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MOBILE LEARNING FOR INSTRUCTIONAL PURPOSE IN NIGERIA: AN EXPLORATORY ANALYSIS

ABSTRACT

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The main purpose of this research is to explore the use of M - learning for instructional purpose in Nigeria with a view to uncovering the degree to which it is in use in the institutions of learning. The issue was addressed from the view point of students and also from the theoretical point drawn from relevant extant literatures of other students and some learning theories, frameworks as well as relevant literatures were examined.

This research is empirical in nature and as such employs a cross sectional approach which involved the use of survey design in collecting data from students of different departments from two highly rated and recognized universities in Nigeria. Finally, the result of the study is presented and findings were discussed. The study offers findings to the research questions which comprised of the students commuting habits, ownership of the mobile device, skill, access to the internet as well as their disposition towards adopting mobile learning. This is because these factors among others, were identified as critical to the implementation of m – learning.

Ultimately, the findings of this work should help and guide future research works and policy makers. It is also valuable for identifying ways to contribute to improving the learning experience in Nigeria and by extension Africa using the mobile technology.

Keywords: Mobile computing, m-Learning, E- learning, mobile technology, Nigerian Education System

ACKNOWLEDGEMENTS

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1 INTRODUCTION

Learning in institutions has been shaped as well as influenced by the various types of technology that have been witnessed in the past and present. The traditional methods for instruction were textbooks during the paper based dispensation, now in the technology era; the acquisition of knowledge is depicted as a process that is mediated by the device. These emerging technologies pave the way to the progress of numerous prospects that enhance the learning process in such a manner that was not possible before now.

The Internet has provided opportunities for communication and by extension made the learning experience better (Sharples, 2000). The traditional ways of classroom lectures, acquiring information via use of books at the library has been made easier in higher institutions of learning by the advent of e- learning. In recent times, the evolution of the mobile phones which comes in various shapes, sizes and functionalities has further enhanced mobile learning in various ways. Such that the predominance of mobile phone and its importance will outnumber the use of personal computers (Motiwalla, 2007; Sharples, Taylor & Vavoula 2005) and other previous technologies (Kalba, 2008). This development has led to a current shift in information retrieval via books to laptops and now to mobile devices.

By definition, mobile learning is the use of portable wireless device for learning. While a mobile phone which possesses several capabilities and functionalities is basically for communicating, mobile learning (here after m – Learning) aims at optimizing these properties in a learning environment. In m – learning, the mobile device is the tool which acts as the focal point that reconciles all forms of learning activities, experiences and explorations. The implementation of m – learning suggests that the attitude towards learning tasks, interaction and communication can be improved and therefore the message is not about increasing the ability to learn. Hence in this study, m – learning is depicted as a situation in which the mobile device acts as a facilitator in the learning process.

This research investigates the use of M - learning for instructional purpose in Nigeria by studying the student's activities. According to Kirschner, Sweller

and Clark (2006), the objective of instruction is to provide learners with specific guidance on how to cognitively manipulate information in ways that are consistent with learning goals, and to accumulate the result of such processes in long-term memory.

The overall purpose of this study is to explore the degree to which it is practiced while using the higher institutions in Nigeria as the focal point. If indeed it is in use, perhaps one could identify ways through which valuable contributions could be made in improving the learning experience in Nigeria using the mobile technology. Kearney, Schuck, Burden and Aubusson (2012) express the importance of investigating appropriate teaching techniques that captures the m- learning concept from the learner's viewpoint and understanding rather than from the perspective of the affordances of the technology. This study does not aim at advocating the end of the use of the face to face classroom teaching method but instead suggests that learning can be improved by complementing the traditional method of teaching with the use of the mobile technology.

1.1   Structure of the study

The first chapter presents an introductory phase of the study, its structure, brief background information on Nigeria's education and communication system. The research questions as well as the scope and design of the study is also presented here.

The second chapter offers findings on the definition of learning, discusses briefly relevant theories of learning, and reviews some literatures on mobile technology, mobile learning and others related to the use of Mobile learning in institutions of learning in various countries. A few frameworks are highlighted and briefly compared.

The third chapter focuses on the methodology of the research work with regards to cross sectional approach. A quantitative approach is the means used for data collection in this study.

The fourth chapter presents the data analysis, results and findings based on the response to the questionnaires administered.

The fifth chapter concludes the study with discussion on the empirical findings of the study, recommendations and further research is also proposed.

1.2   Brief Background of the Nigerian Education system

Nigeria currently has a population of about 154.7 million (World Bank, 2011), occupying a landmass of about 923, 768sqkm and with a total of about 274 ethnic groups. According to World Bank (2011), Nigeria accounts for 47% of the West African population and about 20% of the Sub-Saharan Africa population. The challenge of affordable education for its populace in the midst of de-

creasing national resources and the increasing growth of the population is quite high.

National University Commission (NUC, 2013) maintains that Nigeria presently has 129 universities: 40 Federal universities, 38 state universities while 51 are privately owned. According to Ekundayo and Ekundayo (2009, p.244), UNESCO (2009) puts the number of tertiary institutions in Nigeria at 160. These tertiary institutions include Colleges of Education, Polytechnics and Monotechnics. In addition, there has been higher demand for university education than can be catered for by the number of universities available in Nigeria (Ekundayo etc., 2009.)

The following account of the Nigerian education system provided here is a summary and based on the article by Ajadi, Salawu and Adeoye (2008). Changes have occurred in relation to the method of instructional delivery in the Nigerian tertiary institutions of learning for the past 31 years. The first step was in the creation of a distance education unit as part of a University in Nigeria in 1974. Correspondence and Open Studies Unit (COSU) of the University of Lagos now called Distance Learning Institute. To begin with, it offered first degree level for programmes in science education and later, Postgraduate Diploma in Education (PGDE). In 1976, the National Teachers' Institute supported by UNESCO began as was the first dedicated distance education institute. It offered Nigerian Certificate in Education (NCE) in 1990 and introduced PGDE in 2005. The University of Ibadan adopted the distance learning model and began its Distance Learning Institute as External Degree Programme in 1979. In 1983, an Act of the National Assembly birthed the National Open University of Nigeria (NOUN). It was the first distance learning tertiary institution in the country and was established in response to the inadequacy of the traditional face –to – face classroom method of teaching in meeting the need of the increasing populace for education. The institution was closed down and the Act suspended in 1984 due to issues regarding the change in the country's government but was resuscitated in 2002 when the challenges that initiated its establishment were again observed.

1.3 Communication: An enabling factor for M- learning in Nigeria

Telecommunication services in Nigeria became well known in 1886 (Ajadi etc., 2008). It was introduced by the colonial government primarily for the administrative purpose of sending and receiving messages between the Lagos and London offices. Public telegraph (e- cable) was the first kind of communication service in Nigeria and there after came the telephone service which was made available for all government offices in Lagos by 1893 and soon other parts of the country (Ajadi etc., 2008.)

The telecommunication industry experienced huge growth in the demand for telephone lines while the quality of service decreased, it soon became affordable to the rich, members of the diplomatic corps, top government officials and others. In 1985, Nigerian Telecommunications Limited (NITEL) was established and enjoyed monopoly of providing the service till 1992 when the sector was deregulated and Nigerian Communications Commission (NCC) was established. Private Telecommunications Operators also emerged and provided telecommunications services though they were interconnected to NITEL. In 2001, as a result of NITEL's inability to meet the ever increasing demand of the telecommunication service, by the populace GSM was introduced. Four wireless licenses were allotted by NCC to MTN, Econet (now Airtel), M-Tel and Globacom later in 2003.

In 2008, the mobile subscriptions using the prepaid service in the African region were estimated at 95% (ITU, 2010). The mobile phone adoption in Nigeria has been swift and is manifested by the 19million mobile subscribers as at 2005 (Kalba, 2008). Currently as at April 2013, the subscriber data reflects that there are approximately 165million connected lines comprising of mobile GSM, mobile CDMA and fixed wire/ wireless (NCC, 2013). The common way for paying for the mobile phone service in Nigeria remains the prepayment system. Kalba (2008) claims that the prepaid system is a major factor that propels the increase in mobile phone subscription in emerging regions. The prepaid product is activated by purchasing prepaid calling cards which contain air time and are usually available at the local shops. The air time range from as low as three minutes to one hour talk time. In recent times in Nigeria, the lowest airtime recharge denomination available is N100 (One hundred Naira).

1.4   Research questions and objectives

As elucidated earlier, the advent of wireless network in Nigeria lends a friendly environment to the issue of mobile learning. Given the high demand for education in Nigeria (as observed in 1.2), the wireless technology offers an attractive opportunity for improving the learning experience. Mobile technology will enable the schools to extend learning beyond the walls of the traditional classrooms and thereby proffer a solution to this problem of high demand for education. The main objective of this study is therefore:

To examine the learning habits of students and identify ways in which improvement can be made by the introduction of mobile devices in learning.

The research questions for this study are:

1. Is there some considerable amount of time spent by students in travelling to and from school that can be useful for learning supported by this technology?

According to Sharples, Taylor and Vavoula (2005), a study by Vavoula on everyday adult learning revealed that 1% learning took place on transport which implies the necessity to tailor the mobile learning technology to support this need. In this regard, this study investigates the amount of time spent by the Nigerian student in commuting to and from school daily. Given that this study is in favor of the mobile learner, the survey was also asked how often they travelled and by what means so as to find out if there is indeed an opportunity for learning in this type of activity that could be supported by the mobile learning technology.

2. What is the awareness level of the students with regards to mobile learning for improving the learning experience? Is the awareness level a factor currently militating against the use of the technology in the schools?

The objective here is to uncover the level of awareness of the students with regards to mobile learning. The survey sort to find out if the students had any knowledge of m – learning and the means by which such information was obtained.

3. Are the mobile devices available to the students?

Sharples, Taylor and Vavoula (2005) advocate taking into account the ubiquitous use of personal and shared technology in support for a theory of mobile learning. Accordingly, this study investigates the availability and affordability of the required devices amongst the Nigerian university students. A survey by Litchfield, Dyson, Lawrence and Zmijewska (2007) show that at least 95% of Australian students now have mobile phones and other devices and hence see the need to incorporate the use of these technologies into the curriculum and design of student learning. Corlett, Sharples, Bull and Chan (2005) also agree that the popular use of mobile devices provides an opportunity to be harnessed to enhance learning.

4. Is there any meaningful observation in differences/inconsistencies with respect to different departments?

Litchfield, Dyson, Lawrence and Zmijewska (2007) assert that the assumption has generally been that all student groups have similar m-learning needs and in situations where studies have examined m-learning with different populations, the results are difficult to interpret because of inconsistencies in discipline areas. At the same time, they identified the challenges in generalizing implementations of various studies due to the fact that most m-learning studies have been made in small-scale and executed in only one discipline. Therefore, this study looks into 6 different disciplines.

