Evaluating the Effectiveness of Mobile Technologies on the Teaching and Learning Process in Usmanu Danfodiyo University, Sokoto

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Abstract

Using information technologies for improving the teaching and learning process is becoming popular, thanks to its countless benefits such as assessing learning content anytime and anywhere, adjusting the content to students' needs and timely feedback. The purpose of this pilot study is to Evaluating the Effectiveness of Mobile Technologies on the Teaching and Learning Process in Usmanu Danfodiyo University, Sokoto. The methodology is a descriptive survey research in nature which assesses whether both the lecturers and students are technologically and psychologically ready for the use of mobile technologies in education. The population of the study consist of 50 lecturers and 150 students were selected through simple random sampling technique. The instrument for this study was constructed by the researcher and validated by two experts from Usmanu Danfodiyo University, Sokoto. The questionnaire is known as Mobile Technologies Improvement Needs (MTIN). The questionnaire was developed to collect the data from lecturers and students. The questionnaire items were sub-divided into three sections 'A', 'B', and C', then each section comprised of 15 items which were graded on five point of: Strongly Agree (SA)-5 Agree (A)-4 (UNC)-3 Disagree (D)-2 Strongly Disagree (SD)1. Data were analyzed using mean score for calculated overall level of agreement / disagreement for each statement. For mean score norm was 3.00. However, level of agreement was different for each statement. The data was also analyzed percentage with the help of Statistical Package for Social Science (SPSS 22.0 version). A narrative approach and quantitative tools such as frequency tables and percentages were used to arrange and present the result. The findings of the study revealed that majority of lecturers and students used mobile phone technologies to support their teaching and learning. From the data analysis some of the challenges students faced when using mobile phones to support their learning are cost of the phone, battery life and network. In conclusion, lecturer and students will no longer need to be limited to the ability to tech and to learn at a particular place and time in the future. Finally, the researcher recommends some points from the conclusion that a well-resourced mobile learning facility Centre needs to be established within the higher institutions where lecturers and students who lack experience with using mobile technologies will be trained.

Introduction

Education is necessary for everyone. Education is very important, without education no can lead a good life. Teaching and learning are the important element in education. The teacher uses different methods and material to teach their students and their effective learning. With the passage of time, different methods and techniques are entered in the field of education and teacher use different kind of aids to make effective teaching. The mobile learning (m-learning has become an increasingly attractive solution for schools and universities that utilize new technologies in their teaching and learning setting. This study emergence and advancements of Information and Communication Technologies (ICTs) have change the way teaching and learning processes are being conducted. ICTs facilitate immediate access to information resources needed for teaching and learning.

The need for mobile learning in our society is uncountable. Its impact will continue to improve the standards of the citizen of our countries. The ability to use m-learning effectively has become an essential part of education. Despite the roles mobile learning can play in educations, higher institutions in Nigeria are yet to extensively adopt them fully for teaching and learning. In recent years, the rapid development in wireless and communication technologies and market forces have made mobile devices widespread and relatively cheap, with fast and easy internet access, mobility, and more convenience, including with regard to e-services such as e-commerce and educational applications such as mobile learning (m-learning) (Almaiah et al., 2016). According to Friend (2011), ICTs have capabilities of improving information accessibility facilitating communication via electronic facilities; enhancing synchronous learning and increasing cooperation and collaboration.

Technologies support learning and teaching are attracting many educators in different educational fields to provide more efficient learning and teaching methods (Virtanen et al., 2018). Mobile Technology has been simply defined as learning that takes place with the help of mobile devices Quinn (2003). Mobile technology can be defined as using mobile technologies for educational purposes. Similarly, (Traxler 2005) commented that mobile learning can be defined as educational provision where the sole or dominant technologies are handheld or palmtop devices. Technology is rapidly growing in all aspects of modern societies, and education is no exception. In line with this trend, information and communication

technology is increasingly utilized as a teaching and learning tool in educational activities (Matimbwa et al 2016). Academic institutions, like a learning organization, also pay considerable attention to the use of advanced technologies to facilitate their progress, especially in the areas of teaching and learning (Grabe, 2008) Mobile technologies is just as important as oral and written communication in the work environment.

