

BARRIERS TO M-LEARNING IN HIGHER EDUCATION INSTITUTIONS IN NIGERIA

Shaibu Adekunle Shonola, Mike Joy

Department of Computer Science, University of Warwick (UNITED KINGDOM)

Abstract

The emerging use of mobile and portable devices in education has potential to motivate new approaches to learning and the prospects of implementing m-learning are already obvious and are public knowledge through many research articles. However, the challenges of adopting m-learning in Nigerian universities are enormous. Apart from security issues that have been thoroughly examined in previous studies, this paper identifies and discusses other barriers and challenges being encountered when implementing m-learning, by means of a comprehensive review and survey study carried out in selected Universities in Nigeria. Questionnaires and interviews were the primary instruments used for data collection in identifying the enabling and deterring factors affecting the adoption of m-learning. The results of the study revealed that the m-learning barriers in Nigeria include regulatory issues, school curricula, inadequate funding, lack of infrastructure, over-dependence on mobile technology, attitude and fear, as well as political issues. This paper analyses and discusses the results in detail and concludes by making appropriate recommendations.

Keywords: mobile learning, m-learning, barriers, challenges, Nigeria.

1 INTRODUCTION

The application of computers and interactive learning technologies in education is a modern and effective method of disseminating knowledge. Recently, mobile and wireless equipment have been evolving rapidly to influence learning processes, mostly in Higher Education Institutions, and the use of mobile devices for learning purposes is one of the developing fields in the education sector. It is getting more accepted with the improved accessibility and major enhancements in the capabilities of mobile devices in terms of processing speed, screen sizes, memory capacity, storage volume and network connectivity. Furthermore, the use of these modern portable devices falls in line with planned educational goals to improve students' study retention and achievement, support segregation of learning needs, and reaching out to students who would not have used their mobile phone to participate in learning [1].

Mobile technology is a rapidly growing industry in Nigeria, and from the data obtained from Nigerian Communications Commission (NCC), there are more than 130 million active subscribers and around 75 percent of the Nigerian population now has access to mobile and smart phones as at May 2014 [2]. All students in tertiary education in Nigeria have at least one mobile device. According to the National Universities Commission (NUC), there are fewer than 150 universities in Nigeria serving the huge population of over 150 million [3]. Most of these institutions are offering classroom-based programmes only using desktops and PCs as their main teaching and research equipment. There is an urgent demand for other forms of education delivery such as m-learning and e-learning in order to make use of high availability of mobile devices as well as to leverage the students' academic usage patterns of their portable device and realise the goal of the education curriculum [4].

Although m-learning is being introduced gradually in universities across Nigeria, it is a growing form of knowledge delivery and it faces many challenges such as integration of m-learning into the existing educational curriculum and development of highly rich m-learning content. These challenges, which are not only technologically dependent but also individually, economically and politically induced, require robust solutions in order to successfully implement m-learning in Nigerian universities. The aim of this paper is to identify the barriers affecting implementation and adoption of m-learning in Nigerian universities and analyse how the barriers disturb successful delivery of m-learning systems through a systematic research study. This paper will recommend solutions to these problems, and the findings of this paper will ensure straightforward and effective implementation of m-learning in Nigerian Universities.

2 RELATED RESEARCH

The adoption of m-learning is not the same in all countries due to the level of awareness of the technology, availability of infrastructure, the expertise in the mobile technology and the willingness of the stakeholders to implement and use the technology. While there are few articles and publications that discuss the barriers to m-learning adoption, there is much in the literature that examines the challenges of e-teaching and e-learning, and m-learning is a subset of e-learning. Some of the papers on e-learning along with a few on m-learning are reviewed in the section. Assareh and Bidokht [5] state that e-education has some special kind of barriers that should be known and considered when developing curriculum. The authors classify the barriers to e-teaching and e-learning into 4 categories: (i) learners - due to personal issues such as financial problem, motivation, assessment of their progress, isolation from peers, inadequate skills and experience in distance learning, affection and social domain; (ii) teachers - with subdivision barriers such as lack of adequate knowledge about the e-teaching environment, difficulty of assessment in different domain; (iii) curriculum - ambiguity, quality, resource, teaching process, evaluation; (iv) school - organizational and structural factors. The authors conclude that overcoming these barriers needs more cooperation of related factors like curriculum developers, teachers, technological specialist as well as virtual and actual interaction among learners. This study is specific to e-learning environments and has limited application to m-learning systems in Nigeria.

