can download educational applications onto their smart phones while 27.3% cannot. There is a balance between teachers and learners who can download applications onto their mobile devices. Downloading applications is more complex than downloading any other materials. One has to purchase applications, especially specialised ones like educational materials. In general, implementation of M-learning environment needs applications and design tools such as: Blackboard mobile for Mobile management. Bump, Inkling, KeneXa, HotLava Mobile, Drop Vox, Course Smart and Edmode for Authoring Tools. Pocket, Pen ultimate, Iannontate, Ever note [11].

5.6. *Searching for definitions of words*

According to Long (2014) it is possible to use mobile learning devices to deepen an individual's understanding of a subject. This means that mobile devices can be called information providers. This can be seen in the responses given by both teachers and learners. 90% of the learners indicated they can search for words on mobile devices while 10% cannot. Although 20% of the learners do not have mobile devices, those that are able to search for words stands at 90%. This means that the 20% learners that do not have mobile devices use other people's devices to search for words if the need arises. The majority of the learners are literate in terms of word search. This shows the differences in complexity between application download and word search. The learners are already taking advantage of mobile technologies for the role of a dictionary.

On the other hand, 91.7% of the teachers are able to find a definition of a word, while only 8.3% cannot. Teachers are more literate than the learners and they under pressure to research before going to class, if they are to be effective in teaching. There is a balance between teachers and learners on the numbers of those who can search for words.

5.7. *Using a mobile device as a calculator*

Mobile phone use in education, has moved from just sharing information to being used for mathematical problem solving [2] [17]; [48]. Only 11.7% of the learners cannot use a mobile device as a calculator, while 88.3% can. This shows the importance of a calculator in learners' lives. An ordinary calculator does not require a smartphone or the internet to operate. The percentage difference of learners who can conduct a word search and those that can use a calculator is minimal because the learners have access to mobile devices. The question to ask is why the minority who are not using the calculator and word search are not encouraged like the majority. The reason is that the ordinary calculator is non-scientific while the calculator on a smartphone is scientific. The calculator on a smartphone has more features. Hence, learners find it difficult to use mobile calculators which have more features. This explains the high percentage usage of calculators at 88.3%, although only 58.3% of learners use smartphones.

On the other hand, 91.7% of the teachers know how to use a calculator on a mobile device, while 8.3% cannot. Compared with learner statistics, there are more teachers who are literate in using

the calculator than the learners. The calculator device is handy, especially in mathematics education.

5.8. Access to social networking sites

Only 10.3% of the learners say they cannot access social networking sites on a mobile device. Although 20% have no cell phones, only 10.3% say they cannot access social networking sites. Social networking sites are very popular with the youths. The only thing that can keep any of them from such sites is if they totally do not have access to a mobile device. This means therefore that 9.7% of the 20% without mobile devices somehow have access to a device that does not belong to them if the 10.3% are the only ones that totally have no access to social media. To make mobile education interesting and appealing to young people, educators should take advantage of social media in education dissemination.

81.8% of the teachers can access social networking sites on a mobile device, while 18.2% say no. The age bracket of the majority of the teachers is low, between 25 and 29 years, and are inclined towards social media like most of the youths. This is an advantage in that they can teach using social media. We have a balance between teachers and learners who access social media. It agrees with [24] who highlighted the effects of mobile technologies on learning and teaching in accordance with social media in the form of Skype, Twitter, and Blogs for providing better learning.

5.9. Using mobile device to look up something not understood during class

Globally, there is an emerging trend in mobile phone use in education, particularly teachers and learners have been using this tool in searching for information [2] [17]; [48]. This is where teachers and learners use these devices to understand certain things that are not clear. The result shows that there are 20% of learners who do not have cell phones compared to the 23.7% that cannot look up something. Not having a cell phone is affecting learner abilities to mobile learning. The 3.7% additional learners who do not look up anything are either not motivated or mobile learning is not part of their school activities. 74.3% of the learners look up something not understood in class in class on their mobile devices.

On the other hand 83.3% of the teachers responded positively, while 16.7% responded negatively that they use mobile devices to look up things they do not understand. The 16.7% negatives are those that do not have a smart phone and do not plan to purchase any either. This is all about technophobia. Could it possibly be those in the 30–34 age group? Why is it that they do not want to own any phone? The 83.3% positive response means teachers are doing research on their work. There is a balance between teachers and learners who look up things they do not understand on mobile devices.

5.10. Sending email

One interesting aspect of mobile learning according to Joanne [24] is that students can use mobile devices, to interact with each other and share their knowledge and skills and also send email and get feedback through email from their teachers. While 80% of the learners can access the internet, only 70% of them can send email from their mobile and 30% cannot. The number of those that can access the internet is less than those that can send email. Social media is more important to young people than email. Therefore mobile learning should target social media if it is to appeal to the youths.

On the other hand, 53.8% of the teachers answered yes to

sending email while 41.7% answered no. It seems most teachers do not have use for email. Learners actually seem to use email more than their teachers, since 70% of the learners answered yes and 30% answered no. Therefore it is advisable to avoid communication between the teacher and the learner using email in a mobile education environment. Rather use social media which teachers and learners prefer equally for effective and efficient communication.

5.11. Posting comments on a blog

The blog is a new social media concept and most learners are just getting used to it. Therefore 42.4% of the learners cannot post onto blogs, while 56.7% can. Blogging can be used as a specific learning platform. It would take further training the learners in blogging for it to be acceptable as a mobile education platform.

On the other hand 58.3% of the teachers answered positively, while 41.7% of the teachers answered negatively. This result compares to the learner numbers. This can only confirm that using blogs is a foreign concept for both teachers and learners. Therefore teachers would also need further training on blogging. In short, both teachers and learners need to be skilled in blogging if it is to be adopted in mobile learning.

5.12. Mobile technologies to read articles or assignments

Several studies reveal that students frequently report using a variety of electronic media including cell phones while in class, studying, and doing homework [33,36] [69]; [78]. But in this case, the difference between learners who read assignments from mobile devices and those that do not is small, standing at 58.6% against 41.4%. This reflects that mobile learning is not yet used in most schools, otherwise the difference would be wider. The 58.6% shows that if the reading of assignments and articles was to be introduced, then a higher number of learners would be motivated and able to use it.

On the teachers' side, 58.3% said they do not read articles via mobile devices while 41.7% said they do. There are more learners who read articles from mobile devices as compared to the teachers. Yet, under normal circumstances teachers are supposed to read more articles from mobile devices than learners, if they are to lead the way in mobile education. That simply means teachers are not conducting enough research into their lessons or they are still using traditional methods of research. Teachers are not aware of the benefits on internet-enabled devices. The reading culture is not there nowadays, Teachers are getting their information from set books year in and year out. It is the education system that has set aside stipulated books for learners to use, and has to amend if it is to embrace mobile learning.

5.13. Use of mobile device for academic purposes

Presently, cell phone use is a dominant and defining characteristic of this generation of college students and often occurs during class time, while completing homework, and while studying [74,78]. That notwithstanding, usage of mobile devices for academic purposes is not only about being in a formal environment only but also about informal learning outside the classroom environment. 29.3% of the learners indicate that they do not use mobile devices for academic purposes, while 70.7% do. When we looked at social networks access, 89.7% do access while 10.3% do not. There is high usage of mobile devices for social networking rather than academic purposes. This means that if the learners are introduced more to using mobile devices in class, the percentage of usage of mobile devices in class will exponentially increase.

On the other hand 41.7% of the teachers do not use cell phones

for academic purposes, while 58.3% use it. Already, 41.7% is too large a number considering that each teacher has access to many learners; an average of 20 or more. That means this will inconvenience learners exponentially. This all boils down to the awareness of teachers of the benefits that mobile education can bring. The opposite should be true here, with more teachers using mobile devices for academic purposes than learners, or evening out between the two. Unfortunately, as the situation stands, the attitudes of the teachers will negatively impact the positive attitude of the learners.

5.14. Usage of educational applications

Using these devices in educational fields is advantageous [3], therefore, the students can access the content of courses more effectively and any time of the day by downloading many applications onto their mobile devices. Also educational applications such as games can enhance learner skills in different subjects. This is because games are absorbing and also exciting to most young people. 55.9% of the learners say that they do not use any educational applications to enhance their skills, while 44.1% say they do. The truth is that all games have a lesson to be learnt from them, hence the answer should be positive for all that have access to the games. The explanation can also be that mobile learning and technology have not been adopted in their schools. The few learners that take interest in educational games are self-motivated.