1.5   Research scope and design

This research work is done in just two of the Federal universities in the southern region of Nigeria. The geographic coverage and scope of the study is limited by resources and time. Self- completion questionnaires were administered to the respondents via hand delivery.

The quantitative approach of research was used based on the identified underlying theory and the fact that the research questions had been drawn. The unit of analysis in the study is made up of undergraduate students from different course of study, year of study and cuts across various age ranges.

A cross sectional approach which involved a one-time collection of data was utilized. The survey was carried out within 3 weeks in each case. After which the collection of data, the responses were coded and analysis was carried out using the SPSS software.

2 DEFINITION AND THEORIES

2.1 Introduction

While the importance of learning is generally understood, it is at the same time seen from different perspectives (Schunk, 2000). Furthermore, it is essential to comprehend the way people learn since learning is a concept pivotal to many different human activities (Shuell, 1986). This research focuses on the learning activities of students and how the learning experience is enriched using technology. This chapter offers learning definitions as well as a few arguments with regards to the definition from the view of different researchers. An overview of the theories of learning is presented alongside issues on learning theories. In addition, a review of relevant literatures on M- learning and its use in learning institutions of various countries is provided. The chapter ends by considering and comparing five of the many frameworks of m – Learning.

2.2 Definition of Learning

In the course of this research, no common definition for the word 'learning' was found. Kirschner, Sweller and Clark (2006), define learning as a change in long-term memory. According to Lachman (1997), most textbooks define learning in relation to the phrase 'Permanent change in behavior as a result of experience or practice'. Lachman questions the use of the words change, behavior and experiences/practice in such definitions. So also, Schunk (2000, pg.2) sites the definition of learning given by Shuell in 1986 as "an enduring change in behavior, or the capacity to behave in a given fashion, which results from practice or other forms of experience". Both Lachman and Schunk criticize such definitions on three levels.

First, on the issue of practice/experience, these definitions do not take into cognizance some behavioral changes such as, changes that occur as a result of factors such as heredity and the environment.

Secondly, Lachman argues that visible change is a byproduct of learning which is reflected in the stimulus – response relation and not necessarily in behavior. In other words, the byproduct of learning is a testament to the fact that learning has taken place. Similarly, Schunk says that learning is inferential, it can be assessed and may not necessarily be displayed at the time at which learning takes place.

Thirdly, they criticize the words permanent/enduring change as is used in such definitions since it does not account for temporary changes in behavior that maybe for example as a result of the influence of drugs or alcohol which can wear out.

Schunk adapts the learning definition from the cognitive point of view with emphasis on the role of the learner's thoughts and beliefs. Lachman asserts that learning is a process or series of processes and proposes/ purports instead that learning is the process by which a relatively stable modification in stimulus – response relations is developed as a result of functional environmental interaction via the senses.

2.3   On theories of Learning

Theories provide a basis for further development of any field. The theories of learning mentioned in this study is viewed from the human perspective and according to Schunk (2000), the educational scenario provides a vivid/ good understanding of the power of learning in man. He explains that learning from the human perspective is such that involves the acquisition and modification of knowledge, skills, strategies, beliefs, attitudes and behaviors. It involves cognitive, linguistic, motor, and social skills and can take many forms.

Shuell (1986) points out that the history of empirical research on learning began from the classic study of Ebbinghaus in 1913 which was first published in 1885. Behavioral tradition of psychology began from about 1950's till 1960's after which psychology began to change towards the cognitive orientation in the late 1960s and early 1970s. The following is a brief summary obtained from Schunk (2000) on behavioral and cognitive theories as relevant to learning.

2.3.1   Behavioral theories

These theories view learning from the perspective of stimuli – response associations which are formed as a result of selective reinforcement of correct response. That is, learning is described with regards to the events occurring in the environment. It may describe better the simple forms of learning that are associative in nature. Most of the older theories of learning belong to this category.

2.3.2   Cognitive theories

These are theories which describe learning as an information processing activity where knowledge is cognitively represented as symbolic representations which serve as guides. They are more suitable in explaining complex forms of learning and to a large extent, theoretical views in recent times are cognitive. Social cognitive theories focus on the social environment in which human learning happens.

Also worthy of mention is the Constructivist theories which are cognitively oriented. Constructivist theories are more focused on how learners interpret situations and the process by which their cognitive structures are enhanced. With regards to instruction, the constructivist approach to learning is subjective since learners receive information which they process cognitively in ways that mirror their needs, dispositions, attitudes beliefs and feelings. In contrast, the behavioral and cognitive approaches are objective.

There are two major types of constructivism: individual or cognitive constructivism and social cognitive constructivism. In cognitive constructivism, the students develop their ideas individually in a personalized process unlike in the case of social constructivism where the ideas are built as a result of the interactive process between the students as well as between students and their teachers thereby embracing a more socially interactive and dynamic learning atmosphere. All the same, they are both similar in the sense that in both instances, the importance of guided teaching or assistance is recognized. Also, they both value the inquiry or question and answer system whereby the students build ideas from experiences to which they ascribe meaning. According to Powell and Kalina (2009), cognitive constructivism was construed by Jean Piaget and shortly afterwards, Lev Vygotsky founded the theory of social constructivism.

2.3.3   Issues on theories of learning

The two theories differ on various grounds and the following issues are some instances for contrasting them (Schunk, 2000):

     i.   Learning process

While behavioral theories emphasize more the role of the external environment as a facilitator in the learning process, the cognitive theories argues that the learning process is facilitated by the internal environment where the mental processing of information takes place. In this regard, the behaviorists imply learning should be teacher –centered and the cognitivist, learner – centered.

     ii.   Learning factors

Both theories differ on the importance they accord the differences in the learners as well as in the environment and their effect on the learning process.

While behavioral theories down plays the role of mental activities in describing learning, cognitive theories not only acknowledges the relevance of instructional factors to students but also highlights further transformative processes that it undergoes. More emphasis is laid on the learner differences by the cognitive theories than the other.

iii. Role of Memory

Some behavioral research view memory in association with neurological connections that are established as a result of the relationship between behavior and external stimuli. Cognitive theories, on the other hand, accord much relevance to the part played by memory. In the case of behavioral theories, forgetting is due to lack of responding over a period of time while cognitive theories explain that it is as a consequence of memory loss, interference or inadequate cues to enable access to information. Behavioral theories advocate periodic, spaced reviews to maintain responses' strength in learners repertoires while cognitive theories highlight the relevance in presentation of materials with a view to enabling learners organize, relate and remember the information obtained.

iv. Motivation

From the perspective of behavioral theories, motivation is defined as "probability of occurrence of behavior caused by repeating behaviors in response to stimuli or as a result of reinforcement." This definition once again down plays the significance of the internal process in a motivated behavior. This implies that similar definition explains both learning and motivation. In contrast, even though cognitive theories view motivation and learning as related, there exists some differences. Cognitive theories agree that reinforcement is a facilitating factor in student motivation; it does not have an automatic effect on the student behavior but instead is dependent on the interpretation given by the student. A number of cognitive processes (e.g. goals) that motivates students have been identified in various studies and the neglect of these processes reflects the inability of behavioral theories in explaining the complex nature of human motivation.

v. Transfer

Transfer here implies the application of the knowledge or skills acquired. The knowledge application can be in a different environment from where it was acquired or can be modified. Transfer also considers the effect of previous on new learning and also defines learning as unsituated. Behavioral theories emphasize that transfer of behaviors is dependent on identical elements or features between situations. On the contrary, cognitive theories focus on information storage, retrieval and uses process. It purports that transfer takes place at the

point where learners understand the application of knowledge in various scenarios.

In summary, the theory of constructivism perceives the acquisition of knowledge as a process which involves the learner actively participating by making sense of what has been learnt and applying the same in the real world. Collaboration and social interaction activities enhance the sense making process and thus shapes our perspective of what is learnt.

Overall, in the course of this research, most of the authors (Looi et al, 2010; Motiwalla, 2007; Sharples etc., 2005; Holzinger, Nischelwitzer & Meisenberger 2005; Sharples, 2000) of articles relating to mobile learning refer to the social constructive theories as most suitable category for explaining the activities and context involved in mobile learning. This is because they agree that learning is a social activity, that is learner–centric, and that the mobile phone is also a tool for communication which provides feedback. As aptly put by Leung and Chan (2003), '... mobile learning technology is not a stimulus for reshaping learning but instead it is a reflection of an organization's culture'. Holzinger, Nischelwitzer and Meisenberger (2005) recommend exploratory, scaffolding and situated approach of learning which are all based on problem solving. This is because such activities provide a forum which offers group support and fosters generative learning. For example, through this method, students have a better chance in attaining their individual objectives in a group forum as against being on their own.

While some authors agree that the constructivist theory's depiction of learning definition is quite precise, they disagree with the recommended instructional implication in terms of requiring minimal guidance (for example Kirschner etc., 2006). An in-depth exposition into this view is however, not within the scope of this study.

2.4   Review of Literature

Mobile learning is the point at which mobile computing and electronic learning intersect to produce anytime, anywhere learning experience. (Leung & Chan 2003.). As defined by Litchfield, Dyson, Lawrence and Zmijewska (2007) m-learning is the facilitation of learning and access to educational materials for students using mobile devices via a wireless medium. Costabile, De Angeli, Lanzilotti, Ardito, Buono & Pederson (2008) also affirm that the combination of e learning and mobile computing is called m - learning. In these definitions, it can be observed that the availability of the appropriate mobile device, the access to the wireless network and the need to acquire knowledge is what culminates in the m – learning experience.

M- Learning which shares same benefits with E- Learning affords the learner the flexibility of studying anywhere, any how and any time with the use of portable wireless technologies. Motiwalla (2007) maintains that, 'it is facilitat-

ed by a convergence of Internet, wireless networks, mobile devices and e- learning'. The technology enables the learner take advantage of short breaks such as lunch times to seek out information. Examples of these devices are digital media players, smart phones and PDA (Personal Digital Assistant). The portability of these devices avails the learner the opportunity to utilize spare times for learning instead of having to wait or defer the desire to obtain relevant information till arrival at the nearest library or access to a computer. Koole (2006) regards the portability feature of the device as an enabler to the process of accessing information such that with m – learning, the information moves to the learner instead of the learner moving to the information. It also reduces the burden of having to carry a laptop.

Mobile learning presents opportunity for lifelong learning which is beneficial for the incessant need in skill and competence development. Lifelong learning encompasses of the formal, informal and non - formal learning (Laal & Salamati, 2012.).

Consequent to the concurrent development of learning and technology, Sharples, Taylor and Vavoula (2005) purport that there is now a convergence of both which thus provides a conducive environment for m – learning. As learning has become personalized, learner – centered, situated, collaborative, ubiquitous and lifelong so also in comparison, technology has become personal, user – centered, mobile, networked, ubiquitous and durable.

Several studies have emphasized the benefits of M- learning. According to Evans C. (2008, p.493) a research by (Kurtz, Fenwick & Ellsworth, 2007) revealed that students who received lectures via podcast obtained better grades than those who received conventional lectures after compiling a complete lecture course in 65 podcasts and using lecture times for solving tasks and other related problems.