Manir [6] observed that some of the universities in Nigeria have websites just only for advertisement of their courses but not for leaning activities. The universities' presence on the internet is for information dissemination and communication to students and staff rather than supporting learning activities by providing learning content and materials. The author concluded that the universities' inability to develop content rich learning portals is due to lack of sufficiently trained ICT staff and faculty members. Osang *et al.* [7] listed barriers to the implementation of mobile learning in Nigeria to include social abuse, ease of examination malpractice, low computer literacy levels, poor motivation for educators, poor learning environment, and lack of expertise in technology, among others factors. The authors, however, failed to give adequate rationale behind their choice of these factors as barriers to m-learning in Nigeria. Some of the listed factors appeared to be weaknesses of improper implementation of m-learning rather than being barriers to m-learning, and the others such as poor learning environment is supposed to be one of the reasons for implementing m-learning in Nigeria.

Umoru and Okeke [8] discussed possibilities and challenges of m-learning in Nigerian universities. The challenges they raised regarding m-learning devices includes small screens, tiny keyboards preventing efficient input, high prices, limited computing capability, and connectivity issues. They further mentioned the lack of technical experts in the mobile learning field and adaptation of mobile software for the Nigerian educational curriculum as some of the challenges facing m-learning in higher education institutions in Nigeria. While their research is a significant piece of work on mobile learning in Nigerian Higher Education Institutions, they failed to address these barriers in the context of the latest mobile devices which are now being rolled out with screens that are big enough and keyboards that are suitable for learning. Furthermore, the newest mobile devices have powerful computing capability while their prices are also falling significantly [9].

3 METHODOLOGY

In identifying the challenges of m-learning implementation, two separate research processes were used as primary instruments to obtain respondents' opinions. The first was a hard-copy survey instrument for collecting quantitative from learners. The second was an interview with a sample group of academic staff to obtain qualitative data on their m-learning experience as well as their understanding of factors contributing to m-learning adoption negatively. The study used three universities from South West Nigeria for the purpose of the studies. The study obtained 120 responses for the quantitative approach and 30 interviews for the qualitative approach, all of which were analysed. Secondary instruments for data collection are documented evidence, papers and graphs obtained from the academics and through literature reviews of relevant journals.

4 WHAT ARE THE BARRIERS AND THEIR EFFECTS?

Fig. 1 shows the results obtained from the study conducted to identify the barriers of m-learning in Nigeria. The various results obtained from the study and issues raised are discussed below.