66.7% of the teachers indicated they use education-related applications on their mobile devices, while 33.3% said no. Through ipads and laptops the 33.3% can access the internet, but they are not aware that the applications they use are relevant to teaching. For example, Google as a search tool is an education application as well. Teachers believe in education-related applications more than their learners. This is a positive attitude as they will lead the learners towards the adoption of educational applications. Fig. 1

6. Findings from UTAT

A variety of models and theories have been recognized on the adoption of technologies and to predict usage and behaviour. The UTAUT model, developed by Ref. [82] was adopted and extended to examine learners' and teachers' behavioral intention to adopt and use mobile learning. The model was developed through a combination of eight similar technology acceptance models to produce a unified model. The combined models are: Technology Acceptance

Model (TAM) (Davies, 1989), Innovation Diffusion Theory (IDT) (Rogers 1995), Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975); Motivation Model (MM) (Davis, Bagozzi, & Warshaw, (1992), Theory of Planned Behavior (TPB) (Ajzen, 1991), Combined TAM and TPB (Taylor & Todd 1995), Model of PC Utilization (MPCU) (Thompson et al., 1991), and Social Cognitive Theory (SCT) (Bandura, 1986). Furthermore, the UTAUT consist of four key constructs [82]:

- i) Performance Expectancy: Performance expectancy is defined as the extent to which a person believes using an information system/technology will assist him/her gain benefits from job performance.
- ii) Performance Expectancy and Mobile Learning: In mobile learning context, performance expectancy advocates mobile learning will be found useful because it enables individuals to have quick access to information, any time and any place, and on their preferred device.
- iii) Effort expectancy: Effort expectancy is the degree of ease associated with the use of an information system/technology.
- iv) Effort Expectancy and Mobile Learning: In this context of effort expectancy in the use of mobile learning, it is likely that effort expectancy will most strongly affect behaviour during the initial and early stages of mobile use of academic content and the effort expectancy will decrease over time as the user becomes more experienced.
- v) Social influence: This is the extent to which technology users perceive that others important to them believe that the users should use a new information system.
- vi) Facilitating Conditions: This is the degree of belief that organizational and technical infrastructure exists to support the use of any system.

6.1. Performance expectancy

This has four questions under it.

6.1.1. Usefulness of mobile technology to learning

Mobile phones have to be used in teaching and learning due to their usefulness [41]. This is the case with these responses where 58.3% and 30% of the learners agree and strongly agree respectively that mobile learning would be useful to their studies. This

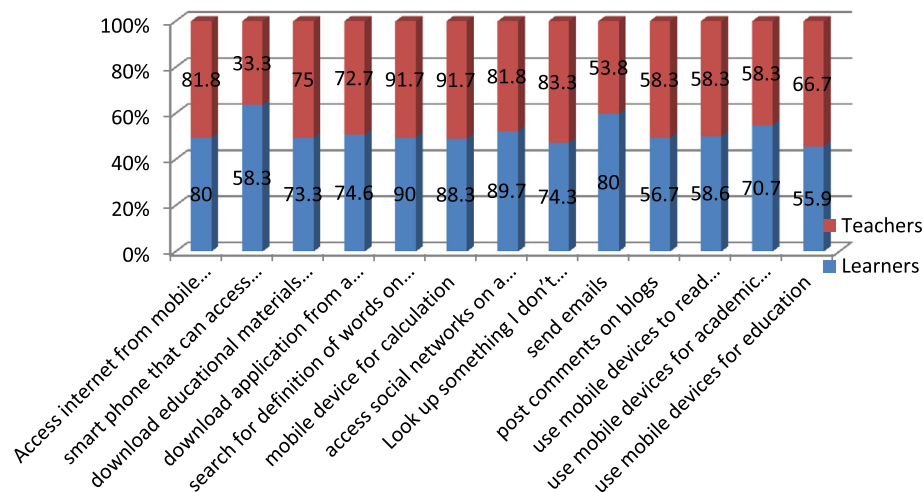


Fig. 1. Self-generated questions.

constitutes the majority of the learners. 8.3% of the learners are neutral, while 3.3% of the learners disagree that mobile learning is useful. The reason is that for one who is not using mobile learning already, there is a degree of uncertainty on its future benefits.

50% of the teachers agree and 50% strongly agree that mobile learning will be useful in their teaching. The 100% positive response shows that teachers really want mobile learning, but the only problem may be that training is lacking or that there is no such policy in their schools. Therefore they may not be aware of the types of mobile applications for teaching and learning. Both teachers and learners agree that mobile learning is useful to teaching and learning.

6.1.2. Accomplishing teaching activities quickly

There is a growing amount of research that suggests electronic media in any form encourages multitasking [33]; Junco & Cotton, 2011 [36][37,42,86]; and task-switching [67]. This is also the case with mobile learning devices as it can enable both the teachers and learners accomplish learning activities quickly through its various inbuilt features they have. 58.6% of the learners agree and 29.3% of the learners strongly agree that mobile learning will help them accomplish learning activities quickly. Only 12.1% are neutral. This shows that learners want mobile learning, know about its benefits, but it is not yet adopted in their schools as policy.

With the teachers on the other hand, 36.4% agree, while 63.6% strongly agree giving a total of 100% that are agreed that mobile learning will assist them accomplish teaching activities quickly. This means they see the potential benefits of mobile learning. The reasons therefore that not all of them do possess smartphones may not be educational, but economical. There is consensus between teachers and learners on the benefits of mobile devices enabling them to accomplish their tasks quickly.

6.1.3. Enhancing teaching and learning capabilities

75% of the learners agree and 23.3% of the learners strongly agree that mobile technology will enhance their learning activities. This is 98.3% positive. Only 1.7% of the learners are neutral. The neutrality is because they have not used mobile learning and hence do not know its benefits.

On the other hand, teachers also see the benefits. 41.7% agree, while 58.3% strongly agree that mobile learning has the potential to enhance their teaching capabilities. This gives a 100% positive response. The teachers are willing. It boils down to the existence of a schools mobile learning policy and the national ICT policy and their implementation. If there is no monitoring and evaluation of

the national ICT policy this then slows down its implementation. There is consensus between teachers and learners on enhanced teaching and learning capabilities through mobile learning and teaching. This is so because mobile learning has great potential for facilitating education and may also facilitate the development of communication, critical thinking, problem solving, creativity and innovation and other high-level skills among students in higher education (Thomas et al., 2014).

6.1.4. Increasing chances of improved learner grades

Only 1.7% of the learners disagree that mobile learning will improve their grades. Although they know the benefits of mobile learning, they still feel that without mobile learning they can still achieve good grades. 10% of the learners are neutral on whether mobile learning will improve their grades or not. It simply means that whether they use mobile learning or not they still get good grades. 63.3% agree and 25% strongly agree, which is a convincing percentage of positive responses.

On the other hand, 100% of the teachers are positive that their learners will improve their grades once mobile learning is introduced. 83.3% of them agree while 16.7% of them strongly agree. This shows the confidence that both learners and teachers have in that mobile learning and teaching can impact on learner performance. This is consistent with <http://sgo.sagepub.com/content/5/1/2158244015573169> [15]; who found that using the Internet for information seeking was associated with better academic performance. Fig. 2

6.2. Effort expectancy

There are four questions under this.

6.2.1. Interaction with mobile devices clear and understandable

3.4% of the learners disagree that with time their interaction with mobile devices will be clear and understandable. This is most likely the group that is among the 20% of learners that do not have mobile phones and have not enjoyed the use of internet-enabled phones. Therefore phobia is likely to set in. Some of the learners do not understand phones and find it difficult to interact with the phones. 28.8% of the learners agree while 55.9% of the learners strongly agree that with prolonged usage, interaction with mobile devices will be clear and understandable. The responses lean towards the strongly agree. More than 80% of those with internet-enabled phones are motivated and interacting with the phone all the time.

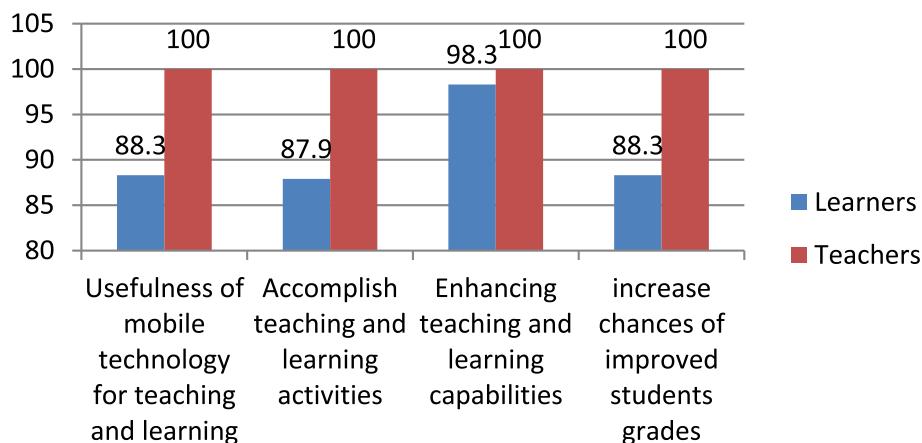


Fig. 2. Performance expectancy.