In view of harnessing the advantages of mobile learning, it is expedient to define new teaching and learning techniques. Costabile et, al. (2008) designed a gameplay system to assist middle 'school students to obtain historical notions while visiting archaeological parks. Their study revealed that the students were motivated, stimulated and excited about archaeological visits.

The personalization and extended reach capabilities of the wireless/hand device is what attracts learners (especially adults) and these capabilities also possess the potential to alter students' interaction and response to each other (Motiwalla, 2007). A trial was conducted by Litchfield, Dyson, Lawrence and Zmijewska (2007) at a University in Sydney during the autumn semester of 2007 using PDA's to teach students about mobile technology and how to program the devices. At the end of the semester, the findings revealed that the students gained better in experiencing the real mobile device when compared to their experience in the use of a simulator.

Mobile technology provides an opportunity to enhance experiential learning (Lai, Yang, Chen, Ho & Chan, 2007) as well as enhance active learning (Li-

tchfield etc., 2007). Both terms 'experiential' and 'active' are similar in the sense that they involve participation which implies that students can actually contribute to the learning process (Looi et al, 2010). Rochelle (2003), points out that M- learning introduces another type of participation called the new informatic participation which occurs among connected devices. It is different from the usual social interaction between the teacher and student but occurs at the same time and in same space.

Mcconatha, Praul and Lynch (2008) examined the performance of 112 students enrolled in a sociology course when a software (Learning Mobile Author) was introduced via mobile devices to enable access to reading and practice materials. The result to an extent supports the belief that mobile technology can improve learning performance. Motiwalla (2007) conducted an exploratory study in extending e- learning into wireless/handheld devices using a mobile learning framework. 62 students were used to pilot- test a prototype application which connected mobile devices to three courses. The result proves that mobile devices have significant impact on the quality of students learning. In the m - learning scenario, the role of the teacher has gradually shifted from an instructor to a facilitator of the learning process while the role of the student has moved from a passive recipient of knowledge to an active participator. A study by Rau, Gao and Wu (2006) revealed how the mobile technology was used to reduce the distance between teacher and student thereby improving student motivation and reducing student pressure.

In this study, the use of mobile learning in complementing the traditional method of teaching in schools is highly advocated. Yen and Lee (2011, 144) recommend the use of the traditional classroom teaching method to enhance problem solving abilities for the students. Dawabi, Wessner and Neuhold (2003) designed a platform 'ConcertStudeo' with the objective of enhancing the traditional face to face classroom interactivity and cooperation by providing additional functionalities. The trial of the platform yielded discussions with instructors and students concerning their requirements for improvement. However, the authors reported that positive interest was garnered for the interactive potential of the platform.

Mobile learning establishes a bridge between the formal and informal learning spaces which affords the learner the opportunity to interpret and apply what is learnt from one environment to another (Looi et al., 2010

Corlett, Sharples, Bull and Chan (2005) view the mobile devices as not built to support the average student needs (for example reading course content, revising for exams) even though the students may find some of the applications beneficial but rather as devices that are originally fashioned to fit the office work atmosphere. Hence, the effectiveness of the use of the device in institutions of learning is achieved only when advantages and challenges of the technology are understood by the developers and this knowledge is applied to suitable pedagogical practices (Motiwalla, 2007). Some authors (Danielsson, Hedestig, Juslin, & Orre, 2003) suggest that when developing educational software,

the objective should not be tailored to support the completing of defined tasks but instead the focus should be on the learning process. This is because they recognize the fact that learners are dissimilar in culture, level of knowledge and skill capability.

The wireless connection of the mobile device is not restricted by location and time. This allows for information dissemination, completion of assignments and tasks at anytime and anywhere. According to Motiwalla (2007, p.585), Ben Moussa (2003) identifies several benefits of mobile learning such as it affords the user the opportunity to control and filter information, enhances customer orientation and collaboration in real time.

This concept provides an atmosphere that takes learning outside the classroom and even remote places. This implies learning is not location specific. In fact, the learning space is now described by the learning process unlike in the past when it was described by the location (Looi et. al., 2010).

The collaborative features of the technology such as SMS messaging, digital cameras serves as a medium for cooperation, communication and an atmosphere for teamwork between students and instructors (who may be geographically distributed).

The mobile device is portable in that, it is light- weighted and easy to carry around. In built resources such as organizers, calendars, maps etc. assist learners plan their time and creates a personalized atmosphere for the individual learning.

Mobile learning supports the quick delivery of learning materials that are tailored to meet the individual and collective students' needs or learning goals. These materials are current and up to date. Delivery is in real time and can be in multimedia formats.

This learning style offered over the wireless network can be adjusted to suit whatever change in learning goals that may arise. Hence, reflecting the flexibility in the mode of learning.

It is learner centered since the learner takes the responsibility of the learning decision and direction (Zhang et. al., 2010). This implies that onus of what, in what format, at what pace and where to learn rests majorly on the learner and this creates a motivation to learn.

According to ITU, the "African region has emerged as one of the most dynamic regions with regards to development in ICT". The mobile cellular penetration for the African region was estimated to be 41% at the end of 2010. A study by Motiwalla (2007) further stated that 65% of the students in the experiment were willing to use their mobile device for e- learning.

The digital divide in the African region is almost non-existent as regards mobile phones unlike in the case of the Internet due to the needed infrastructure. Another aspect is the payment structure. The prepaid service is easily affordable by students.

While various studies such as those reviewed earlier have shown the positive potentials and contributions of the mobile technology, it is worthwhile to

mention in addition, some of the possible challenges or weaknesses. This will provide a holistic approach to improving the learning experience using mobile technology.

On the one hand, in the traditional classroom learning, the students are within the premises of the school hence it provides for minimal or limited distractions from happenings around. On the other hand, for mobile learning, the student is faced with the challenge of learning in the midst of possible environmental disturbance. This is a possible reason the use mobile learning has not become popular in education (Motiwalla, 2007). However, Sharples (2002) suggests that M - learning can be effective if the devices are designed such that within defined contexts, only the necessary tools are enabled. This implies that applications which may act as a distractions to specific context are disabled. For example, a classroom scenario where applications like Facebook and others may not be relevant and as such could be disabled to enable the learners concentrate on only the relevant tools. Syvänen, Pehkonen and Turunen (2003) identify fragmentation in learning as a challenge to m – learning and proffer as a solution to this problem that tools should be built explicitly for a mobile scenario.

M – Learning also borrows some challenges from mobile phones. Examples are the functionalities such as the small size display screen, possible slow speed connection and the difficulty experienced in typing when using the phone keypads. The durability and obsolescence related issues of the devices are also of critical importance. Accordingly, '' a well-designed device, in theory, should enable the user to focus on tasks rather than on the tools for accomplishing tasks'' (Koole, 2006.).

While in the traditional classroom learning style it is possible for students to undertake a course that spans over an hour, the m- learning counterpart cannot sustain the concentration span of students for that long. Hence content is an important factor to be considered in implementing mobile learning (Leung & Chan, 2003.).

Information and interaction overload is another challenge that the learners will likely face as a result of extensive use of the mobile device. Motiwalla (2007) predicts that this results in ''the danger of learning becoming chaotic''. On the contrary, Koole (2006) believes that the affordances of the technology provides a solution to information overload.

Zhang et. al., 2010 advocate that for the sustainability of m learning, it is imperative to consider the proper assessment and funding issues, address the proficient developmental needs of the teachers and their participation in co designing the technologically enhanced curricula. This indicates that collaboration is a key to actualizing this genuine innovative pedagogy

On the topic of mobile learning, it is of high importance that it is situated in the following context as prescribed by Sharples, Taylor and Vavoula (2005) for better clarity of the key features that distinguishes it from other forms of learning.

It is essential to consider the subject of mobility in the context of mobile learning. According to Sharples, Taylor and Vavoula (2005), learners are consistently in motion and this span over various categories such as time, for example, a scenario where knowledge acquired is perhaps modified or applied in a different environment or at a different time from where it was learnt. It is also described in cases such as a change in topic, courses or curriculum as well as regards technology where it is possible to move within or outside the coverage area of a mobile phone.

The question of how much time is spent on travelling or is estimated as 'spare' time is significant to the study mobile learning. According to Sharples, Taylor and Vavoula (2005), a study conducted by Vavuola in 2005 on adult learning revealed that while 51% of learning occurred at learners usual environment (work or home). The remaining percentage was accounted for by various other locations/ environment. It is worthy of note that the same study by Vavuola revealed that 1% of learning took place while on transport. Furthermore, it is critical to research how willing learners are in taking advantage of such available 'spare' time and converting them to a learning environment. The learning approach as discussed earlier (learning theories), the social constructivist theories appropriately suit the learning style of mobile learning.

On the overall, an increasing number of studies were found on the subject of m - learning with most of them being conducted in the USA, Asia, Britain, Scandinavia, and Australia (Litchfield, Dyson, Lawrence & Zmijewska (2007). However, very limited investigative study has been found regarding the use of M– learning for instructional purposes in schools in Africa and as a result, this study aims at exploring the situation in the Nigerian schools.

2.5   M- Learning Framework

A framework helps to transmit the theoretical aspect of a subject into the operational environment where it is to be applied. There are a number of distinctive M- learning frameworks based on different learning theories and perspectives. Five of such frameworks are briefly considered here and they are listed in no particular order.

2.5.1   Leung and Chan (2003): M- Learning framework

Leung and Chan (2003) proposed a model consisting of four layers where the design and development burden can be shared by different parties such as vendors, providers and so on. The four layers are: the mobile learning applications, the mobile user infrastructure, the mobile protocol and finally, the mobile network infrastructure. (See table 1). The layers are described shortly.

TABLE 1 M- Learning framework (adapted from Leung & Chan, 2003)

The mobile learning applications
The mobile user infrastructure
The mobile protocol
The mobile network infrastructure

The mobile learning application

Given that electronic learning (here after E- Learning) is in operation in Nigeria (Ajadi etc., 2008) and the existence of numerous potential mobile applications, it implies that mobile learning applications can also be implemented (if not already) by modifying the available applications of E- learning. There are different types of learning activities within and outside the classroom and this should form the basis for the selection of the mobile learning application to be used.

The mobile user infrastructure layer

The infrastructure necessary for learners to meet their learning needs demand such technologies as wireless networks that possess high- band width with uninterrupted connectivity as well as the appropriate handheld devices. Improving the functionalities of the mobile devices (as mentioned earlier in 2.4) leads to the demand for an appropriate operating system that will better manage the resources. An operating system with small footprint, real time and decreased storage requirements is appropriate for mobile learning (Leung & Chan, 2003.)