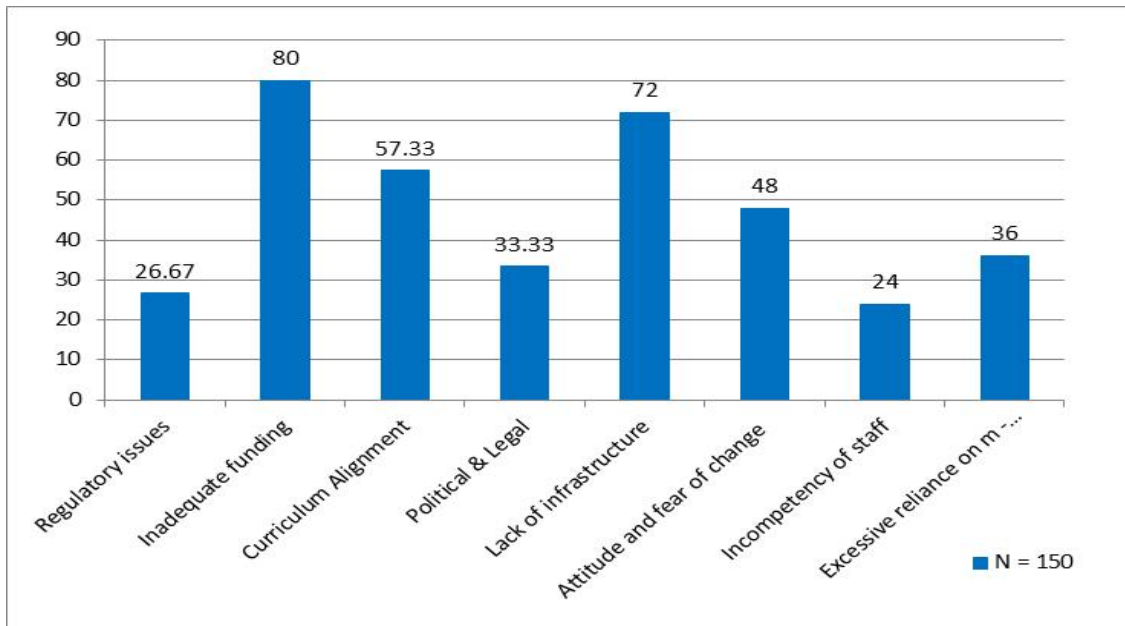


Fig.1 : Barriers to m-learning adoption in Nigeria Universities

4.1 Curriculum Design

One of the challenges of adopting m-learning in Nigerian universities is the modification and alignment of the curriculum to accommodate mobile learning. Almost six out of ten of the participants (57.33%) agreed on this. While university administrators will have to modify the existing curriculum for the context of m-learning, the academics will need to integrate the new technology into their modules. The alignment of science and engineering programmes is remarked to be quite complex due to laboratory involvement, however, art and humanity programmes can easily be aligned. The challenges of aligning m-learning in Nigerian National Curriculum were also highlighted by Adedoja *et al.* [10] on the future of mobile learning in the Nigerian education system. Although, the curriculum redesign and alignment can be done smoothly, Kneil-Boxley [11] remarked that many instructors often hesitate to integrate new technology into their modules until they have evidence that it will benefit their teaching experience and enhance students' learning. The effect of their hesitation can delay implementation and adoption of m-learning or even bring it to a halt, and Cant and Bothma [12] observed that lecturers are important in effective content delivery in the university and successful integration of technologies in education is normally influenced by their perceptions.

4.2 Attitudinal Barrier

Attitude and fear of change is one of the issues raised in the survey as a barrier to effective implementation of m-learning in Nigeria. Nearly half of respondents (48%) said unwillingness to change on the side of learners and lecturers, mostly due to 'business as usual syndrome' or fear of failure is a major barrier. Many of the elderly academic staff in Nigerian Universities were trained with pen and paper for lecturing and research, and they are comfortable to continue to use them for knowledge delivery and they are not willing to change [13]. They show undue resistance to using modern learning technologies as they have not been properly trained to use them. Another reason obtained from the study for their attitude is additional responsibility in terms of preparation for m-learning along with classroom teaching, thereby giving them extra workload without motivation. The effect is lacking behind in development in education in terms of learning technologies and innovative research. Similarly, some mature students are also not willing to embrace technology when learning as they are mainly studying for promotion at work rather than skill acquisition. This result is consistent with that obtained on a previous study on e-learning in which the author stated that lukewarm attitudes on the side of the staff and students in the e-learning processes is a challenge to successful implementation in Nigeria [6] as well as the result of the study obtained by Agbatogun [14] on the use of Interactive digital technologies in Southwest Nigerian universities being impeded by lack of motivation for the faculty members. Another notable reason for the unenthusiastic attitude of lecturers is that mobile devices take learning out of the classroom beyond the reach of the lecturers, and this can be perceived as a threat and loss of control. This reason is also supported by Hashemi *et al.* [15].

Meanwhile, Osang *et al.* [7], remarked that the acceptance and readiness to use mobile technology by the teaching staff and their students is a crucial factor that will determine the success rate of mobile learning implementation in Nigeria.

4.3 Excessive Reliance on Mobile

The survey revealed that over a third of the participants (36%), mostly the educators believed that students relied more on mobile device than attending classes when they were aware that they can access learning materials through their mobiles. While this practice was not a bad idea per se, the effect is that students will certainly miss out on important discussions in the classroom or any other useful activities such as impromptu quizzes being organised by their lecturers. Some educators tried to prevent the students' reliance on mobile device being a substitute to classroom attendance by not putting learning content and materials online.

In addition to the educators' observation on over reliance on mobile devices by the students, some of the academics are of the view that m-learning will only make the students expertise in the use of mobile device rather than support for learning. Therefore, the effect of excessive reliance on m-learning is that study performance can be hampered as valuable time will be wasted learning the use of the tool instead of studying. While that is a perceived view of the academics on the matter, their opinion is supported by the findings of Osang *et al.* [7] wherein the educators believe that technologies usually create expertise in that technology rather than the actual knowledge it is meant to deliver.