On the other hand 41.7% of the teachers agree and 58.3% of the teachers strongly agree on this issue. There is consensus between teachers and learners on this one improved usage with time.

6.2.2. Acquiring skills from mobile devices

61.7% of the learners agree and 26.7% strongly agree that they accept that mobile devices will make them more skilful. 11.7% of the learners are neutral, but this is minimal. 66.7% of the teachers agree and 33.3% strongly agree that it would be easy for them to become skilful when using mobile learning devices. There is consensus between learners and teachers that with time they will acquire more skills from mobile devices. This is in line with the position of (Mäkelä et al., 2014). They believe that mobile learning devices will develop skills and expertise of teachers and learners.

6.2.3. Ease of use of mobile learning devices

Ease of use is the measure of the degree an individual believes a particular technology is free from effort [14,16]. 63.3% of the learners agree and 31.7% of the learners strongly agree that they are favourably disposed to using mobile devices and find mobile devices easy to use. Only 5% of the learners are neutral on the issue. On the other hand 33.3% of the teachers agree and 50% of the teachers strongly agree that they will find mobile devices easy to use. This gives a total of 83.3%. 16.7% of the teachers are neutral. They can see the benefits of using mobile technology in education but are unable to use it because of schools policy. Both learners and teachers are favourably disposed to using mobile devices and will find them easy to use if introduced into schools.

6.2.4. Learning to operate mobile learning devices is easy for me

The bulk of the learners, that is 53.4% feel that learning to operate mobile devices is easy for them. 51.7% are neutral and 1.7% disagree. Those that disagree are part of the 20% that don't have mobile devices. Those that are neutral would need training in that area for them to be able to operate mobile devices as they are currently sitting on the fence. Training will empower them to make the decision on whether learning to operate mobile learning devices will be easy or not. Being able to operate increases their learning capability and skill.

On the other hand 25% of the teachers were neutral when it came to the question of whether or not learning to operate mobile learning devices would be easy for them. Those that are neutral is

because most find it hard to use, they do not have it or are not able to use it. They require training to overcome this. 58.3% of the teachers agree and 16.7% of the teachers strongly agree that learning to operate mobile devices would be easy for them. Both teachers and learners are positive that learning to operate mobile devices will be easy for them. According to [40] young learners in this mobile technology era can practice ubiquitous learning effortlessly. This can be done with enough motivation of know how to operate these devices. So is also the case with teachers. Fig. 3

6.3. Perceived playfulness

This section has 5 questions to it.

6.3.1. Time lapse/concentration/addiction

69.5% of the learners disagree and 6.8% of the learners strongly disagree that when they use mobile devices they would not be aware of the time lapse. The explanation could be that the learners really want mobile learning to be introduced into class but if they are open about this their schools would not introduce it, if it affected time. Therefore only 8.5% of the learners are neutral, 13.6% agree and 1.7% strongly agree.

On the other hand, 54.5% of the teachers agree that their learners will be addicted to mobile devices if mobile devices are introduced into class, resulting in disruption of lessons. However 18.2% of the teachers disagree and 27.3% are neutral. Those that are in agreement do not strongly agree. They are not sure of the results to be expected because they haven't tried it. Those teachers that disagree is because they have no idea of how mobile technology works or they have no power to control learner activity in class. It seems learners and their teachers differ on the levels of disruption that mobile technology will have on lessons, with the teachers showing fear that there is a huge chance of disruptions. Though the state of mind of the learner at the time teaching is going on has to be put into consideration (Wang et al., 2009).

6.3.2. Forgetting there is work to be done

66.7% of the learners disagree and 13.3% strongly disagree that when using mobile devices they will forget the work that they have to do. There is research to support that when learners are introduced to mobile learning in class, they play a lot and forget about their work. This is the reason why the learners are on the defensive

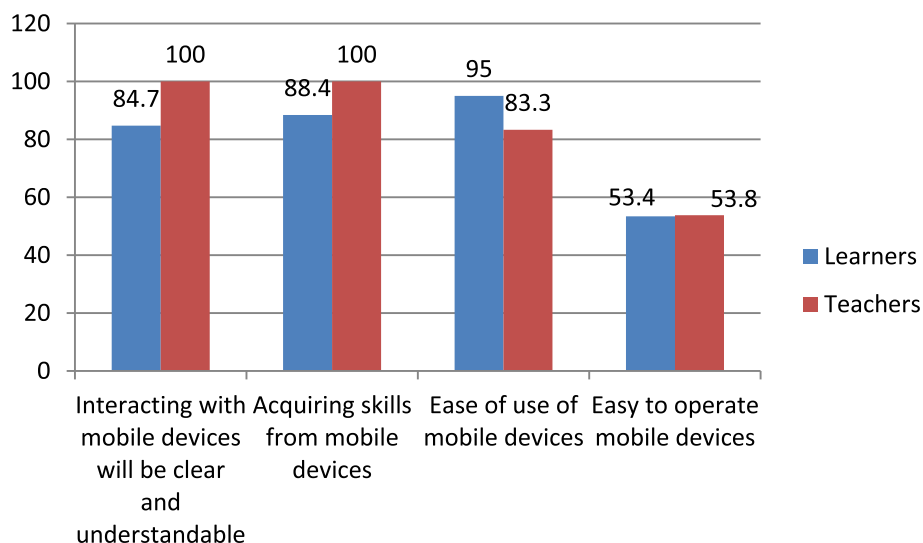


Fig. 3. Effort expectancy.

in their response with 80% disagreeing that mobile technology will affect their work in class. 13.3% of the learners are neutral and 6.7% openly agree they will be affected.

83.3% of the teachers agree that when using mobile devices learners will forget the work that they must do, while 16.7% disagree. This has to do with addiction of learners to mobile devices (Wang et al., 2009) This shows the differing opinions between learners and teachers on how much mobile devices will affect learner performance, with learners disagreeing that mobile technology will negatively impact on their work, while teachers agree that mobile technology will negatively impact on learners' work.

6.3.3. *Enjoyment of learning*

There is a balance between those learners that agree that mobile learning will bring them enjoyment to their work and those that disagree. 25% of the learners agree while 18.3% of the learners strongly agree. This gives a total of 43.4%. 36.7% disagree while 6.7% strongly disagree bring the total to those learners who disagree to 43.4% also. The belief is that as they learn it also serves as a recreation exercise. As they play with the mobile devices they not only enjoy but they learn as well.

On the other hand, the teachers feel that using mobile devices will make them enjoy their teaching. 75% agree and 25% strongly agree, giving a total of 100%. They know the benefits for recreation and learning. There is a consensus between teachers and learners Mobile devices in education can be both recreational and educational according to both teachers and learners. For instance [32], revealed that 3G technology based-mobile phones when used for educational purposes affected students' attitudes. Students could enjoy themselves and try a positive learning experience when using these phones.

6.3.4. *Stimulating curiosity*

Wang et al. (2009) noted that learners are curious during the interaction with mobile device because of their innate propensity to explore. 65% of the learners agree and 21.7% of the learners strongly agree that mobile learning will stimulate their curiosity. The learners are positive; they know the benefits of knowing more and are adventurous. Only 1.7% of the learners disagree and 11.7% are neutral.

Of the teachers, 50% agree and 16.7% strongly agree that using mobile devices in teaching and learning will stimulate learners' curiosity. This is 66.7% in agreement. Those that agree know the benefits of mobile learning. It boils down to an awareness of what it can do. However, 16.7% disagree and 16.7% are neutral. These 16.7% who are neutral belong to the group that don't have devices. If one does not have a device then they do not know its power. Overall, it seems according to both teachers and learner perceptions, mobile learning stimulates curiosity.

6.3.5. *Exploration capability improved*

Almost all learners agree that using mobile devices will improve their exploration capabilities. 74.6% agree and 16.9% strongly agree. Only 8.5% are neutral. 100% of the teachers agree that using mobile devices will lead to them exploring the education applications on their devices. 72.7% strongly agree and 27.3% agree. They explore to gain knowledge and explore how to use applications. Training is important to usage. There is consensus between teachers and learners that mobile learning will improve their exploration capabilities. Teachers are encouraged to adopt various innovative approaches for engaging students in activities with different tablet devices for accessing and exploring diverse learning resources [66]; Scott, 2014. Fig. 4

6.4. *Behavioural intention*

This has 4 questions under it.

6.4.1. *Using mobile technology for future studies*

The majority of the learners are willing to adopt mobile learning in their studies in the future. According to [50] when students have an intention to use mobile learning, it will influence their utilization of mobile learning positively. 76.7% agree, while 10% strongly agree giving a total of 86.7% who are agreed that they are willing to adopt mobile technology in future studies. 13.3% are neutral, however, maybe because they are uncertain about the future of mobile education.