The mobile protocol layer

This is the layer where the mobile learning applications are connected to various mobile networks and operating systems to offer a uniform interface. The flexibility of this layer conforms to bandwidth fluctuations, resultant delays and other forms of mobility issues. It possesses the ability to provide applications with reliability and better response time. The most popular optimization techniques used are "delayed acknowledgements, header compression and concatenation of several smaller packets into one to reduce wireless network traffic". (Leung & Chan, 2003.)

Wireless Access Protocols (WAP), Short Message Service (SMS), Wireless Markup language (WML), Extensible MarkUp Language (XML) are some examples of data services that can be employed in this layer.

WAP promotes interoperability among various wireless networks, devices and applications. The WAP protocol has achieved popularity for data services globally and this is attributed to its thin- client architecture and device independence. This thin – client architecture enables applications to run on the server and transported to the mobile device consequently eliminating the sophisticated client device required.

<u>The mobile network infrastructure layer</u>

All previously mentioned layers are dependent on the support provided by the network. Of utmost significance is the quality of service available for mobile learners. Poor performance of the mobile learning applications may result in frustration and consequently a termination of the learning session. Critical factors to be considered in the network are coverage, transmission speed, multicasting, reliability, durability and the roaming facility.

2.5.2 Park's framework for M- Learning

Park (2011) proposes a pedagogical framework which characterizes mobile learning in the context of distance education. This framework applies Moore's transactional distance theory and alters it by including two different forms of distance learning (individualized and socialized). The structure of the frame work is such that it comprises of 2 axis (see figure 1): the vertical axis which represents the flow of transactional distance from high to low and the horizontal axis which represents the flow of activity from individualized to socialized.
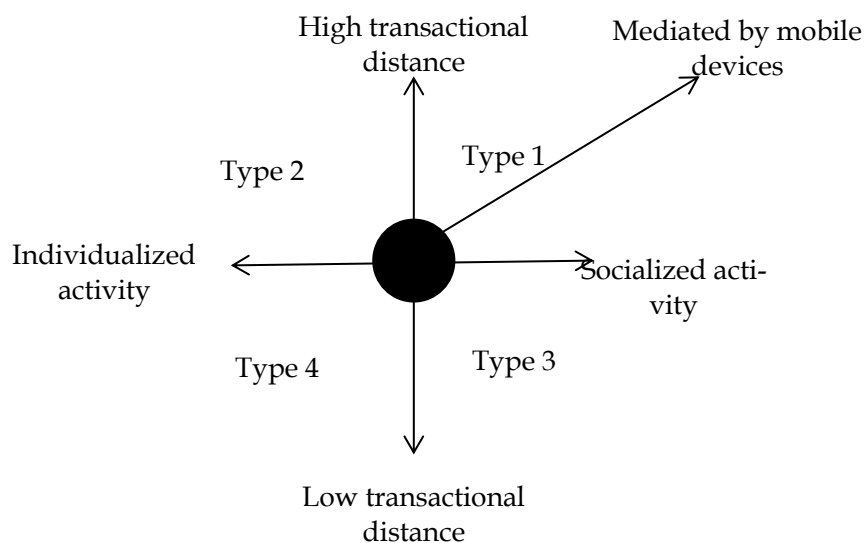
FIGURE 1 Park's framework for M - Learning

This context of distance education hence produces four types of mobile learning; (1) high transactional distance socialized, (2) high transactional distance individualized, (3) low transactional distance socialized, and (4) low transactional distance individualized. The general notion is that for example, the high transactional distance socialized segment supports a mobile learning environment where the learners have high psychological and communication distance between them and their teachers or institutional support, major communication is among students and less facilitated by teachers.

There is high collaboration and communication among the learners via group learning and projects. Also, the mobile device is the predominant means,

by which learners obtain learning material and instructions. For the case of the low transactional distance individualized segment, mobile learning reinforces activities characterized by less psychological and communication distance but more communication and interaction between teachers and learners, vague learning content, and lastly the place of control lies greatly within the domain of the instructor.

2.5.3 Koole: Framework for the Rational Analysis of Mobile Education (FRAME) model for framing M- Learning.

Koole (2006) provides an all-inclusive framework for mobile learning. The Framework for the Rational Analysis of Mobile Education (FRAME) model was built as the thematic bedrock for evaluating the efficiency of mobile devices for distance learning education. The framework also provides an explanation of the procedure involved in mobile learning process and it is based on the perspective of information as the learning environment of the learner.

In this context, the FRAME model (figure 2) is made up of three parts represented by circles (device usability, learner and social) in a Venn diagram. The primary intersection of these three parts offers a depiction of what mobile learning is. Furthermore, the combination of all aspects, intersections, the primary intersection, and the information context describe mobile education.
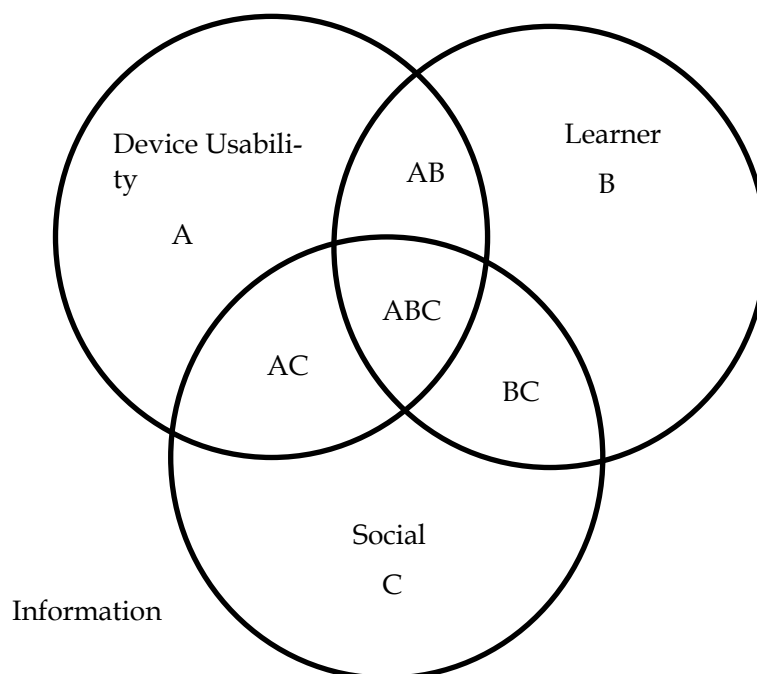
FIGURE 2 Koole's FRAME model for M- Learning

The areas where two circles intersect represent attributes belonging to both. For example, the attributes situated at the point of intersection between the learner and the device usability (AB) on the one hand and the intersection between the device usability and social area (AC) on the other hand both represent the affordances of mobile devices. Likewise, the intersection of both the learner and the social area (BC) comprises the learning theories and instructions from the perspective of social constructivism. Finally, ABC, which is the point where the three major parts intersect at the centre of the Venn diagram describes and symbolizes the mobile learning process.

2.5.4   Sharples, Taylor and Vavoula (2005)'s M- learning framework

The authors apply the cultural – historical activity theory in order to explore the structure of activity within mobile learning. From the perspective of Activity theory, they view learning as a cultural- historical activity system where tools can act as both facilitators as well as restraint on the learners' objective in transforming their skills and knowledge. Their framework comprises of viewing the tool- mediated activity of mobile learning in two ways: the semiotic layer and the technological layer. (See figure 3).
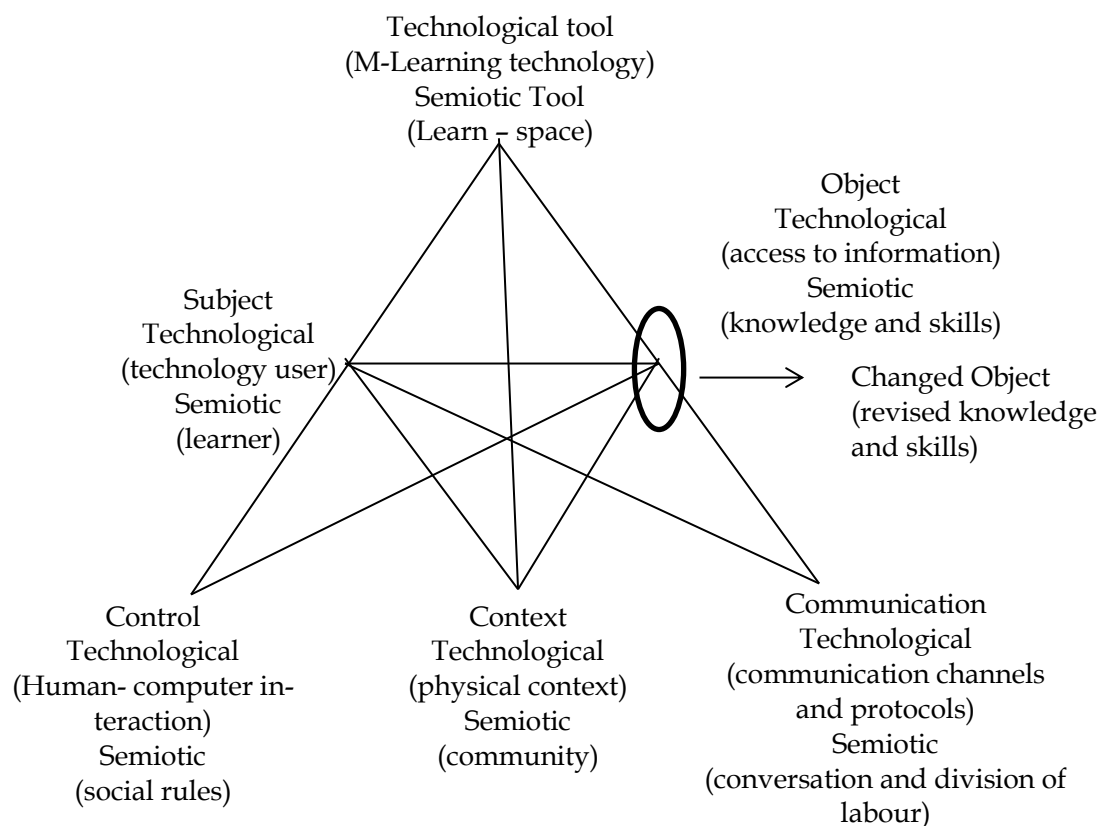
FIGURE 3 Sharples, Taylor and Vavoula's M – learning framework

On the one hand, the semiotic layer views learning as a semiotic structure where the learner aims to achieve a goal is facilitated by cultural tools and signs. On the other hand, the technological layer reflects learning as in terms of interaction with technology which involves tools (for example mobile phones) acting as agents in the knowledge acquisition process, collaboration and communication. In this model, learning is seen to occur in a socio- cultural system which is affected by factors such as control, context and communication. The control factor addresses the question of who controls learning (the teacher, student or the technology?). Also, since the use of technology exists within a shared community structure it is worthwhile to consider the social rules and conventions that are in operation. The factor of context encompasses the various actors that network about a common goal. Finally, the factor of communication considers the technological system and the way learners adapt their communication and learning activities to it.