4.4 Incompetency of Staff

Another obstacle for developing content-rich m-learning in Nigerian Universities is lack of competent staff on m-learning systems as revealed by the opinion of around a quarter of the participants (24%). While mobile devices are useful in education both as administration and organisation tools, they are hardly used in delivering rich learning content. Boyinbode and Akinyede [16] observed that m-learning is more used for information dissemination and communication, and that the strength of m-learning lies has being a method of communication rather than a content rich approach, due to lack of technical mobile developers or lack of interest in developing learning content on mobile devices. This result is also consistent with that obtained on studies conducted on e-learning and the use of digital technologies in learning in Nigeria wherein the authors concluded that lack of comprehensive and adequate knowledge of modern technologies among most Nigerian information professionals is inimical to the success of e-learning, and the issue has been a recurring factor [6]. The effect is m-learning is only used for information dissemination and communication instead of being a learning portal.

Perhaps, if there are no technical personnel to develop efficient and effective m-learning systems, then importation or buy off from the shelf from a developed country is a possible recommendation. However, Issa *et al.* [17] remarked that even after learning technologies were imported into the country, lack of experts to provide technical support for the academic members was a hindrance. The result of the study is also in line with Okeke and Umoru [8] view that lack of competent staff can derail mobile learning programs in Nigeria.

4.5 Lack of Infrastructure

More than seven out of ten of the respondents (72%) were in agreement that another major constraint to m-learning in Nigeria is lack of infrastructure to support its implementation as well as the existence of an irregular power supply, which is constantly needed to power the m-learning servers and network devices. Nigeria is a country characterised by regular power outages on a daily basis in all cities, and this has negative effects on all developmental projects including m-learning implementation. The effect is that an m-learning system cannot survive or achieve its utmost objective in this kind of an unfortunate situation. Similarly, developing and sustaining a reliable and productive m-learning system depends on the provision of proper m-learning infrastructure which includes hardware, software and good connectivity, all of which constitute a barrier to m-learning in Nigeria. This result is in line with the studies of Folorunso *et al.* [18] and Osinaike and Adekunmisi [19] in which the authors believe that lack of infrastructure is of one the barriers that influence the use of technology in education in Nigeria.

4.6 Inadequate Funding

The vast majority of the participants, eight out of ten (80%) believed that gross under-funding of the education sector, as well as its near total neglect by government, is one of the issues of main concern to stakeholders. The problem of inadequate funding has affected all aspects of education from primary to tertiary to the extent that it is usually reported in all articles on problems and challenges of education in Nigeria. Perhaps, if the classroom teaching and learning which the mainstream education is so neglected, one should wonder about the fate of mobile learning in Nigeria. Mutula [20] observed that the problem of funding being faced by educational institutions has a devastating effect on the development of learning technologies including mobile learning. This study is also consistent with the findings of Osang *et al.* [7] in which a similar proportion (75%) of the educators believe that a poor learning environment resulting from inadequate funding will affect teaching and learning activities, and it is one of barriers to m-learning in Nigeria.

4.7 Regulatory Issues

Around a quarter of the respondents (26.67%) believed that undue regulations on ICT and learning technologies, including mobile and e-learning from regulatory authorities such as the National Universities Commission and Ministry of Education may hamper successful implementation of m-learning in Nigeria. Their belief is due to the fact that these authorities in the past have interfered in the operation of distance and open learning programmes being conducted by many universities in late 1990s to early 2000s which eventually led to the closure of distance programmes in Nigeria. Although there is no known direct regulation that hinders the adoption of m-learning in Nigeria Universities, there is a directive from the NUC that only year one and two students should be subjected to electronic examinations and assessments, and this directive has impacted on the full implementation on m-learning, in the aspect of learning delivery and most especially on the examination and feedback processes.

This study is also consistent with the findings of Osang *et al.* [7] on regulatory issues as only the general subjects are open to online examinations mainly at year one and two levels. Some inter-department examinations and assessments are conducted via online methods as well. Their aim is to take advantages of fast and immediate grading through computer examinations and release of results as soon as possible.