100% of the teachers agree that they would like to use mobile learning in teaching in the future. This is about 58.3% agreed and 41.7% strongly agreed. They will be happy if mobile education is adopted as possible and that they are mobile-ready. Both learners and teachers are looking forward to adopting mobile technologies in the future for teaching and learning purposes.

6.4.2. *Happily using mobile learning devices*

The majority of learners will be happy to use mobile devices if they are introduced in learning. This is because they know that mobile learning will not only foster the way they will access information, but also enable them to be innovative and good problem-solvers, [84]. 76.3% agree and 16.9% are strongly agreed which is 93.2% in total. Only 6.8% of the learners are neutral. All teachers on the other hand will be happy to use mobile learning devices if they are introduced for teaching and learning. 83.3% agree and 16.7% strongly agree. They have the intention to use it because they know the benefits of it. There is consensus among both teachers and learners that they will happily embrace mobile learning and teaching.

6.4.3. *Planning to use mobile devices for education if they have one*

The perception of the learners is based on behaviour. Furthermore the eagerness to use mobile phones among learners and teachers show higher possibility of adopting mobile learning [13]. The perception towards mobile learning is positive. 75% of the learners agree and 18.3% of the learners strongly agree that as long as they have a mobile device at hand they will use it for educational purposes.

Among the teachers, however, ownership is a strong component. Some have mobile devices, while other don't. Either way they agree that if they were to have it, they will be able to use it. 58.3% of the teachers agree while 41.7% of them strongly agree. There is a consensus among learners and teachers that they are planning to use mobile devices for education.

6.4.4. *The frequency of accessing the internet from hand-held device*

The Internet is a novel form of learning which permits learners to access learning material ubiquitously through a network [46]. 70.7% of the learners use the internet from their handheld devices on a daily basis, 10.3% thrice a week, 10.3% twice a week, 5.2% once a week and 3.4% never. The twice a week, once a week and never is 19%, while the everyday and thrice a week is 81%. The availability of data on the phones is an influencing factor on the frequency of access to the internet from handheld devices. The WiFi in schools and WiFi hotspots outside school might also be a factor influencing the frequency of access.

Among the teachers, 75% of them accessed the internet from handheld devices every day, while 25% accessed it twice a week. It's not everybody who has an opportunity to be on the internet as and when they feel like it. Other groups use it at all times not only for

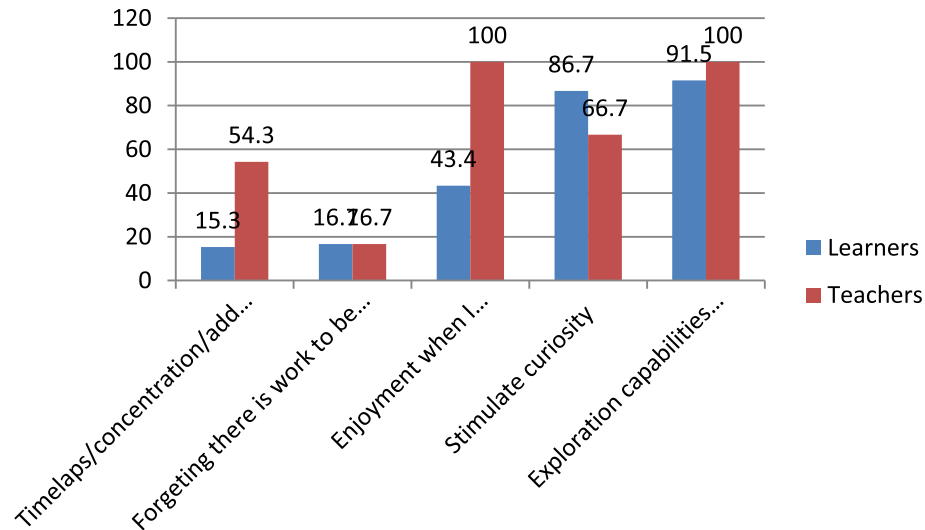


Fig. 4. Perceived playfulness.

learning but for social media and other things as well. The frequency of everyday usage of mobile devices by both learners and teachers is high. Therefore if the same frequency is adopted for education purposes, mobile education would have positive implications in schools and on learners. Fig. 5

6.5. Social influence

This has 5 questions under it.

6.5.1. People who influence behaviour

People who influence learners' behaviour in education are the teachers, parents and peers. Students are inclined to use mobile learning continuously and comfortably if people who influence the behaviour make them do so [29,49]. 56.7% of the learners agree and 6.7% of the learners strongly agree that people who influence their behaviour think they should use mobile learning devices for education. This is 63.4% of the learners. External influence can impact on learners' educational use of mobile learning devices if given space. 13.3% agree and 10% strongly disagree while 13.3% are

neutral.

The people who influence teachers' behaviour are the administrators, principals and peers. Administration would encourage the teachers to do research and read wide. The friends would encourage them to look up things outside discussions, like politics and events. 45.5% of teachers agree and 18.2% strongly agree, which comes to 63.6% who feel that people who influence their behaviour think well of mobile education. 27.3% strongly disagree and 9.1% disagree which add up to 36.4%. There is strong motivation towards mobile education by people who influence both learners' and teachers' behaviour.

6.5.2. Influence of people who are important

According to [50]; students would likely use the mobile devices if they perceive a good view from important people or family support. In other words, using mobile learning would be increased when the students have a high intention by their friends, teachers or families [49]. 38.3% of the learners are neutral that people who are important to them influence their attitudes towards mobile education. Agree is 26.7% and strongly agree has 13.3% giving a total

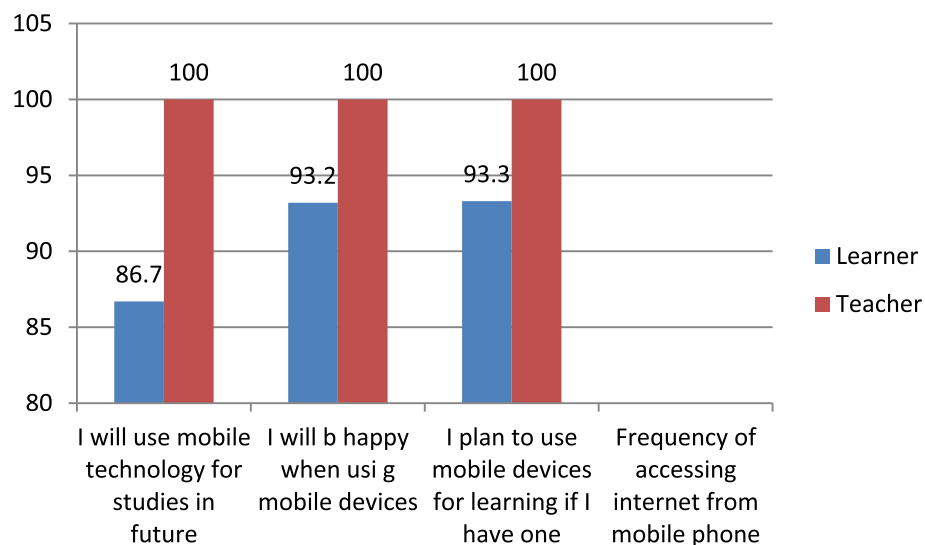


Fig. 5. Behavioural intention.

of 40% of those in agreement that people who are important to them influence their behaviour towards mobile education. Disagree is 16.7% and strongly disagree is 5%, giving a total of 21.7% of those in disagreement that people who are important to them influence their behaviour towards mobile education. This means that those that have influence on their behaviour on mobile education have more impact on them than those that are important to them, because the difference in those in agreement between those who are important to them and those who influence their behaviour is 63.4% and 40%, giving a difference of 23.4%.

Teachers feel that those that are important to them are in their workplaces although these people are not socially tied to them. The importance of these people may not necessarily be in education which is why there are so many teachers who are neutral and so many who are disagreed that people who are important to them influence their attitude towards mobile learning. Those who agreed are few. 50% are neutral, 33.3% disagree and 16.7% agree. The people that influence the behaviour of teachers in mobile education have more impact on them than those who are important to them. 63.6% agreed for those who influence their behaviour versus 16.7% who agreed for those who are important to them giving a wide gap. The patterns and trends between teachers and learners on people who are important to them versus those that influence their behaviour is similar almost.

6.5.3. Group discussions with mates

Mobile learning technology has also been implemented as an academic communication tool through email, text, audio, and voice discussion board postings [83]. While investigating student perception of mobile learning, Cavus et al. (2008) advocates that students perceive student-instructor and student-student communication to be most useful in mobile learning. This is because it brings about collaborative learning. 61% of the learners agree and 32.2% strongly agree that mobile learning will be helpful when they partake in group discussions with their class mates. This figure is high because most of the learners are on social media and their peers are also available on mobile platforms. However, 6.8% of the learners are neutral.