2.5.5   Kearney, Schuck, Burden & Aubusson's M- learning framework

In their framework, m - learning is characterized within the concept of time and space using three constructs: personalization, authenticity and collaboration. (See figure 4 below). Each of these three constructs is further divided into two sub- scales. The structure comprises of circular layers that indicate the close connection between the three constructs and their sub-scales. The bi-directional arrows in the diagram illustrate a symbiotic relationship between Time - Space and the three constructs.

The personalization feature is based on the theory of motivation and socio- culture which are prominent in describing e - learning. This layer captures features of agency which reflect the autonomy, flexibility, and control within the learners experience in this learning style. It also illustrates customization from the perspective of the student as he/she optimizes the affordances of the technology (for example, context aware competencies) to conceptualize the m - learning experience.

The authenticity feature captures the ability of the student in applying a task or the information of what is learned into the real world scenario. Contextualization and situatedness are the two sub classes used to analyze this feature. The former entails authentication of tasks and processes enabled by the use of the technology.

Collaboration deals with social interaction. This aspect depicts the relevance of learning interactions and networking among peers, teachers and others in a shared conversational space mediated by the mobile device. Conversation and Data sharing are the two subclasses used in analyzing collaboration.

28
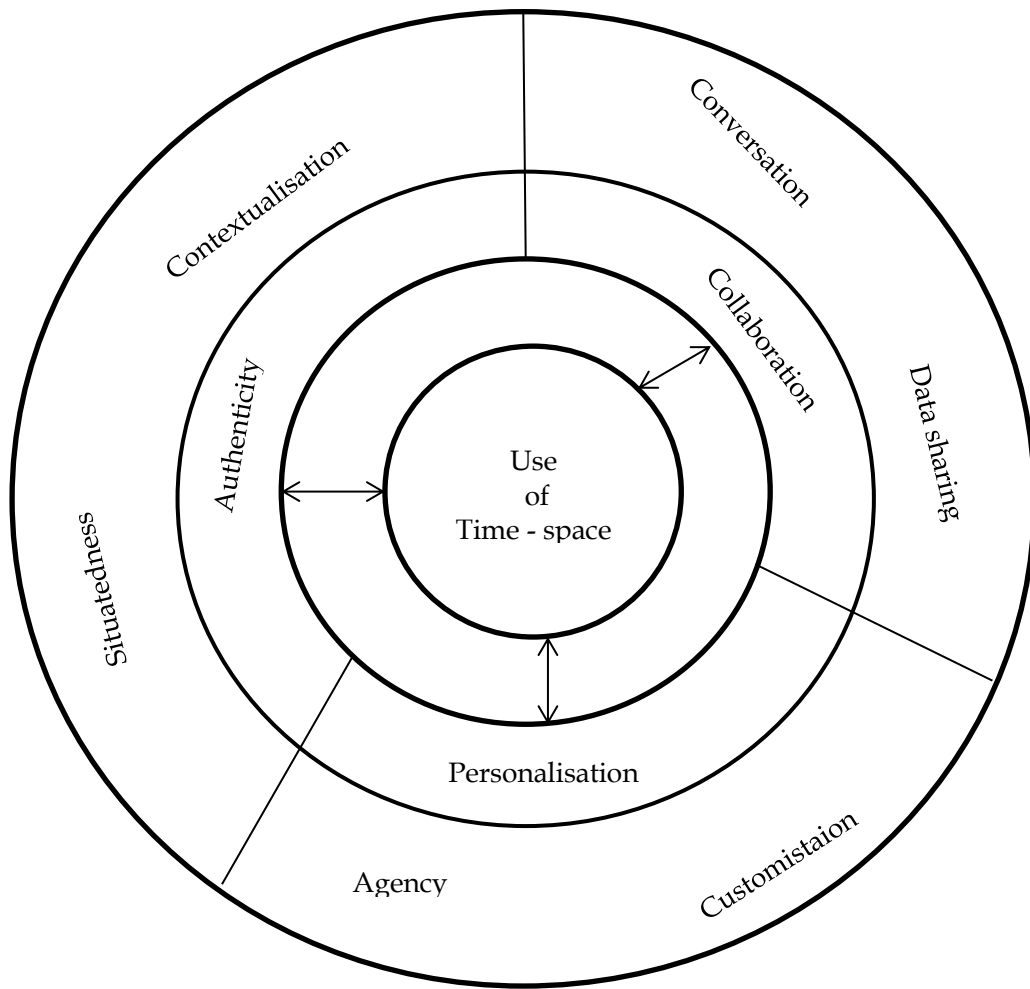
FIGURE 4 Kearney, Schuck, Burden & Aubusson's M- learning framework

2.5.6 Comparison of the five frameworks

The table below (table 2) shows a brief comparison of the above described frameworks:

TABLE 2 A brief comparison of the frameworks

Framework	Approach	Underlying theory	Context
Leung and Chan (2003)	Technological	Not mentioned	Functionality
Park (2011)	Pedagogic	Transactional distance	Distance learning
Koole (2006)	Pedagogic	Social constructivism	Information
Sharples, Taylor and Vavoula (2005)	Pedagogic	Activity	Learner's world of interaction
Kearney, Schuck, Burden and Aubusson (2012)	Pedagogic	Social - cultural	Time and space

The third, fourth and fifth frameworks are in the researcher's point of view, more comprehensive since they consider to a great extent a variety of other factors (for example: culture, collaboration and communication) which are influential to the study of mobile learning. Simultaneously, these factors are also significant components in the social constructivist philosophy and consequently, offer a basis for such theories of learning and instruction. In the light of this understanding, the framework by Koole is selected in this study to be most appropriate. Nevertheless, due to constraints in time, resources and the fact that this study is in an exploratory phase, all aspects of Koole's model are not captured.

This study views M- learning as a concept that bridges the gap between the teacher and student. As such, it has the assumption that the students require the skills to access relevant information at the time of need from the phone or computer. This implies the availability of the device and the wireless connectivity are necessities. In addition, the concept of mobile learning is advantageous if there are courses in the curriculum of studies demanding the need to source for information. To be considered on the other hand is the role of the teachers or school administrators as the successful implementation of m- learning does not solely depend on the students.

3 METHODOLOGY

3.1 Introduction

A research problem is one that needs a solution and in some cases, the type of problem determines the approach to solving it. This research work seeks to investigate if indeed the mobile technology is in use for instructional learning among universities in Nigeria and at what degree. It is based on the social constructive theories which projects learning as a social activity that is focused on the learner –centric and the mobile phone as a tool for communication which provides feedback .The study attempts to bring to light the relative association or similarities existent across various courses of study (departments), sexes, age and other variables. The willingness of the students to use their mobile phones for instructional learning is also discussed. In order to achieve the objective of this study, questions were used to design a survey. The questions with a bit of modification borrow from the works of Motiwalla (2007) and Sharples, Taylor and Vavoula (2005) as highlighted in the literature review.

In this research work, the bias is for undergraduate university students in Nigeria. This excludes already graduated, masters and postgraduate students as well as students of the polytechnics, colleges of Education and private universities in the country.

This chapter elucidates the research method used in the study as well as the research design and strategy that was employed. Generalizability, reliability and validity issues are discussed and finally, the hypotheses for the study are presented.

3.2 Research Method

In this research, a small survey comprising of 135 randomly selected respondents was used. The participants cut across different years of study, age

groups and course of study. The participants are undergraduate students of two prominent southern federal universities in Nigeria. Some questionnaires were distributed to the respondents and response was collected almost immediately while a few others were collected a few days after. Overall, the administration of the questionnaire was done within a period of 3 weeks in each school at different departments and lecture halls and the participants in the survey were informed on the aim of the study.

It was originally intended that both the self- administration and on-line method of survey be employed in this study. However, as a result of envisaged low response rate and the limited time available for the study, self – administration appeared more advantageous in terms of response rate. Initially, 170 questionnaires were sent out and 140 received after completion. 5 of the 140 collected questionnaires were eventually rejected as the respondents were graduates and therefore did not qualify for inclusion in the target population. The difference of 30 questionnaires fell into the category of badly filled (10 questionnaires) and unreturned (15 questionnaires). A high response rate was found in this study to be 79.4%, this ensures a representativeness of the wider population from where the sample has been drawn. (Buckingham & Saunders, 2004.)

3.3   Research Design and Strategy

The strategy of inquiry used in this study is the survey which belongs to the non- experimental category of design and also is associated with the quantitative approach. Creswell (2003) defines a quantitative approach as one that leads to knowledge advancement through the predominant use of the post positivist views by the researcher. This approach also involves the use of strategies of inquiry as well as foreknown tools for gathering data and yielding statistical data. The survey design is normally connected to a deductive approach which has the aim of validating a theory through the process where the researcher collects data to test such theories and then scrutinizes the results for a confirmation or negation.

The survey design was particularly employed in this research due to its economic advantage in reaching a larger number of respondents within a relatively short time frame. Another merit of the survey design for this study is the possibility to generalize from the sample to the population. Also, it permits the use of questionnaires containing homogenous data questions. It provides the researcher with control over the process of the research and a basis for comparison. In addition, the researcher being a Nigerian is familiar with the terrain hence providing a vantage ground for exploration and collation of data. Lastly, it provides the possibility to represent data numerically which enables replication and standardization and in the end supports the use of statistical methods.

Self-completion questionnaires were administered with the aid of gate-keepers to randomly selected respondents to ensure generalizability. The nature of the research uses a cross sectional approach which involved collecting the

data from more than one case at a single point in time in order to collect a body of quantitative or quantifiable data in connection with two or more variables with the objective of investigating in order to identify patterns of association. (Bryman, Bell, Mills & Yue , 2011.).

The instrument contained twenty- five questions (appendix A). These questions generated different types of variables. While more than half of the questions (fourteen of them: 1, 3, 5, 7, 10, 12, 14, 19, 20, 21, 22, 23, 24, 25) fell into the nominal or categorical variable class. Two questions (2, 15) fit into the variables characterized as interval/ratio (also known as numerical variables). Six questions (4, 6, 8, 9, 11, and 13) were ordinal variables. Lastly, three questions (16-18) were designed using Likert scales to capture the students' skill level in relation to the use of e-mail, word processing and internet surfing as well as their attitude towards the use of social networking sites.

However, the prevalent demerit of this method of data collection was observed in the time invested in preparing the questionnaire as well as in the analysis of data.

3.4   Statistical tests and analyses

A deductive approach was used and this implied that the existing theory on the research subject determined the method.

The use of frequency tables and diagrams such as pie charts and bar charts were employed to present some of the findings of the work. Fink (2003) supports this and the main benefit of the use of such tool is observed in their upfront comprehension (Bryman etc., 2011).

Tools such as measures of central tendency (for example, the mean value) and measures of dispersion (for example, standard deviation) were also useful in interpreting some of the results since it allowed for comparisons to be made. An instance in this research is in the evaluation of the skill of the students.