4.8 Political and Legal Issues

On all national issues, political and legal processes have always been involved and they have being observed as a hindrance to viable projects in Nigeria including m-learning as agreed by a third of the participant (33.33%). The participants' opinion is due to the fact that all aspects of national programmes are being politicised. Agbatogun *et al.* [11] remarked that the level of technology integration in Nigerian higher education institutions is dependent to a large extent on government policies. While the National Policy on education by the Government specifies that Information and Communication Technology (ICT) should be integrated into all stages of education to enhance effective modern teaching and learning, Diso [21] observed that nothing much has been achieved regarding IT policies in Nigeria when compare to international standards.

5 DATA ANALYSIS

Further analysis was carried out on the data collected by examining the responses of the main stakeholders independently as shown in Fig. 2 below. It could be observed that the educators and students shared similar views on most of the barriers; however, a wide difference is noticed on their viewpoints on excessive reliance on mobile devices.

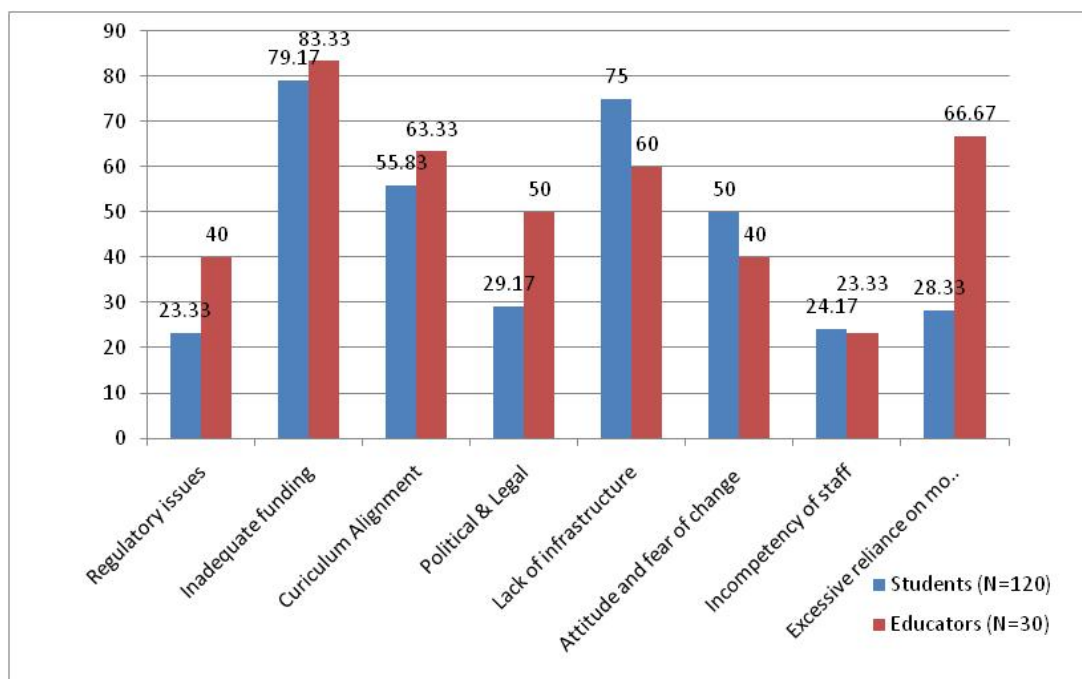


Fig. 2 Barriers to m-learning in Nigeria as highlighted by students and educators

A statistical test was also conducted using the Mann-Whitney U Test based on the stakeholders as shown in table 1 and 2. According to the table 2, there is significant difference between students and educators viewpoints in relation to the barriers of m-learning in Nigeria. This implies that educators and students have different views on the barriers affecting the implementation of m-learning in Nigeria and may be due to their level of education and use of mobile devices in education.

Table 1: ranking of dimension (students and educators) on the barriers of m-learning

Dimension	Number of Participants	mean of ranks	sum of ranks
Students	120	12.5	100
Educators	30	4.5	36
Total	150	8.5	136

Table 2: Mann-Whitney test

Test	The barriers of m-learning
U Mann - Whitney	0 (critical value of U = 13)
Z	3.3082
p-value (2-tailed)	0.05

6 LIMITATION OF THE STUDY

Nigeria as an independent country is divided into 6 geopolitical zones namely; North West, North East, North Central, South West, South East and South-South. This study could have been conducted in universities across the 6 geopolitical zones, but due to insecurity in 5 of the zones, the study was limited to South West which is known as the only safe zone. However, the study was carried out in HEIs in Lagos region which is the most populated state, being the commercial hub as well as the former capital of Nigeria.