On the other hand, 91.7% of the teachers agree and 8.3% strongly agree that learners will find mobile learning helpful when they partake in group discussions with their class mates. This gives a 100% total of those who agree. This means the teachers understand

the power of working in groups for learners. Learners are likely to take to social media for group discussions. There is a consensus between learners and teachers that mobile learning would encourage teamwork and group discussions.

6.5.4. Schools support for mobile learning

While 60% of learners agree, 26.7% strongly agree that their schools will support the adoption of mobile learning. This constitutes 86.7% of the learner population. However, 13.3% are neutral. This is a group of learners that is not privy to decisions and policies of schools.

On the other hand 41.7% of the teachers agree and 58.3% of the teachers feel that their schools will support the use of mobile learning. This constitutes 100% of the teachers. This shows the confidence that both learners and teachers have in their decision-makers on mobile learning policies. Sarraf, AL-Shihi, & AL-Manthari (2015) agrees that having a conducive environment and support from the authorities are vital in influencing the students to use mobile devices as a learning tool.

6.5.5. Friends embracing mobile learning/teaching

53.3% of learners agree and 13.3% of learners strongly agree that their friends would be happy to use mobile devices in class. This constitutes 66.6% of the learners. However, 33.3% are neutral. On the other hand only 58.3% of the teachers agree that their colleagues will be happy to use mobile devices for teaching. They are not in the minds of their colleagues so they cannot answer for them or they are uncertain. The learners, on the other hand, seem confident that mobile learning for them and their peers would be a welcome venture. Fig. 6

6.6. Voluntariness of use

This subsection has three questions.

6.6.1. Should mobile learning be compulsory in class

Previous research proposes that college students' cell phone use may be a distraction in academic settings (Levine et al., 2007). This is at variance with the responses given by learners in this study. 59.3% of the learners strongly agree while 11.1% agree that mobile learning should be compulsory so that it is formally introduced in class. This constitutes 71.2% of the learners. Unfortunately there

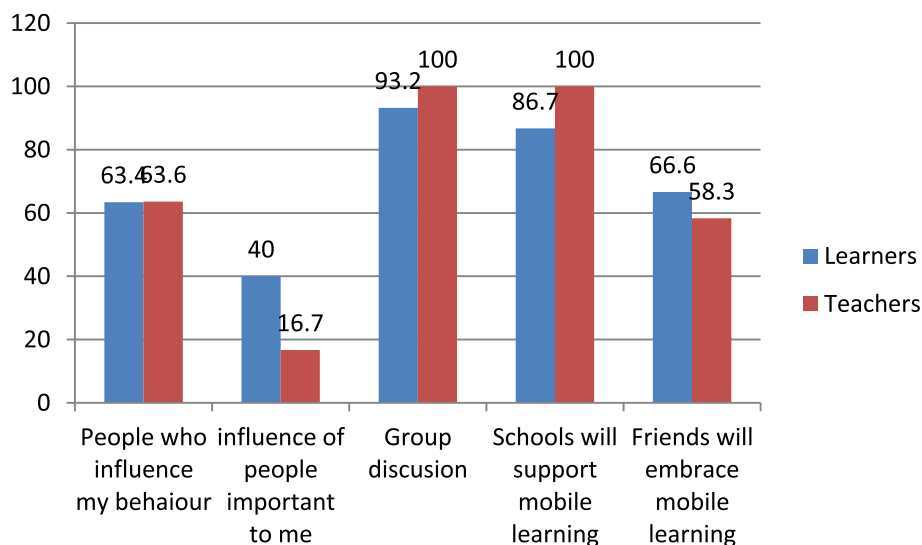


Fig. 6. Social influence.

exists fear from stakeholders that learners will abuse the opportunity and be distracted from lessons. These are preconceived thoughts. 20.3% of the learners are neutral, 1.7% disagree and 6.8% strongly disagree.

33.3% of the teachers strongly agree while 25% of the teachers agree that mobile learning should be compulsory in schools. Although teachers believe it might be a distraction to learners, they are also convinced that its benefits are more than its disbenefits. While 25% of the teachers are neutral, 16.7% disagree that it should be compulsory. This is a group of teachers that feel mobile learning will distract the learners, and some teachers who are suffering from techno-phobia. They fear that the learners are more techno-savvy than them. The teachers would definitely need some training. Otherwise the trend is that both learners and teachers agree that mobile learning should be made compulsory in class.

6.6.2. Should mobile learning be mandatory in schools

[15] opined that using these innovative technologies is associated with better academic performance. Therefore making mobile learning mandatory in schools depends on the value attached to it by the authorities. If the authorities feel it will enhance learners and teachers performance there is every possibility that it will be introduced. In this study, 74.1% of the learners agree and 8.6% of the learners strongly agree that mobile learning should be mandatory in schools. This constitutes 82.7% of the learner population. 5.2% of the learners strongly disagree though.

On the other hand 58.3% of the teachers agree while 16.7% of the teachers strongly agree and 25% of the teachers are neutral. While in the previous section some of the teachers felt mobile technology would be distractive to learners in the class environment, in this section they support mobile learning activities in schools. This means preferably outside the class like with assignments and field work if not in school.

6.6.3. Learner options to choose if they want mobile learning or not

48.3% of the learners strongly disagree while 10% of the learners disagree that they should be made to choose if they want mobile learning or not. The issue is that there is no reason to ask them to choose when they have already indicated interest. 28.3% of the learners are neutral on the issue, while 10% agree and 3.3% strongly agree. On the other hand, 100% of the teachers disagree that learners should be given the right to choose. They believe it is the

administration from schools and parent ministry that should make such decisions not learners. Both the teachers and the learners feel it is not for them to choose, but it should be the policy makers. Fig. 7

6.7. Facilitating conditions

This section has 4 questions

6.7.1. Resources necessary for mobile learning

68.3% of the learners agree and 21.7% of the learners strongly agree that they have the resources necessary for mobile learning. This is a high response of 90%. Only 10% of the learners are neutral on the issue. The 10% are those that indicated that they don't have mobile phones and do not intend to acquire any.

Among the teachers, 91.7% agree and 8.3% strongly agree that they have the resources necessary to use mobile phones. Resources is not only about the mobile device, but knowledge and financial standing and a positive attitude. Resources are not a problem when it comes to introduction of mobile learning. That notwithstanding financial should also be looked into because not all learners and teachers may be able to afford these devices. The cost of purchasing devices for use by teachers and students can be prohibitive [18].

6.7.2. Knowledge necessary for mobile learning

90% of the learners indicate they have the knowledge necessary for mobile learning. Of these 60% agree while 30% strongly agree. The learners have phones and know how to use them and have the resources in these phones. 10% of the learners are neutral.

Of the teachers, 100% have the knowledge necessary to use mobile learning. 75% strongly agree and 25% agree. If given proper training teachers are already knowledgeable. Therefore both learners and teachers are knowledgeable and ready for mobile learning.

6.7.3. School facilities for mobile learning

Facilitating conditions refer to availability of resources to support adoption and usage of mobile learning at given institutions [51]. 40.4% of the learners, which is the majority are neutral on whether their school has facilities for mobile learning or not. This is because most of them are not aware of it since they are not using it, or they are unconcerned if they are not benefitting from it. 47.4% of the learners are agreed since they are aware or know of the

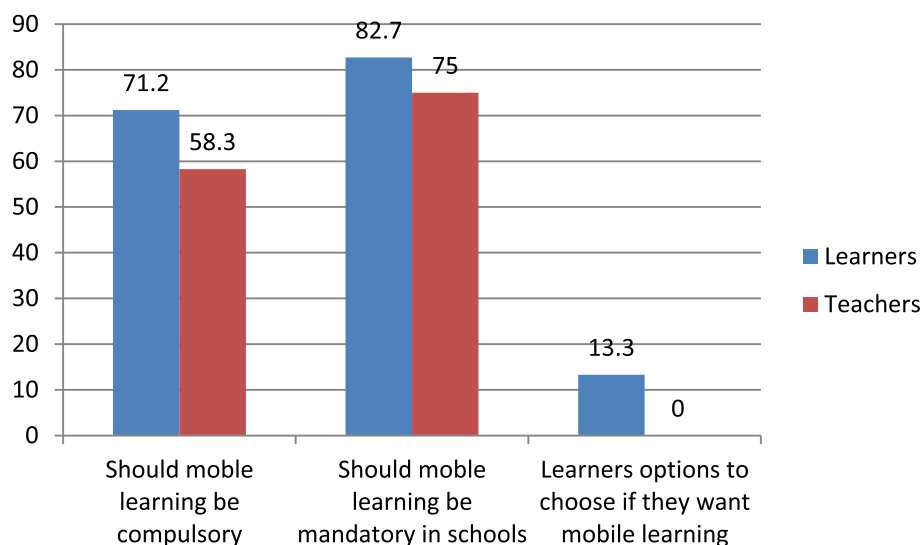


Fig. 7. Voluntariness of use.

presence of mobile technology in their schools. This is most likely the private schools. Of these 22.8% agree while 24.6% strongly agree, 12.3% disagree while 5.3% strongly disagree. This is most likely a group of learners that are not aware if their school has anything or not.