The Pearson's chi – square value for the cross tabulation was one of the methods used in measuring the strength of association between the variable employed in the design. For example, cross tabulations were carried out between the faculties and their mode of internet access, the number of courses requiring the use of internet, their skill.

Finally, a correlation matrix for multiples pairs of variable was utilized. Buckingham and Saunders (2004) believe in the efficacy of this method in assessing the interrelationship between different variables. In this work, this technique was used to check the interrelationship between variables such as Gender, Frequency of internet use, Faculty, Access to internet and others.

3.5   Generalizability, reliability and validity

This study uses a deductive approach which involves beginning with a theory in relation to the research (Creswell, 2003). The next step is generating a set of hypotheses that support the theory and developing a research design with implications of issues such as external validity which deal with the results and the researcher's ability to determine cause – effect or correlation in the results (Bryman, Bell, Mills & Yue, 2011).The last steps in a deductive approach are choosing the research site and respondents, collecting and analyzing data with the aim of getting results and writing out the findings.

The importance of measurement as related to quantitative approach is in its ability to outline clearly the differences between individuals in terms of classification provides consistency and correlation that may exist between concepts.

Buckingham and Saunders (2004) assert that the use of questionnaires enables the gathering of generalizable information on a large population. In addition, questionnaire survey is an appropriate individualistic mechanism for collecting data.

The designed survey in this research borrows from studies conducted by Motiwalla (2007) and Sharples, Taylor and Vavoula (2005) albeit with some modification to suit the research objectives. This will enable the replication of the results and findings of this research in other parts of Nigeria, in private universities or colleges of education in the country or other African countries. In addition, Bryman, Bell, Mills and Yue (2011), assert that reliability applies to the consistency of a measure of concept. This implies that items can be measured in the same way regardless of the time and the researcher who conducted the survey. However, there is a tradeoff between reliability and validity in the sense that improving measures of reliability can lead to less validity and the converse holds. (Buckingham etc., 2004).

Reliability in this study was first ensured by testing and retesting of the data using SPSS software. Tests such as Pearson's chi square test were employed. In addition, the results found were compared to some results from other researchers in previous studies on the same subject. Buckingham and Saunders (2004) also maintain that results from surveys generate reliable information that sheds light on the social world provided the survey is carried out systematically and cautiously.

3.6 Hypotheses

On the one hand is observed the high statistics of the Nigerian populace and the eminent issues associated with the demand for university education (as presented in section 1.2 of chapter 1). On the other hand, is also the demand and increase in the adoption rate of the mobile device evident in the figures revealed by the subscriber data (as shown in section 1.3 of chapter 1). Based on these facts and that of the interest of the researcher on the subject of m – learning and its benefits to schools, this study considers the university students perspective with the aim of understanding their activities using the following hypotheses:

1. *Mobile technology is not currently being used to teach in all or most Nigerian universities.*

The answer for this premise is found in part from section 1.2 of chapter which discussed in brief the background of the Nigerian education system. In addition, the results from the analysis of the survey help provide insight into arriving at a conclusion to this hypothesis.

2. *The devices that would support learning are neither readily available nor affordable in Nigeria.*

This hypothesis arises from the assumption that the unavailability and unaffordability of the device are factors that may be responsible for the mobile technology not being in use. Relevant literatures that were reviewed have shown that the ownership of the mobile device sets an advantageous situation for the introduction of m – learning to schools. The finding from the result of this study further reveals what percentage of the students has the mobile device with the wireless connectivity.

3. *The average Nigerian student does not have the required skill for M learning.*

This study considers the skill of the student especially with regards to accessing relevant information on demand to be an important issue to the concept of m – learning. The ability to obtain information is not restricted to the mobile device but also laptops, desktop computers and others. The analyses of the response to the survey carried out provide an insight to this notion.

4. *There is not (adequate) awareness level of the use of mobile technology for enhancing learning in Nigeria.*

The research uncovers the percentage of the students who know or have heard of m – learning. This is because awareness is viewed in this work as a factor that can impede or foster the implementation of m – learning.

5. *There is considerable time spent in travelling to and from school that can be used for learning via mobile devices*.

The study points out how much time is spent on travelling activities by the students. The aim of this discovery, is to identify and design suitable learning programmes that can be catered for using m – learning.

4 DATA

4.1 Introduction

Information obtained from responses is processed by placing them into categories that become meaningful within the theories and framework of a study. Statistical methods and processes are used to evaluate the strength of relationships between the variables measured at various levels. In the light of this, cross tabulation which in SPSS is carried out using the 'crosstabs' command, was used in analyzing the relationship between the variables used in the study. This chapter looks at the relationship between the variables in order to test the hypotheses of the study.

4.2 Data Context

After the collection of the responses, tables and scales were generated in order to summarize and measure the respondents' reaction. The result of such summary was then analyzed with regards to the objectives of the study. Some of the variables used in this research work needed to be further categorized to enable data analysis. An example is the area of course of study where a number of departments and courses had to be grouped together into a single faculty. The faculties were grouped into six categories which are Engineering, Medicine, Agriculture, Art and humanities, Sciences and lastly Social sciences, further grouping is presented below:

The use of engineering encompasses all the engineering courses offered by the school (for example, environmental engineering and civil engineering). The basic idea is that all engineering courses can be completed after five years of full time study.

Medicine as used here includes all the different medical departments as well as dentistry and pharmacy students since it requires six years of full time

study to graduate and they all would undertake similar courses at some point in the cause of study.

Agriculture comprised of all agricultural related courses such as fishery, animal science, crop science and so on.

Social science was made up of courses such as accounting, business administration, geography, sociology, physiology and so on.

Science consisted of various courses from the physical science like mathematics, computer science, geology and life science such as chemistry, biology.

Art and humanities comprised of courses such as linguistics, religious studies, fine art, physical and health education, adult education.

TABLE 3 Data variables of the research

Variables	Number of Respondents
Total Sample Size	135
University A	57
University B	78
Faculty	
Engineering	16
Medicine	12
Agriculture	16
Social Sciences	7
Sciences	62
Art and Humanities	21
Missing entries	1
Gender	
Male	73
Females	57
Missing entries	5
Age Groups	
≥ 18	19
19 – 22	68
23 – 26	43
27 – 30	1
Missing entries	4
Study Year	
Year 1	13
Year 2	51
Year 3	25
Year 4	29
Year 5	15
Others	1
Missing entries	1

4.3   Data Presentation in relation to research questions

Research question 1: Time spent by student in commuting to and from school daily, the means of transportation and the frequency was captured in question 7 to 9 of the questionnaire (Appendix 1). From the response (figure 5, table 4 and 5), it revealed that travelling to school by bus was found to have the highest frequency (61 students which makes up 46.7%). 75 of the 124 students who responded to the question spent less than 1 hour travelling to school. Out of this 75 students, 35 of them went by bus, therefore accounting for 57.4% of those who spent less than 1 hour travelling. 31 students commuted by walking, 15 students by bicycle and 16 students by motor bike. The question here is, is less than 1 hour a considerable time enough to do any form of learning? Nevertheless, there are different learning activities that can be designed to fit various time frames while bearing in mind that it is difficult to delineate learning from other everyday activity but rather it should be seen as being incorporated in various non-learning activities (Sharples etc., 2005.).
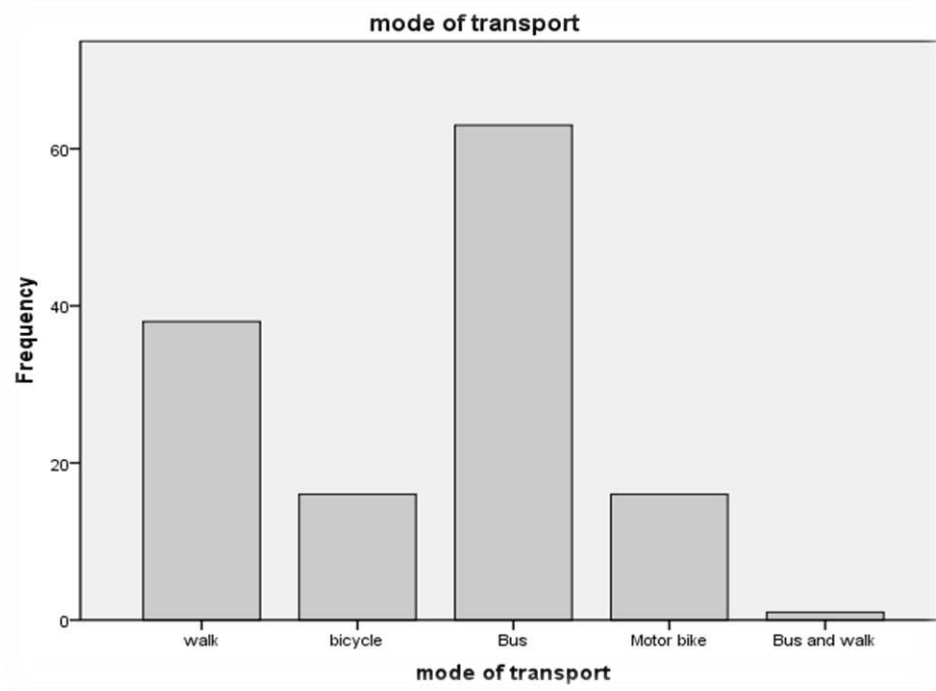
FIGURE 5 Mode of transport

TABLE 4 Mode of transportation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Walk	38	28.1	28.4	28.4
	Bicycle	16	11.9	11.9	40.3
	Bus	63	46.7	47.0	87.3
	Motor bike	16	11.9	11.9	99.3
	Bus and walk	1	.7	.7	100.0
	Total	134	99.3	100.0	
Missing	System	1	.7		
	Total	135	100.0		

TABLE 5 Amount of time spent commuting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 1 hour	76	56.3	60.8	60.8
	2 - 3 hours	31	23.0	24.8	85.6
	3 - 4 hours	16	11.9	12.8	98.4
	more	2	1.5	1.6	100.0
	Total	125	92.6	100.0	
Missing	System	10	7.4		
Total		135	100.0		

Research question 2: Questions 23 – 25 were designed to ascertain the students' level of awareness as it concerns mobile learning as at the time of the survey. The response obtained reflects that 75 students (which constituted 55.6% of the sample) had heard previously about mobile learning. The internet was shown to be the most predominant mode of obtaining this knowledge. In addition, 86 students believe that learning can be improved by the use of mobile learning. However, 35 students (that is 25.9%) answered 'maybe' to this question. (See figure 6, 7 and 8 below).

Heard of Mobile learning before now?