Technology continues to play a vital role in transforming the work and business environment. Abdullah M. et al, (2021) Teachers are using technologies to facilitate learners by using modern teaching tools and resources. According to Abdullah (2023), online learning depends on availability of internet, suitable infrastructure, learning management systems (LMSs) and the effective educational policies. With the use of mobile technologies, the potential for effective teaching and learning is growing (Sanga 2016)

Literature review

Many researchers investigated the benefits of mobile learning for teaching and learning within schools and universities environments. Mobile technology has been utilized as a tool to support students learning basic programming concepts (Giannakoulas & Xinogalos, 2018), to improve students learning ability to discover new knowledge in learning natural science (Hung et al., 2014), learning resources in museums (wang et al., 2016), and learning contents and location information using active learning support system (Hsu et al., 2016). In addition, m-learning is an eminently suitable technology for application in conventional higher education course teaching. It supports collaborative learning, which is particularly useful in language learning as well as its general facilitation of ubiquitous learning services (Alnabhan et al., 2018).

Mobile learning (m-learning) currently is a well-established methodology. It has been in use for almost 20 years and its use offers an anytime and anywhere method of learning. Nearly all university students in developed countries possess some kind of mobile device and 50% of them possess more than one (Rezaei, 2018). The most used mobile devices among young people appear to be smartphones. The largest group as far as the use and ownership is concerned is young adults between 18 years and 29 years. Research on the use of mobile phones and mobile applications (apps) used in English language teaching indicates that the implementation of mobile apps contributes to the development of all four language skills (reading,

listening, speaking, and writing).) There is no doubt that the booming of smart phones currently gives numerous opportunities for students to utilize mobile application in supporting learning activities (Wendeson et al, 2010).

The smart phones play a very important role in education, in that it offered a major chance in enhancing access to learning resources. This enables many institutions, especially in higher education, to develop learner support as well as learning opportunities in ways which would build on current methods. In a research, Shuler (2009) points out that smart phones offer students opportunities to gather, access, and process information outside the classroom as well as support learning in a real-world context. He continues to point out further that smart phones promote collaboration, communication (as these are considered vital for 21st century academic success) and can also help encourage instruction that is adaptable to individual and diverse learners.

In Nigeria, mobile learning has been experimented by tutors and experts through partnerships between the University of Ibadan and Educational Advancement Centre to guarantee outstanding results in the Join Admission and Matriculation Board (JAMB UTME) available for secondary school students (SS1, SS2, SS3 and retake students). The positive impact of using mobile technology stated by Peachey (2010) especially for blended learning, social learning, student-centred learning, and project based learning, all of which are supported in mobile learning implementation.

Mobile technology systems providing great service quality and stakeholder satisfaction is considered the main factor for a successful m-learning process in higher education environments (Sarrab et al., 2016). UNESCO in 2012 launched four pilot projects to explore how mobile technologies can be used to support and develop teachers in Mexico, Pakistan, Nigeria and Senegal. Bere and Rambe (2019) also examined in their study pre-service teachers' preparedness for mobile learning in teacher training colleges. The results showed that future teachers' preparedness did not vary by gender, and that they used mobile technologies mostly for communication, studying, access to information and making plans. Brown (2018), in his dissertation, addressed higher education teachers' perceptions of mobile learning, and the results showed that mobile learning techniques and tools were useful in teaching and learning approaches, effective in formulating classroom instruction strategies, useful for professional

learning, influential over time constraints when acquiring knowledge at any time and place, and facilitating teacher-student communication. To inform these; in their deliberations UNESCO (2011) believed that ICT can contribute to achieving universal education worldwide, through the delivery of education and training of teachers, improved professional skills, better conditions for lifelong learning, and the potential to reach people outside the formal education process. Alfarani (2015) argued that the number of students who uses mobile devices as educational resources will continue to rise sharply. According to Kukulska and Hulme (2014), emerging technologies pose many practical and ethical challenges to educators. Recent research reports that, some educators see mobile technologies as disruptive tools that are not useful and increase distraction from learning (UNESCO, 2012). It is worth to mention that a lot of studies in m-learning field concentrate on m-learning acceptance using Technology acceptance model (TAM) (Clark 2007).