Among the teachers, 8.3% strongly agree while 41.7% agree that their schools have facilities for mobile learning, giving a total of 49.9%. 41.7% of the teachers are neutral on this issue. This is a group of teachers who are not bothered because they do not use mobile learning in their schools. There is mixed response from both learners and teachers on whether their schools are mobile-ready or not. If we zoomed down into the schools individually we might find that some are mobile-ready and others are not.

6.7.4. Teachers to teach mobile learning courses

Researchers have shown that, students will use mobile learning if they know that they have someone to help them when they have difficulties in utilization [49,58]. 40.4% of the learners agree and 31.6% of them strongly agree that their schools have teachers who can assist in teaching using mobile technologies. This comes to 72% of the learners. On the other hand 21.1% of learners were neutral, 5.3% disagree and 1.8% strongly disagree. The environment that exists for this to happen is that the teachers are techno-savvy, there are ICT labs in place, there is an ICT in education policy and a schools ICT policy. At the end of learning, learners have to be computer literate, well-trained vocationally and skilled.

The teacher responses were that 41.7% agree and 16.7% strongly agree, while 41.7% are neutral on the issues. This boils down to the school level. Some schools have teachers who are mobile-ready while others don't. Learners have confidence that their teachers are skilled enough to conduct mobile learning. Fig. 8

6.8. Business benefits of mobile learning integration into the classroom

Mobile teaching and learning has its benefits. Instead of carrying around loads of textbooks learners can use mobile textbook readers connected to their school library or database. Some schools do not have all the educational material they require hence they can access it from other schools or libraries. Learners can access and download educational material anytime and from anywhere, more so if they cannot complete all the work given in class before they leave

school. This is in agreement with Ferry, (2009) who noted that modern mobile phones can be used to help learners access web based contents, remix it, share it, collaborate with others and create media rich deliverables for the classroom teachers as well as global audience. Also [19], noted that in China learners can view their teachers' web page or access some other online English learning resources via mobile phones and they can also take online tests. Mobile devices support internet access and learners can search for educational material they require. Therefore this expands their knowledge. Those learners that prefer videos as a learning mode can view videos on their mobile devices to illustrate related topics. Mobile technologies support research as learners can search for information from the vast international databases. The paperless classroom can be supported through mobile technology. Past examination papers, assignments, projects, syllabus, summaries, school work can all be uploaded onto a mobile device. Mobile technology provides a platform for better learning and accessing information easily. Learners can also make a follow-up on work covered in class. Liaw (2009) reported that mobile phones can provide course material to learners including due dates for assignments, and information about time table and room changes.

Mobile devices can be used for psychometric tests, which can be done online in class to test the learners' aptitude, personality, etc. Mobile technology can also be used for communication between the teacher and the learners through social networks for notification, comments and questions. Also, learner assessment can be done online. Mobile technology facilitates group work and group discussions among the learners. The advantage is that learners become active participants in class. Learners are more involved in hands-on activities Instead of using chalk boards. Through mobile technology, learners engage in conversation whereby they resolve differences, understand the experiences of others, and create common interpretations and shared understanding of the world [60,72]. Dissemination of lessons to learners can be done through mobile technologies. The advantage with mobile technology is that all is available at the click of a button.

6.9. Discussions and conclusion

From the results of this survey, Namibia is mobile-ready, with added support from the education policy makers. The findings were that the majority of teachers and learners in Namibian high schools

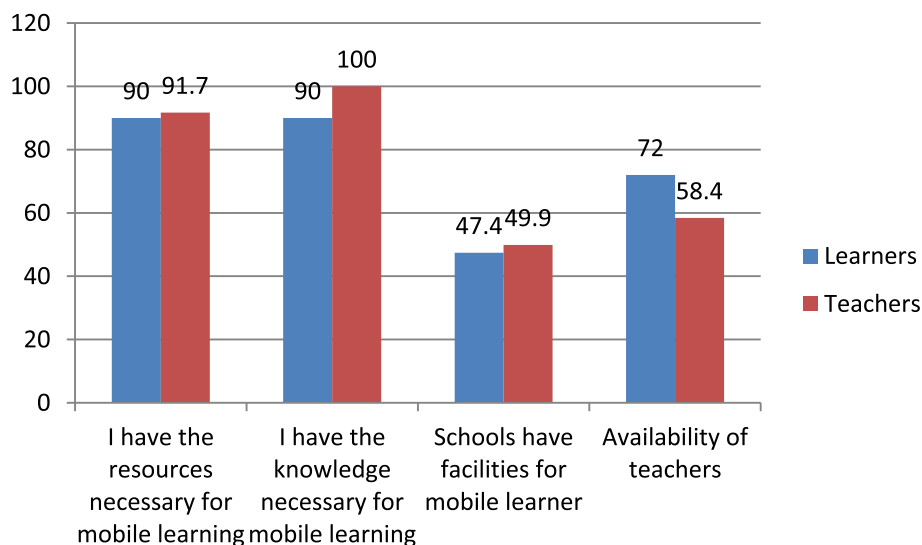


Fig. 8. Facilitating conditions.

are mobile ICT literate. The majority of teachers and learners own handheld mobile devices [26], stated that among the ICT tools mostly owned and used among people are the mobile phones [26], went further to state that they are tools that can provide suitable learning platforms as they have a lot of applications teachers and learners may use in their academic activities. The majority of both teachers and learners can access the internet, download education materials and applications from the internet using mobile devices, use mobile devices as calculators, access social networking sites, search for definitions of words on mobile, send emails, conduct searches for material, send emails, read assignments and post comments on blogs. Both teachers and learners were positive that mobile technology would enhance their teaching and learning capabilities, assist in improving learner grades and accomplish teaching and learning activities quickly. This is in agreement with Sife et al. (2007); who stated that ICTs have capabilities of improving information accessibility; facilitating communication via electronic facilities; enhancing synchronous learning and; increasing cooperation and collaboration. Sife et al. (2007) also stated that in the teaching and learning process, ICTs are known to be more cost-effectiveness as they facilitate collaborations among learners and tutors and enhance pedagogical improvement through simulations, virtual experiences, and graphic representations. Although learners were positive that mobile education should be made compulsory in schools, they feel that the decision lies with policy makers on whether schools should adopt it. Coder Dojo (2012) challenges policy-makers to maintain the current level of excitement around these new innovative opportunities and encourage the adoption of mobile learning into formal education through policy formulation. Both learners and teachers feel that Namibia has the resources in place to introduce mobile learning without any glitches. These resources are in the form of infrastructure and human resources.

One of the most-cited reasons for discouraging the introduction of mobile teaching/learning in the classroom is distraction of learners. It is said that instead of learners following the lesson at hand they will be searching the internet for things that are not related to the lesson, be on social media, watch videos, etc. Wei, Wang and Klausner (2012) found texting during class partially affected a learners' ability to self-regulate their attention to classroom learning. In an earlier study, Wei and Wang (2010) noted college learners' ability to text and perform other tasks simultaneously during class might become a habit over time. Such habits may be defined as automatic behaviors triggered by minimum consciousness. Unnecessary sites such as social media sites should be blocked. Strict supervision of learners is required. Therefore there should be policies in schools on what can be accessed and when to access non-education specific material.

Internet access is expensive, and unless the schools negotiate deals that are affordable with internet service providers (ISP), then introducing mobile learning won't be of any benefit. Providing mobile technologies to learners across schools could be costly and can be accompanied by a range of infrastructural and maintenance challenges but the advantages of having these facilities should also be considered [68]. This could be done at national level by the parent ministry to ensure there is no digital divide between the well-resourced schools and the under-resourced schools. Total dependence on technology has its disadvantages in addition to its advantages. If the technology is down, or electricity is not available, or there is a shortage of skilled technicians to manage the system, then teaching and learning grinds to a halt. Not everyone is ICT literate to use mobile phones. Not everyone has access to a smart phone. Therefore if mobile learning is introduced in schools then the relevant ministry or school administration should be in a position to provide all learners with mobile devices. Mobile devices

can get lost easily. Therefore that would create a cycle of theft from one another.

When a gap exists between the learner's knowledge of usage of mobile technology and teacher's knowledge, especially if the learner is more knowledgeable than the teacher, teacher training in the usage of mobile technologies is required. So is training the learners as well in mobile ICT usage. This consistent with previous studies [21] [62]; [9], which have reported that inadequate training, knowledge and skills; a time, inflexible attitude, and reluctance to use technology are the common challenges among teachers in influencing their use of technology.