■ yes
□ no
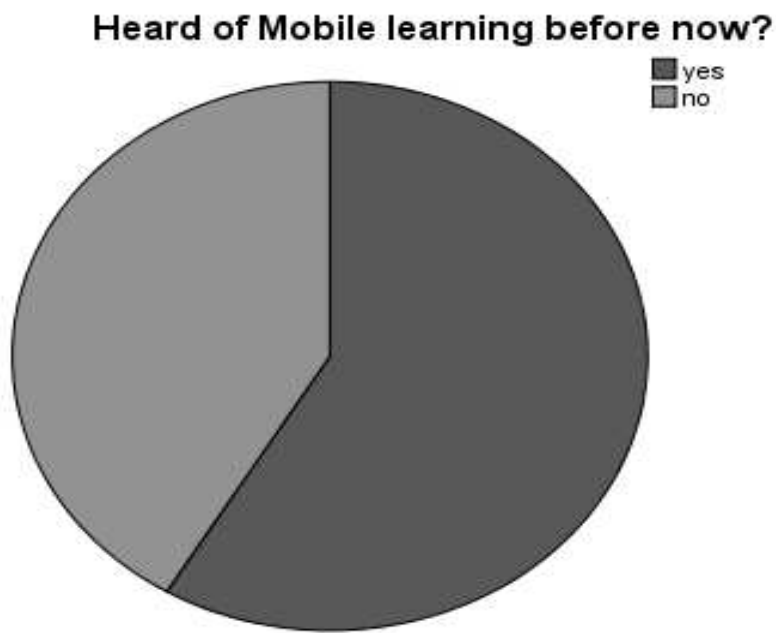
FIGURE 6 Awareness of mobile learning

Where you heard about mobile learning

■ TV
■ Internet
□ Magazine
■ Newspaper
□ Internet and others
■ combination of others
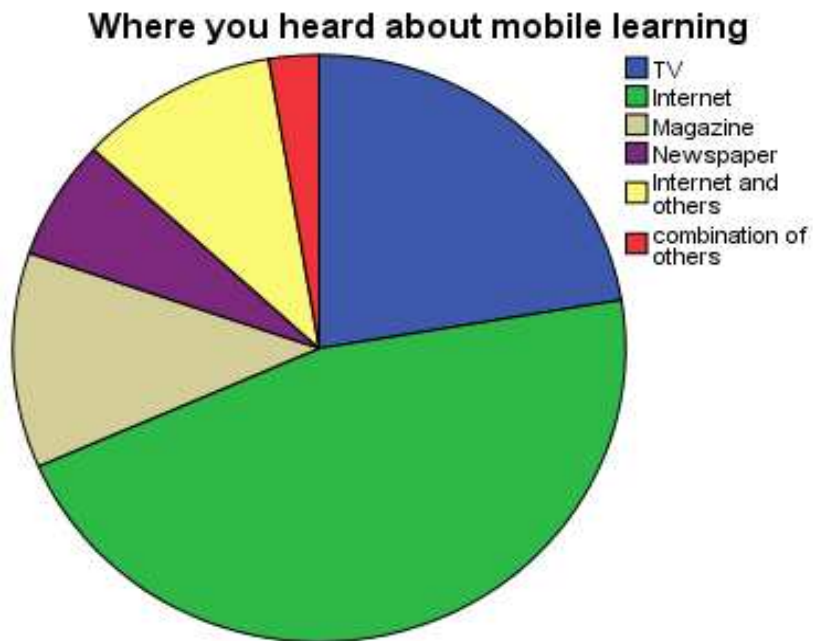
FIGURE 7 Where you heard about m- learning

Mobile learning will improve the learning experience
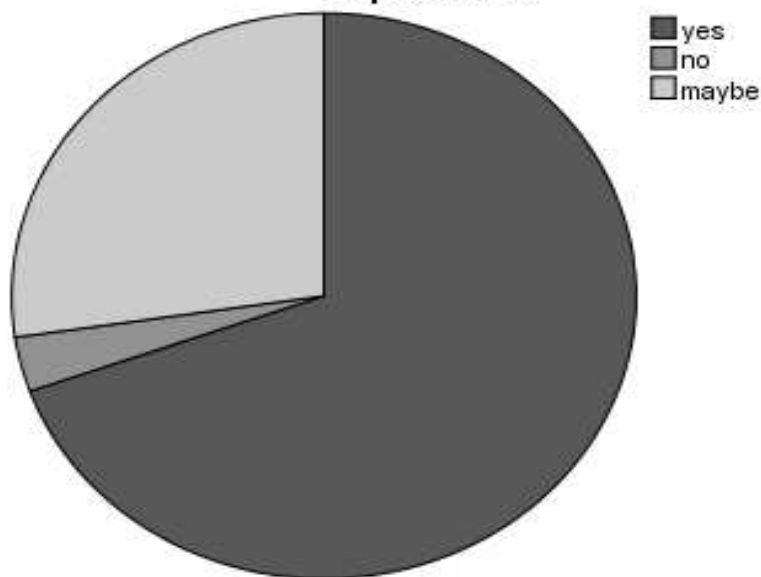
FIGURE 8 Can mobile learning improve the learning experience?

Research question 3: The question of the availability of the mobile device was answered in question 19. Question 20 and 21 went on to further access the type of mobile phones available to the students. The result reveals that of the 128 students who answered the question, 127 own a phone (table 6). 114 students have mobile phones that can access the internet while 105 students could access data services with their mobile phones. (Table 7 and 8).

TABLE 6 Ownership of mobile phone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	127	94.1	99.2	99.2
	no	1	.7	.8	100.0
	Total	128	94.8	100.0	
Missing	System	7	5.2		
Total		135	100.0		

TABLE 7 Mobile phones with internet access

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	114	84.4	89.1	89.1
	no	14	10.4	10.9	100.0
	Total	128	94.8	100.0	
Missing	System	7	5.2		
Total		135	100.0		

TABLE 8 Mobile phones with data services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	105	77.8	82.0	82.0
	no	23	17.0	18.0	100.0
	Total	128	94.8	100.0	
Missing	System	7	5.2		
Total		135	100.0		

Research question 4: On the issue of whether there is any meaningful inconsistency between different disciplines in favor of m- learning. The result of the respondent from the different faculties was cross tabulated against the number of courses that required the use of the internet for completion of assignment. (See table 9, 10 and 11 below). The findings revealed that both the social science, the art and humanities faculties had between 1 to 3 courses requiring the use of the internet to complete assignments. The other faculties had higher respondents tending to have 4 and more courses requiring the use of the internet for completion of course assignments. Nevertheless, the figures (and more importantly, the value of the significant level of .072) from the contingency table reveal that there is unlikely to be a relationship between the faculties and number of courses that require the use of the internet for completion of assignments.

TABLE 9 Summary of cross tabulation between faculty and number of courses requiring
internet

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Faculty * Recode (Number of courses Req Internet	127	94.1 %	8	5.9 %	135	100.0 %

TABLE 10 Chi square table for table 11

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.131a	10	.072
Likelihood Ratio	18.610	10	.046
Linear-by-Linear Association	2.473	1	.116
N of Valid Cases	127		

a. 8 cells (44.4%) have expected count less than 5. The minimum expected count is .28.

TABLE 11 Cross tabulation between faculty and number of courses requiring internet

			Faculty						Total
			Engineering	Medicine, pharmacy, dentistry,	social sciences	Sciences	Art and humanities	Agriculture	
Recode (Number of courses Req Internet	no course	Count	0	0	1	2	2	0	5
		% within Faculty	.0%	.0%	14.3%	3.5%	9.5%	.0%	3.9%
	1 -3 courses	Count	6	3	5	23	14	6	57
		% within Faculty	37.5%	25.0%	71.4%	40.4%	66.7%	42.9%	44.9%
	4 or more courses	Count	10	9	1	32	5	8	65
		% within Faculty	62.5%	75.0%	14.3%	56.1%	23.8%	57.1%	51.2%
Total		Count	16	12	7	57	21	14	127
		% within Faculty	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Still on the subject of finding meaningful inconsistencies between the various disciplines, a look at the cross tabulation between the faculties and the students' level of awareness of m – learning (see table below 12) showed that the Engineering faculty has 53% of their students aware while 47% are not; the Medical faulty reveals 92% of their students are aware while 8% are not; Social science faculty has 71% of their student aware while 29% are not; Science faculty has 57% students are aware while 43% are not; Art and humanities has 37% of their student being aware while 63% are not. The chi- square value of 0.075 (appendix 2, table ix) further indicates a weak association between the two variables.

Likewise, the cross tabulation between the faculties and the students' mode of internet access (result is displayed in table 13 below) revealed that in the Engineering faculty; the most popular mode of access was via the cybercafé (50% of the students). In the Medical and Art and humanities faculties, the laptop ranked as the most common (42% and 38% of their students respectively). In the Social science, Science and Agricultural faculties, the mobile phone was rated the most prevalent means of accessing the internet with 43%, 37% and 53% respectively. There was also a weak association between the two variables from the chi – square value displayed in appendix 2, table x).

On their skill (see table 14), the cross tabulation between the faculties and their internet surfing skills revealed that majority of the students from all the faculties acknowledged that they fell into the category between average to very good skill. However, the faculties of Agriculture and Social science had a few students admitting they had poor or no skill (13% and 14% respectively). The chi –square value (appendix 2, table xi) did not show a strong relationship between the variables. Additional cross tabulation between the faculties and the students' ability to navigate and obtain information from the internet revealed that there is very strong association between the variables. The chi square value of 0.955 supports this. (See appendix 2, tables' xv and xiv).

Bivariate correlation matrix was used to correlate some of the variables against each other and this resulted in an 8 x 8 table (see appendix 2, table xvi). The aim was to find out if all the variables were a good measure of the m – learning concept. The analysis of the correlation coefficient between the variables indicated some modest significance of (0.355 and 0.429). This implies that the students' ability to navigate and obtain information from the internet, their internet surfing skills and where they obtained knowledge of m – learning from are to a good extent useful for describing the m – learning concept.