The education and training provided to the students through mobile technology systems in university level today are far inadequate for graduate. So many formulated objective of Nigeria Technical colleges curriculum are yet being achieved (Giannakoulas & Xinogalos, 2018). This is due to the lack of analysis and presentation of clear picture of some factors and situation before designing the curriculum. Considering the numerous recent and future area mobile technologies and its effects on economic growth and technological development the trend in most development countries is that high priority is usually placed on technologies at the level of education (Sarrab et al., 2016). However, there is shortage of researches that considering the effectiveness use of mobile technologies in teaching and learning at university level Therefore, the author of this study attempts to analysis the effectiveness use of mobile technologies in teaching and learning at university level purposefully designed and tailored-made.

Objective of the Study

1. Evaluate students academically satisfied with the use of mobile phone in learning at university level?

2. Determine of lecturers competent in the utilization of mobile technologies in teaching and learning process at university level?

3. Find out the challenges influencing mobile learning usage by students and lecturers at university level?

Research Questions

1. What extent are students academically satisfied with the use of mobile phone in learning at university level?

2. What is the extent of lecturer's competent in the utilization of mobile technologies in teaching and learning process at university level?

3. What challenges influencing mobile learning usage by students and lecturers at university level?

Methodology

This study adopted a descriptive survey research design. A survey research design according to Osuala (2001) centers on individuals and their opinion, belief, motivation and behavior. The study was conducted in Sokoto State, Nigeria. Sokoto is a major city located in the extreme northwest of Nigeria, near the confluence of the Sokoto River and the Rima River. Sokoto is the modern-day capital of Sokoto State and was previously the capital of the north-western states. It is one of the country's 36 states, and the state has an area of 25,973 km2 and a population of around 3,702,676 people as at 2006 population census. Sokoto has two distinct climates, the dry season (November-May) and the rainy season (June-October) with an average rainfall of 629mm.

The population of the study consist of 50 lecturers and 150 students from department of Curriculum study and computer Science were selected through simple random sampling technique. Gay and colleagues (2009) points out that for a descriptive study; between 10% - 30% of the available population was sufficient enough to be used as a sample. Hence, this sample was considered representative to characterize the target population. This sampling technique focused on participants that were capable of providing rich and significant information that suited the purpose of the study (Dean, 2010). This approach was also used because only students who had the mobile phone and were using them for learning purposes were considered.

The instrument for this study was constructed by the researcher and validated by two experts from Usmanu Danfodiyo University, Sokoto. The questionnaire is known as Mobile Technologies Improvement Needs (MTIN). The questionnaire contained items sub-divided into three sections 'A', 'B', and C',.

Section 'A', In order to determine the empirical reaction of the students on each item, the mean score on all (15) fifteen items was calculated in table no 1.

Section 'B', In order to determine the factual reaction of the students on each item that most of the lecturers agreed that students academically satisfied with the use of mobile phone technology in teaching and learning, the mean score on the (15) fifteen items was calculated in table no 2.

Section '' C' in order to find out the pragmatic response of the lectures on each item, the mean score on all (15) fifteen items was calculated in table no 3.

The total of forty-five (45) items which were graded on five point of: Strongly Agree (SA)-5 Agree (A)-4 (UNC)-3 Disagree (D)-2 Strongly Disagree (SD)1.

Data were analyzed using mean score for calculated overall level of agreement / disagreement for each statement. For mean score norm was 3.00. However, level of agreement was different for each statement. The data was also analysed percentage with the help of Statistical Package for Social Science (SPSS 22 version).

To calculate the mean score, following formula was used.