Mobile learning integration into schools has a varied range of business benefits to the learner, teacher and education in general. Further research should be conducted on comparing the e-readiness status of Namibia region by region, to see if regional ICT policies, schools ICT policies and the national ICT policy need to be revisited.

References

- [1] Information technology Policy for the Republic of Namibia 2008, Retrieved from http://www.researchictafrica.net/countries/namibia/NMICT_IT_Policy_2008.pdf, 2009.
- [2] J.C. Aker, C. Ksoll, T.J. Lybbert, Can mobile phones improve learning? Evidence from a field experiment in Niger, *Am. Econ. J. Appl. Econ.* 4 (4) (2012) 94–120.
- [3] Z. Al-Khanjar, I.Z. Al-Kindi, E. Al-Kindi, N. Kraiem, Developing educational mobile application architecture using SOA international, *J. Multimedia Ubiquitous Eng.* 10 (9) (2015) 247–254. <http://dx.doi.org/10.14257/jjmue.2015.10.9>
- [4] P. Albion, Some factors in the development of self-efficacy beliefs for computer use among teacher education learners, *J. Technol. Teach. Educ.* 9 (3) (2001) 321–347.
- [5] Anderson, J., & Schwager, P. (2004). SME adoption of wireless LAN technology: applying the UTAUT model. 7th conference of the Southern Association for information Systems.
- [6] P. Aubusson, S. Schuck, K. Burden, Mobile learning for teacher professional learning: benefits, obstacles and issues, *ALT-J Res. Learn. Technol.* 17 (3) (2009) 233–247.
- [7] F. Balash, Z. Yong, B. bin Abu, Factors affecting educational technology adoption in teaching, in: *Proceedings of the 2nd International Conference on Education and Management Technology*, IACSIT Press, Singapore, 2011.
- [8] W. Bhuasiri, O. Xaymoungkhoun, H. Zo, J. Rho, A. Ciganek, Critical success factors for elearning in developing countries: a comparative analysis between ICT experts and faculty, *Comput. Educ.* 58 (2) (2012) 843–855.
- [9] C.K. Blackwell, A.R. Lauricella, E. Wartella, Factors influencing digital technology use in early childhood education, *Comput. Educ.* 77 (2014) 82–90.
- [10] Boruff, J., & Storie, D. (n.d.). Mobile devices in medicine: a survey of how medical learners, residents and faculty use smartphones and other mobile devices to find information. *J. Med. Libr. Assoc.*, 102(1), 22–30.
- [11] J. Brown, J. Haag, *ADL Mobile Learning Handbook*, Advanced Distributed Learning, Washington, DC, 2011.
- [12] C. Buabeng-Ando, Factors influencing teachers' adoption and integration of information and communication technology into teaching: a review of the literature, *Int. J. Educ. Dev. using Inf. Commun. Technol.* 8 (1) (2012) 136–155.
- [13] F.F. Chambo, L.S. Laizer, Y. Nkansah-Gyekye, V. Ndueme, Mobile learning model for Tanzania secondary schools: case study of Kilimanjaro region, *J. Emerg. Trends Comput. Inf. Sci.* 4 (9) (2013) 698–701.
- [14] S.C. Chang, F.C. Tung, An empirical investigation of students' behavioral intentions to use the online learning course websites, *Br. J. Educ. Technol.* 39 (1) (2008) 71–83.
- [15] S.Y. Chen, J.Y. Tzeng, College female and male heavy Internet users' profiles of practices and their academic grades and psychosocial adjustment, *Cyberpsychology, Behav. Soc. Netw.* 13 (2010) 257–262.
- [16] W.W. Chin, P.A. Todd, On the use, usefulness, and ease of use of structural equation modeling in MIS research: a note of caution, *MIS Q.* 19 (2) (1995) 210–237. <http://dx.doi.org/10.2307/249690>.
- [17] P. Cowan, R. Butler, Using Activity Theory to Problematize the Role of the Teacher during Mobile Learning, *SAGE Open* 3 (4) (2013), <http://dx.doi.org/10.1177/2158244013516155>.
- [18] H. Crompton, A Historical overview of m-learning: toward learner-centered education, in: Z.L. Berge, L.Y. Muilenburg (Eds.), *Handbook of Mobile Learning*, Routledge, New York, NY, 2013, pp. 3–14.
- [19] G. Cui, S. Wang, Adopting cell phones in EFL teaching and learning, *J. Educ. Technol. Dev. Exch.* 1 (1) (2008) 69–80.
- [20] Educase, The Horizon Report, 2011, The New Media Consortium, 2011. Retrieved from <http://net.educause.edu/library/pdf/hr2011.pdf>.
- [21] P.A. Ertmer, A.T. Ottenbreit-Leftwich, O. Sadik, E. Sendurur, P. Sendurur, Teacher beliefs and technology integration practices: a critical relationship, *Comput. Educ.* 59 (2) (2012) 423–435.
- [22] A. Gasaymeh, A Study of Faculty Attitudes towards Internet-based Distance