7 RECOMMENDATIONS

The above issues constitute some of the main bottlenecks for the successful implementation of m-learning in Nigerian Universities. Within this context, the following recommendations were obtained from the study and the views of the participants as well as the authors as possible solutions;

- The curriculum of m-learning system should be developed in collaboration with relevant stakeholders to reflect academic content and technical procedure to enhance knowledge transfer as well as provide support to learners. The curriculum outline must meet criteria to be suitable for on-line delivery, such as in engineering modules, and it must be based on content delivery and development of cognitive and social skills of the students rather than being a mere communication medium.
- The educators' interest is a crucial factor to be taken into consideration in the adoption of m-learning since they are policy drivers and stakeholders on education matters. As a way of removing attitudinal barriers, the lecturers should be trained by their employers on using the modern technologies for their teaching and research job. Furthermore, the lecturers and learners should be encouraged and motivated to accept technological changes in education, either e-learning or m-learning, and inspired to have a positive attitude towards all learning technologies, m-learning inclusive. Osang *et al.* [7] states that if educators are interesting in using any technology, they will take ownership of such project and drive it in such a way that it will be beneficial to the students and other stakeholders.
- While the use of m-learning gives students a certain amount of liberty and independence in their course of learning [22], it allows them to communicate with their lecturers, to interact with each other and to access course material and learning instructions [23] while on the move or in the comfort of their hostels. Over reliance of the students on m-learning as an alternative to classroom attendance should be avoided as much as possible. They should be made to attend classes as regularly as possible and only use m-learning to support their classroom activities. Keengwe *et al.* [24] emphasized that teaching and learning are more effective when students are actively involved in the classroom activities. Non-attendance of lectures without genuine reason from the student should be penalised.
- The involvement of experts and professionals in m-learning systems should be giving high consideration. Since lack of experts has been identified as a barrier, there is a need to intensify training of personnel in the field of mobile learning or engage experts from other related fields to give their valuable contribution to the development of m-learning system. Similarly, feedback and appraisal on existing learning technologies should be taken into consideration in the development or upgrade of m-learning systems.
- The Nigerian government should as a matter of urgency address the problems of infrastructural decay in the education sector as well as the electricity supply. The future of m-learning in Nigerian Universities will look bleak if there is no adequate electricity supply to power the m-learning servers and network equipment. Adequate provision of modern infrastructures such as hardware, software, and network connectivity should also be of utmost concern.
- Since inadequate funding is listed as one of the barriers, adequate funds should be provided to Nigerian Universities to develop their m-learning facilities as well as to carry out research on how to improve the existing ones. That provision will not only boost knowledge delivery through m-learning, but also have positive impacts on Nigerian universities' global rankings.
- In tackling the regulatory issues on m-learning, the regulations on m-learning should be made in accordance with the international standards. M-learning experts in developed countries should be consulted on regulatory matters. However, the regulations should be flexible and adaptable to suit Nigerian learning environments.
- The government should give absolute priority to the education sector and m-learning in particular by creating enabling policies that will encourage growth and research in m-learning. Matters affecting m-learning, e-learning and other learning technologies should not be politicised but be handed over to technocrats who are knowledgeable in the field.

8 CONCLUSION

Mobile devices have the potentials to improve access to education for the millions of underprivileged users in the developing world such as Nigeria, the impact of mobile learning on the life of people in the

developing countries appears to be more effective than people in the developed countries [25], however, the barriers to m-learning are evidenced by deficiency in infrastructural facilities, poor education funding, lack of motivation and unstable political problems that are common in many developing countries such as Nigeria.

This paper discusses other issues and challenges that affect the implementation and adoption of m-learning in Nigerian educational institutions apart from security and privacy concerns which have been discussed in detail in previous publications [26-27]. The inadequate funding from the government and owners of the universities is top on the list of the barriers. It is followed by lack of infrastructure and curriculum alignment. Attitude, fear of change and incompetency of staff as well as political and legal factors also take good proportions on the list. It is obvious that the adoption of m-learning is considered to be very attractive option and a new learning paradigm whose effect will be a positive one to the development of education in Nigerian universities environment. If the barriers can be overcome, m-learning will enhance blended learning and improve the quality of education in the developing world, as it provides the required supplement to what is obtainable in the classroom system of learning.

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