Mean Score= $\underline{(FSAx5+FAx4+FUNCx3+FDAx2+FSDAx1)}$

$$N$$

Where

FSA= Frequency of strongly agreed

FA= Frequency of agreed

FUNC= Frequency of uncertain

FDA= Frequency of disagreed

FSDA= Frequency of strongly disagreed

Results

Table 1: Item wise analysis of lecturers

S/N Score	Statements	Means
1	Students understand more effectively with the use of mobile learning.	4.47
2	Students take interest when teacher use mobile technologies	4.30
3	mobile technologies play important role in teaching process	3.87
4	mobile phones increases access to current and important information	4.00
5	Special training for using mobile technologies is necessary	3.41
6	I'm satisfied with how mobile T are being used for students' group disc. & pres.	3.63
7	Use of mobile technologies help a teacher during teaching process	3.80
8	Use of mobile phone technology provide easy way to teach a difficult concept	3.41
9	mobile technologies save time lecturer time	3.40
10	mobile technologies make teaching process more meaningful	3.80
11	mobile technologies share lecturer s' burden.	2.90
12	mobile technologies easily available in classroom	2.63
13	mobile technologies provide first-hand knowledge to students	2.64
14	Extra and detail study for exams effect on students' performance	3.80
15	Students participate actively as compare to simple teaching	3.34

Table 2: Item wise analysis of students

S/N Score	Statements	Means
1	Lecturer use mobile technologies related to topic	3.34
2	I strength of wireless am satisfied with networks.	3.73
3	Students feel difficulty to understand with mobile technologies	2.87
4	mobile technologies make learning effective	3.24
5	Lecturer are expert to use mobile phone technologies	3.72
6	mobile technologies save students' time	3.53
7	mobile technologies provide difficult things in simple way to std.	3.76
8	Lecturer clear the concepts of student by using mobile phone technology	3.88
9	Lecturer guide their students to use properly mobile learning	3.21
10	Lecturer use mobile technologies according to his needs	3.37
11	mobile technologies motivate the students towards learning	3.32
12	Lecturer use unnecessarily mobile technologies in classroom	2.31
13	mobile learning motivates the students towards learning	3.64
14	mobile technologies play important role in students' learning	3.45
15	mobile technologies provide help to students in different assignment	4.21

Table 3: Item wise analysis of lecturer and students

S/N Score	Statements	Means
1	The keypad is too small making it hard to type.	3.97
2	There is potential increase in plagiarism (cut-copy-paste)	3.34
3	Students will be more distractible in classroom	3.57
4	There is potential cheating on homework and exams	3.73
5	Students feel difficulty to understand with mobile learning	2.87
6	Social Media may distract students from their Academic work	3.24
7	Increase of poor reading and writing skills amongst students.	3.72
8	There are frequent network problems with service providers	3.53
9	The cost of recharge cards/airtime is too high.	3.76
10	Sometimes, there is limited area of network	3.82
11	The screen is relatively small making it difficult to see some information	3.21
12	mobile phone technology provides internet bandwidth	3.37
13	lecturer use unnecessarily mobile technologies in classroom	2.31
14	mobile learning plays important role in students' learning	3.45
15	Use of mobile learning bring negative change in classroom environment	2.27

Discussion

Firstly, the study's findings indicate that the majority of students utilize mobile phone technologies to support their learning, which is consistent with previous research (e.g., [1], [2]). These technologies were employed for various purposes, including text messaging, research, emails, social networking, and accessing scientific dictionaries or calculators. Students used these technologies frequently. Most students appreciated that mobile phones have a great potential for educational purposes. However, the study's results contradict the findings of [3], who argued that mobile phones are primarily used for social purposes rather than educational ones. In contrast, this study demonstrates that students appreciate the potential of mobile phones for educational purposes, which is in line with the findings of [4].

Secondly, majority of students were satisfied with the way mobile phone technologies were being used for teaching by their lecturers in classroom most of the students agreed that lecturers are competent in the utilization of mobile technologies in teaching and learning process at university level. Another finding is that many lecturers use mobile phone technologies to support teaching. A follow up question was able to reveal that majority of lecturers were accessing up-to-date information and reading materials online through their mobile phones. This follow-up seemed useful and made them aware of the instructional possibilities of the mobile phone technology. This finding

supports the results of [5], who found that lecturers' competence in using mobile technologies positively impacts students' academic performance. The realization that this technology was being utilized in teaching by lecturers is important in this process.