- Education: a Survey of Two Jordanian Public Universities, The College of Education: Ohio University, Ohio, USA, 2009. PhD thesis.
- [23] E. Georgieva, E. Smrikarov, T. Georgiev, A general classification of mobile learning systems (16–17 June 2005), in: Proceedings of International Conference on Computer Systems and Technologies CompSysTech, 2005, pp. 11–16 (Varna, Bulgaria).
 - [24] J. Gikas, M.M. Grant, Mobile computing devices in higher education: student perspectives on learning with cellphones, smartphones & social media, *Internet High. Educ.* 19 (2013) 18–26.
 - [25] C. Gomes, Integration of ICT in science teaching: a study performed in Azores, Portugal, in: A. Vilas, B. Pereira, J. González, J. González (Eds.), Recent Research Developments in Learning Technologies, BadajozFORMATEX, Ponta Delgada, Portugal, 2005, pp. 165–168.
 - [26] R. Guy, *The Evolution of Mobile Teaching and Learning*, Informing Science Press, California, 2009, p. 2.
 - [27] M. Hammond, L. Reynolds, J. Ingram, How and why do learner teachers use ICT? *J. Computer-assisted Learn.* 27 (3) (2011) 191–203.
 - [28] S. Iqbal, I. Qureshi, M-Learning adoption: a perspective from a developing country, *Inter- Natl. Rev. Res. Open Distance Learn.* 13 (3) (2012) 147–164.
 - [29] I. Ismail, R. Idrus, A. Ziden, M. Rosli, Adoption of mobile learning among distance education learners in Universiti Sans Malaysia, *Int. J. Interact. Mob. Technol.* 4 (2) (2010) 24–28.
 - [30] K.K. Jabbour, An analysis of the effect of mobile learning on Lebanese higher education, *Bulg. J. Sci. Educ. Policy (BJSEP)* 7 (2) (2013) 280–301. Retrieved from, <http://bjsep.org/getfile.php?id=145>.
 - [31] W.C. J. Jacobsen, R. Forste, The wired generation: academic and social outcomes of electronic media use among university students, *Cyberpsychology, Behav. Soc. Netw.* 14 (2011) 275–280.
 - [32] A. Jimmoyiannis, V. Komis, Examining teachers' beliefs about ICT in education: implications on a teacher preparation programme, *Teach. Dev.* 11 (2) (2007) 149–173.
 - [33] R. Junco, S.R. Cotton, No A 4 U: the relationship between multitasking and academic performance, *Comput. Educ.* 59 (2012) 505–514.
 - [34] A.C. Karpinski, P.A. Kirschner, I. Ozer, J.A. Mellott, P. Ochwo, An exploration of social networking site use, multitasking, and academic performance among United States and European university students, *Comput. Hum. Behav.* 29 (2013) 1182–1192.
 - [35] M. Katulo, An Investigation of the Role of Principals in Promoting Computer Usage in Selected Schools in Namibia: Unpublished Masters of Education Dissertation, Rhodes University, 2010.
 - [36] M. Kebritchi, Factors affecting teachers' adoption of educational computer games: a case study, *Br. J. Educ. Technol.* 41 (2) (2010) 256–270.
 - [37] C. Kee, Z. Samsudin, Mobile devices: toys or learning tools for the 21st century teenagers, *Turkish Online J. Educ. Technol.* 13 (3) (2014) 85–100.
 - [38] J.E. Kihwele, T.A.L. Bali, The perceptions of teachers, parents and students on the effects of mobile phone use on student learning in Tanzania, *J. Educ. Pract.* 4 (25) (2013) 101–106.
 - [39] P.A. Kirschner, A.C. Karpinski, Facebook and academic performance, *Comput. Hum. Behav.* 26 (2010) 1237–1245.
 - [40] D. Keegan, Mobile learning – the next generation of learning, in: The 18 Asian Association of Open Universities Annual Conference, Shanghai, China, 2004. http://learning.ericsson.net/mlearning2/files/Des_paper_AAOU.pdf.
 - [41] E. Koh, Y. Kin, B. Wadhwa, J. Lim, Teacher perceptions of games in Singapore schools, *Simul. Gaming* 43 (11) (2012) 51–66.
 - [42] A. Kafyulilo, Access, Use and Perceptions of Teachers and Students towards Mobile Phones as a Tool for Teaching and Learning in Tanzania, <http://rd.springer.com/article/10.1007/s106390129207y>, 2012. Educational and information technologies journal (Accessed on 31 October 2012).
 - [43] Y.F. Lan, Y.S. Sie, Using RSS to Support Mobile Learning Based on Media Richness theory, *Computers & Education* 55 (2) (2010) 723–732. <http://dx.doi.org/10.1016/j.compedu.2010.03.005>.
 - [44] G. Lefoe, I. Olney, R. Wright, A. Herrington, Faculty development for new technologies: putting mobile learning in the hands of teachers, in: A. Herrington, J. Herrington, J. Mantei, I. Olney, B. Ferry (Eds.), *New Technologies, New Pedagogies: Mobile Learning in Higher Education*, University of Wollongong, Wollongong, Australia, 2009.
 - [45] A. Lepp, J.E. Barkley, A.C. Karpinski, The relationship between cell phone use and academic performance in a sample of U.S. College students, *SAGE Open* 5 (1) (2015), <http://dx.doi.org/10.1177/2158244015573169>.
 - [46] M.N. Masrek, Predictors of Mobile Learning Adoption the Case of Universiti Teknologi MARA, 2015.
 - [47] W. Matha, K.B. Madarsha, Mobile learning acceptance among students of Ramkhamharn University, Thailand, in: The 1st YRU International Conference in Islamic Education (YRU-ICE 2013), 2013. ID: YRU-ICE2013–S047.
 - [48] J.S. Mtebe, R. Raisamo, Investigating students' behavioural intention to adopt and use mobile learning in higher education in east africa, *Int. J. Educ. Dev. using Inf. Commun. Technol. (IJEDICT)* 10 (3) (2014) 4–20.
 - [49] M. Moran, College Learners' Acceptance of Tablet Personal Computers: a Modification of the Unified Theory of Acceptance and Use of Technology Model: Unpublished Doctorate Thesis, Capella University, Capella, Italy, 2006.
 - [50] L. Naismith, P. Lonsdale, G. Vavoula, M. Sharples, Literature Review in Mobile Technologies and Learning, 2004. Report 11, Future lab Series, http://www.futurelab.org.uk/research/reviews/reviews_11_and12/11_01.htm.
 - [51] C.R. Namibia, ICT Sector Performance Review for 2014, Retrieved from CRAN 2015 Annual Report <http://www.cran.na/downloads/Media%20Releases/Marketing%20Report%202015.pdf>, 2015.
 - [52] A.B. Nassuora, Students acceptance of mobile learning for higher education in Saudi Arabia, *Am. Acad. Sch. Res. J.* 4 (2) (2013).
 - [53] E. Ngololo, An Evaluation of the Implementation of the ICT Policy for Education in Rural Namibian Schools: a PhD in Computer-integrated Education, University of Pretoria, 2010.
 - [54] K. Nyíri, Towards a philosophy of M-learning, in: Proc. of IEEE International Workshop on Wireless and Mobile Technologies in Education (WMTE 2002), August 2002, pp. 121–124. Växjö, Sweden.
 - [55] B. Olutanji, C. Ebesutani, J. Hardt, C. Sawchuk, Specificity of disgust domains in the prediction of contamination anxiety and avoidance: a multimodal examination, *Behav. Ther.* 45 (2014) 469–481.
 - [56] A.T. Ottenbreit-Leftwich, K.D. Glazewski, T.J. Newby, P.A. Ertmer, Teacher value beliefs associated with using technology: addressing professional and student needs, *Comput. Educ.* 55 (3) (2010) 1321–1335.
 - [57] N. Pachler, J. Cook, B. Bachmar, Appropriation of mobile cultural resources for learning, *Int. J. Mob. Cult. Resurces Learn.* 2 (1) (2010) 1–21.
 - [58] P. Papaioannou, K. Charalambous, Principals' attitudes towards ICT and their perceptions about the factors that facilitate or inhibit ICT integration in primary schools of Cyprus, *J. Inf. Technol. Educ.* 10 (2011) 349–369.
 - [59] E. Pianfetti, Focus on research: teachers and technology: digital literacy through professional development, *Lang. Arts* 78 (3) (2001) 255–262.
 - [60] P. Riley, Teaching, learning, and Living with iPads, *Music Educ. J.* 100 (2013) 81–86. <http://mej.sagepub.com/content/100/1/81.abstracthttp://dx.doi.org/10.1177/0027432113489152>.
 - [61] L.D. Rosen, M. Carrier, N.A. Cheever, Facebook and texting made me do it: media-induced task-switching while studying, *Comput. Hum. Behav.* 29 (2013) 948–958.
 - [62] C. Russell, Q. Jing, Evaluating an Institutional Blended & Mobile Learning Strategy, *Electric Dreams. Proceedings Ascilite 2013*, Australia, Sydney, 2013.
 - [63] M. Sanchez-Martinez, A. Otero, Factors associated with cell phone use in adolescents in the community of Madrid (Spain), *Cyberpsychology, Behav. Soc. Netw.* 12 (2009) 131–137. <http://dx.doi.org/10.1089/cpb.2008.0164> PMID:19072078.
 - [64] G. Sang, M. Valcke, J. Braak, J. Tondeur, Learner teachers' thinking processes and ICT integration: predictors of prospective teaching behaviours with educational technology, *Comput. Educ.* 54 (1) (2010) 103–112.
 - [65] P. Seppala, H. Alamaki, Mobile learning in teacher training, *J. Computer-assisted Learn.* 19 (2003) 330–335.
 - [66] M. Sharples, J. Taylor, G. Vavoula, A theory of learning for the mobile age, in: R. Andrews, C. Haythornthwaite (Eds.), *The Sage handbook of e-learning research*, Sage Publications, London, 2007, pp. 221–247.
 - [67] L. Siragusa, K. Dixon, Planned Behaviour: Learner Attitudes towards the Use of ICT Interactions in Higher Education (Hello! Where are you in the landscape of education technology, Melbourne), 2008.
 - [68] A. Smith, L. Raine, K. Zickuhr, College Students and Technology (The Pew Research Center's Internet and American Life Project), 2011. Retrieved from <http://pewinternet.org/Reports/2011/College-students-and-technology.aspx>.
 - [69] A. Tashakkori, C. Teddlie, *Mixed Methodology: Combining Qualitative and Quantitative Approaches*, Sage, Thousand Oaks, California, 1998.
 - [70] D.R. Tindell, R.W. Bohlander, The use and abuse of cell phones and text messaging in the classroom: a survey of college students, *Coll. Teach.* 60 (2012) 1–9.
 - [71] J. Toruam, E-learning and distance education in Nigeria, *Oju Online J. Educ.* 7 (4) (2015) 1–10.
 - [72] UNESCO, Mobile learning for teachers in Africa and the Middle East: exploring the potentials of Mobile technologies to support teachers and improve practices, unesdoc.unesco.org/images/0021/002163/216358e.pdf, 2012 (accessed on 31st October 2012).
 - [73] H. Uzunboyulu, F. Ozdamli, Teacher perception for m-learning: scale, development and teachers' perceptions, *J. Computer-assisted Learn.* 27 (6) (2011) 544–556.
 - [74] V. Venkatesh, M. Morris, G. Davis, F. Davis, User acceptance of information technology: towards a unified view, *MIS Q.* 27 (3) (2003) 425–478.
 - [75] F.H. Wei, G.-D. Chen, C.-Y. Wang, Ubiquitous discussion forum: introducing mobile phones and voice discussion into a web discussion forum, *J. Educ. Multimedia Hypermedia* 16 (2) (2007) 125–140.
 - [76] D.M. West, Mobile Learning: Transforming Education, Engaging Students, and Improving Outcomes, Centre for Technology Innovation at Brookings, Retrieved from, 2013, http://www.brookings.edu/~media/research/files/papers/2013/09/17-mobile-learning-education-engaging-students-west/brookingsmobilelearning_final.pdf.
 - [77] Y. Wang, Y. Shih, Why do people use information kiosks? A validation of the Unified Theory of Acceptance and Use of Technology, *Gov. Inf. Q.* 26 (1) (2008) 158–165.
 - [78] E. Wood, L. Zivcakova, P. Gentile, K. Archer, D. De Pasquale, A. Nosko, Examining the impact of off-task multi-tasking with technology on real-time classroom learning, *Comput. Educ.* 58 (1) (2012) 365–374.