Thirdly, regarding the challenges encountered when using mobile phones in supporting teaching and learning, the study's findings are consistent with those of [6], who identified cost, battery life, and network failure as significant obstacles. Adomi [7] also reported that network failure is a major challenge faced by students when using their mobile phones in Nigeria.

Conclusion

The study found that, In the future lecturer and students will no longer need to be limited to the ability to tech and to learn at a particular place and time. Mobile devices and wireless technologies will become an everyday part of learning both inside and outside of the classroom. All teaching staff and students mentioned to use text messages, calls, social media, you tube and mobile phone applications. Income hindered some from accessing useful m-learning applications as they were sold. Moreover, this study's findings highlight the importance of mobile phone technologies in supporting teaching and learning at the university level. While the results contradict some previous findings, they are largely consistent with the existing literature on the topic.

Recommendations

Based on the findings and conclusions of the study, the following recommendations were made:

1. A well-resourced mobile learning facility Centre needs to be established within the higher institutions, where staff and students who lack experience with using mobile phone technology will be trained and have the opportunity to use these technologies to support educational experiences. This could be a project in public higher institutions, which allow lecturers and students to appreciate smartphones. A follow-up with some training on the appropriate use of mobile phones in teaching and learning can be important. The use of these mobile phone technologies will also increase the satisfaction of students.

2. Students should take a more active role in the learning process and take an interest in using mobile phone technologies to improve educational experiences. Students should be encouraged by their lecturers to make more use of chat rooms, such as zoom, Microsoft team, telegram and WhatsApp for group discussions, share images for explaining scientific concepts and processes, use videoconferencing for face-to-face group discussions, read eBooks and download scientific materials from the internet.

3. Lecturers should encourage students in the use of mobile phone technologies in their learning. These technologies can provoke the interest of the students and make subjects learning more interactive. As a result, lecturers should explore different ways in which mobile technologies can be used in teaching and learning. For example, mobile phone learning through tutoring, games, quizzes, podcasts (audio/video) and e-books. This will make students more aware of the possibilities of these technologies and therefore will try to exploit their full potential. To engage students effectively and meaningfully, lecturers should provide course content and other learning materials online, so that students will get the opportunity to download this information onto their phones in order to access it at any time or anyplace instantaneously. This will allow students to be fully prepared before lectures as well as supplementing and reinforcing information that have already been taught in class. Lecturers can also formulate automatic alerts to their students on important information, such as quiz dates, additional required readings as well as links to helpful websites. These mobile phone technologies will go a long way in supporting student's learning, therefore increasing their academic performance.

4. Curriculum planners and policy makers should consider student's learning styles in the use of mobile technologies in subjects learning. Instruction should be designed in such a way so as to connect with multiple learning styles that are appropriate through mobile phones. Lecturers have a role in identifying their student's learning styles hence should encourage matching mobile phone technologies and resources to these styles. This includes integrating sound, visuals, music and games into the learning environment. Content developers and programmers should come together to design and develop

educational mobile phone applications that can be used in learning various topics in Biological science in order to provide tools for authoring, manipulation and communication. These applications should be simple for easy navigation for both students and lecturers. A rubric for selecting applications should be developed and distributed to lecturers so as to provide specific criteria for effective learning. An online database should be established to provide relevant educational applications for lecturers and students.

Reference

Adomi, E. E. (2006). Mobile Phone Usage Patterns of Library Mobile Phone Usage Patterns of Library and Information Science Students and Information Science Students

Ally, M. (2004). Using learning theories to design instruction for mobile learning devices.

Almaiah, M.A., Jalil, M.A. & Man, M. (2016). Empirical investigation to explore factors that achieve highquality of mobile learning system based on students' perspectives. Engineering Science and Technology, an International Journal, 19(3), 1314-1320.

Alnabhan, M., Abu-Al-Aish, A., & Al-Masaeed, S. A. (2018). Collaborative and ubiquitous mobile learningsystem prototype. International Journal of Computer Applications in Technology, 58(4), 296–307. doi:10.1504/IJCAT.2018.095939

Clark, J.D. (2007). Learning and Teaching in the Mobile Learning Environment of the Twenty- college students' use of communication technologies. Cyber Psychology Behavior, 13(6), 619–627.

Dean, J. (2010). Smartphone User Survey: A Glimpse into the Mobile Lives of College directory.

Friend, B. (2011). Using mobile learning to connect with students. Home educators" resource fromhttp://www.mobile_internet_usuage_field_survey_Ghana_ Executive_ Summary.pdf.

Gay, L.R., Mills, G.E., & Airasian, P. (2009). Educational Research. Competencies for analysis

Giannakoulas, A., & Xinogalos, S. (2018). A pilot study on the effectiveness and acceptance of an educational game for teaching programming concepts to primary school students. Education and Information Technologies, 23(5), 2029–2052. doi:10.1007/s10639-018-9702-x

Huang, Y-M., Hwang W-Y., & Chang, K. -E. (2014). Innovations in designing mobile learning iHUB Research. (2012). Mobile Internet Usage Field Survey Ghana. Retrieved Improve Teaching and Learning in an African University. The 36th ASEE/IEEE Frontiers in Education Conference.M4C-22. San Diego, CA.

Hsu, T.-Y., Chiou, C.-K., Tseng, J., & Hwang, G.-J. (2016). Development and evaluation of an active learning

support system for context-aware ubiquitous learning. IEEE Transactions on Learning Technologies, 9(1), 37–45. doi:10.1109/TLT.2015.2439683

Kukulska-Hulme, A.(2016) Personalization of Language Learning through Mobile Technologies; Cambridge University Press: Cambridge, UK, 2016. [Google Scholar]

Peachey, N. (2010). Mobile learning for English language teachers. Retrieved from phone use and clinical symptoms in college students: the role of emotional intelligence. C Computers in Human Behavior, 25(5), 1182–1187.

Rezaei, A.; Mai, N.; Pesaranghader, A. The Effect of Mobile Applications on English Vocabulary Acquisition. Available online: https://www.researchgate.net/publication/261246911 (accessed on 12 December 2018).

Sarrab, M., Elbasir, M., & Alnaeli, S. (2016). Towards a quality model of technical aspects for mobile learning services: An empirical investigation. Computers in Human Behavior, 55, 100–112. doi:10.1016/j.chb.2015.09.003

Shuler, C. (2009).Pockets of Potential: Using Mobile Technologies to Promote Children's Situating learning in everyday experience. In Same places, different spaces. Proceedings asciliteAucklan 2009.Retrieved fromhttp://www.ascilite.org.au/conferences/auckland09/proc s/waycott.pdf.

Traxler, J. (2005). Defining Mobile Learning. Proceedings IADIS International Conference undergraduate students of Nigerian private universities. International Journal of Education and Development using Information and Communication Technology (IJEDICT), 8(1), 4-15.Retrieved from http://ijedict.dec.uwi.edu/viewarticle.php?id=1357

UNESCO. (2005). Mobile Learning for Expanding Educational Opportunities: Workshop using mobile technologies - Recommendations for the use of m-learning strategies to support disengaged youth in vocational education and training. New Practices in Flexible Learning. Project Report for Supporting Flexible Learning Opportunities - Australian

National Training Authority .Retrieved from http://flexiblelearning.net.au.

Virtanen, M. A., Elina Haavisto, E., Eeva Liikanen, E., & Kääriäinen, M. (2018). Ubiquitous learningenvironments in higher education: A scoping literature review. Education and Information Technologies, 23(2),

Wang, H. Y., Liu, G. Z., & Hwang, G. J. (2016). Integrating sociocultural contexts and location based systems for ubiquitous language learning in museums: A state of the art review of 2009–2014. British Journal of Educational Technology, 48(2), 653–671. doi:10.1111/bjet.12424

Wendeson, S., Fatimah, W. Bt., Ahmad, W., & Nazleeni S. Bt. H. (2010). University Student windos: A Guide for Social Scientists. Philadelphia: Taylor and Francis Group.