TABLE 12 Cross tabulation between faculty and students' awareness of m - learning

			Faculty						Total
			Engineering	Medicine, pharmacy, dentistry,	social sciences	Sciences	Art and huma-nities	Agriculture	
Heard of Mobile learning before now?	yes	Count	8	11	5	34	7	9	74
		Expected Count	8,7	7,0	4,1	35,0	11,1	8,2	74,0
		% within Faculty	53,3%	91,7%	71,4%	56,7%	36,8%	64,3%	58,3%
	no	Count	7	1	2	26	12	5	53
		Expected Count	6,3	5,0	2,9	25,0	7,9	5,8	53,0
		% within Faculty	46,7%	8,3%	28,6%	43,3%	63,2%	35,7%	41,7%
Total		Count	15	12	7	60	19	14	127
		Expected Count	15,0	12,0	7,0	60,0	19,0	14,0	127,0
		% within Faculty	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

TABLE 13 Cross tabulation between Faculty and students' mode of internet access

			Faculty						Total
			Engineering	Medicine, pharmacy, dentistry,	social sciences	Sciences	Art and humanities	Agriculture	
How Internet access	cybercafe	Count	8	2	2	7	6	2	27
		% within Faculty	50.0%	16.7%	28.6%	11.3%	28.6%	13.3%	20.3%
	home computer	Count	0	2	0	2	0	0	4
		% within Faculty	.0%	16.7%	.0%	3.2%	.0%	.0%	3.0%
	friend's computer	Count	1	1	0	4	0	0	6
		% within Faculty	6.3%	8.3%	.0%	6.5%	.0%	.0%	4.5%
	my laptop	Count	2	5	2	16	8	2	35
		% within Faculty	12.5%	41.7%	28.6%	25.8%	38.1%	13.3%	26.3%
	my phone	Count	4	2	3	23	2	8	42
		% within Faculty	25.0%	16.7%	42.9%	37.1%	9.5%	53.3%	31.6%
	school computer	Count	0	0	0	0	2	0	2
		% within Faculty	.0%	.0%	.0%	.0%	9.5%	.0%	1.5%
	My phone and others	Count	1	0	0	9	3	3	16
		% within Faculty	6.3%	.0%	.0%	14.5%	14.3%	20.0%	12.0%
	combination of others	Count	0	0	0	1	0	0	1
		% within Faculty	.0%	.0%	.0%	1.6%	.0%	.0%	.8%
Total		Count	16	12	7	62	21	15	133
		% within Faculty	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 14 Cross tabulation between faculty and students' internet surfing skill

			Faculty						Total
			Engineering	Medicine, pharmacy, dentistry,	social sciences	Sciences	Art and humanities	Agriculture	Total
internet surfing skill	no skill	Count	0	0	1	1	0	0	2
		% within Faculty	.0%	.0%	14.3%	1.7%	.0%	.0%	1.5%
	poor skill	Count	1	0	0	2	1	2	6
		% within Faculty	6.3%	.0%	.0%	3.4%	4.8%	13.3%	4.6%
	average skill	Count	4	1	0	22	8	2	37
		% within Faculty	25.0%	8.3%	.0%	37.3%	38.1%	13.3%	28.5%
	good skill	Count	4	4	5	13	8	4	38
		% within Faculty	25.0%	33.3%	71.4%	22.0%	38.1%	26.7%	29.2%
	very good skill	Count	7	7	1	21	4	7	47
		% within Faculty	43.8%	58.3%	14.3%	35.6%	19.0%	46.7%	36.2%
Total		Count	16	12	7	59	21	15	130
		% within Faculty	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Research question 5: Question 22 was intended to determine the willingness of the students in using their mobile phones for learning. (Result is displayed in figure 9 and table 15). Of the 126 students who answered the question, 117 affirmed the proposition thereby representing 86.7% while 9 (representing 6.7%) were not in support.

TABLE 15 Willingness to use mobile phone for learning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	117	86.7	92.9	92.9
	no	9	6.7	7.1	100.0
	Total	126	93.3	100.0	
Missing	System	9	6.7		
Total		135	100.0		
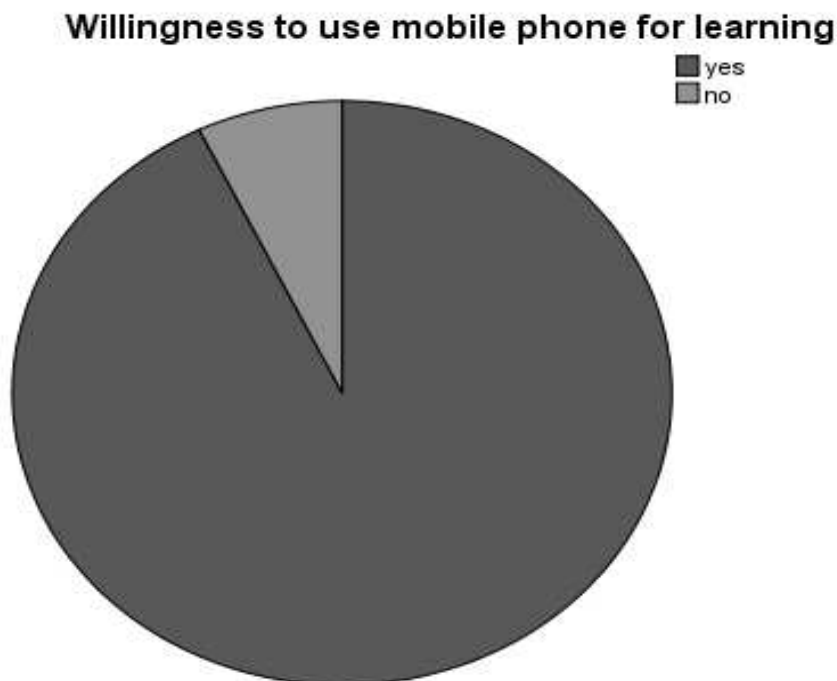
FIGURE 9 Students' willingness to use their mobile phone for learning

Aside from the questions which were intended to provide answers to the research questions, question 17 of the survey instrument was posed to reflect the students' attitude towards social networking sites (For example, Facebook). This is because social networking sites are viewed by the researcher as interactive media and interaction is a significant axis to the theory of social constructivism which was selected in this research as most appropriate for m - learning. The findings (see Appendix 2, table iv – viii) revealed that 94% used such sites; 91% admit that they use such sites to connect with people; 76% acknowledge the fact that they use such sites to keep in touch with events. However, about 36% of the respondents accept that among other reasons, they also use such sites because others use it.

At this point, it is constructive to discuss the hypotheses considered for this study:

Hypothesis 1: Mobile technology is not currently being used to teach in all or most Nigerian schools. The question as to whether m – learning was in use in the institutions considered in this study was not directly asked instead, in order to arrive at this conclusion, responses to the level of awareness of m – learning (question 23 and 24) was scrutinized. The result reflects that approximately 56% had heard of m – learning and the remaining 44% of the students had not. The outcome of their awareness of m- learning supports the hypotheses in the sense that if the technology is indeed in use for instructional purpose then all the students should have some knowledge of m – learning.

Hypothesis 2: The devices that would support learning are neither readily available nor affordable in Nigeria. The main device focused on in this research was a mobile phone that is able to access the internet and data services. Surprisingly, the findings of the survey (as shown and discussed earlier in the result of research question 3) did not support this hypothesis.

Hypothesis 3: The average Nigerian student does not have the required skill for M- learning. The skill of the students was tested by their response to questions in relation to the use of word processing (for example Microsoft word), electronic mail, surfing of the internet, downloading software. In addition, questions that dealt with the ease of use of the internet, ability to navigate and obtain information from the internet were posed (question 16 and 18). It was observed from the analysis of the result (see table 16) that the mean for the responses to the questions ranged between 3.63 to 4.24 which indicates that the students believe they possess between average skills to very good skills and also that they found it easy to navigate, understand and obtain information from the internet. Subsequent to the fact that from this result, the students are found to have the basic skill required for m – learning, this hypothesis is hereby disproved.

TABLE 16 Descriptive statistics of skills

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Skill (word processing)	134	4	1	5	3.67	1.095
Skill (use of email)	133	5	0	5	3.93	1.031
internet surfing skill	131	4	1	5	3.94	.983
software dowloading skill	132	4	1	5	3.63	1.327
Use of internet is clear and understandable	126	4	1	5	4.24	.862
Navigate and obtain information from internet	123	4	1	5	4.18	.897
Internet is easy to use	126	4	1	5	4.14	.953
Valid N (listwise)	119					

Hypothesis 4: There is not (adequate) awareness level of the use of mobile technology for enhancing learning in Nigeria. From the results of question 23 already discussed in hypothesis 1, it is obvious that not all the students are aware of m – learning. In addition, the result from question 25 mentioned earlier (research question 2 and according to figure 6 and 8), which shows 86 students believe that learning can be improved by the use of mobile learning. There is still a significant 25.9% that were uncertain while 3% were opposed to the fact that m – learning would improve their learning experience. However, the study of the review of related literature in chapter 2 reveals that m- learning does as a matter of fact improve the learning experience one way or another. As a result, the empirical findings presented here did not disprove this hypothesis.

Hypothesis 5: There is considerable time spent in travelling to and from school that can be used for learning via mobile devices. As observed earlier (in research question 1), the bus was seen as the most popular mode of transportation. 46.7% of the respondents travelled to and from school by bus. Further cross tabulation between the mode of travel and the time spent on travelling (table 17) yielded the fact that 57.4% of those who travelled by bus fell into the category of students who spent less than an hour commuting. The chi- square value obtained from this analysis was 0.587 (see appendix 2, table xii), which indicates a reasonably strong relationship between both variables.

The cross tabulation between the mode of transportation and frequency of public transport use (table 18) revealed that about 60% of those who went by bus did so twice in a day. The chi- square value for this analysis was found to be very low. (See appendix 2, table xiii). This hypothesis is however, inconclusive due to the fact that the term 'considerable time' is relative. Notwithstanding the important information discovered at this point is the prevalent mode of transportation, the frequency of use and amount of time devoted by the students to such activity.

TABLE 17 Cross tabulation between mode of transport and time spent commuting

			Time for commuting				Total
			less than 1 hour	2 - 3 hours	3 - 4 hours	more	
mode of transport	walk	Count	20	7	4	0	31
		% within mode of transport	64.5%	22.6%	12.9%	.0%	100.0%
		% within Time for commuting	26.7%	22.6%	25.0%	.0%	25.0%
	bicycle	Count	11	4	0	0	15
		% within mode of transport	73.3%	26.7%	.0%	.0%	100.0%
		% within Time for commuting	14.7%	12.9%	.0%	.0%	12.1%
	Bus	Count	35	17	7	2	61
		% within mode of transport	57.4%	27.9%	11.5%	3.3%	100.0%
		% within Time for commuting	46.7%	54.8%	43.8%	100.0%	49.2%
	Motor bike	Count	8	3	5	0	16
		% within mode of transport	50.0%	18.8%	31.3%	.0%	100.0%
		% within Time for commuting	10.7%	9.7%	31.3%	.0%	12.9%
	Bus and walk	Count	1	0	0	0	1
		% within mode of transport	100.0%	.0%	.0%	.0%	100.0%
		% within Time for commuting	1.3%	.0%	.0%	.0%	.8%
Total		Count	75	31	16	2	124
		% within mode of transport	60.5%	25.0%	12.9%	1.6%	100.0%
		% within Time for commuting	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 18 Cross tabulation between mode of transport and frequency of commuting

			Frequency of public transport use				
			once	twice	thrice	more	Total
mode of transport	walk	Count	23	8	1	0	32
		% within mode of transport	71.9%	25.0%	3.1%	.0%	100.0%
		% within Frequency of public transport use	71.9%	13.6%	5.6%	.0%	25.8%
	bicycle	Count	4	8	2	1	15
		% within mode of transport	26.7%	53.3%	13.3%	6.7%	100.0%
		% within Frequency of public transport use	12.5%	13.6%	11.1%	6.7%	12.1%
	Bus	Count	3	37	13	8	61
		% within mode of transport	4.9%	60.7%	21.3%	13.1%	100.0%
		% within Frequency of public transport use	9.4%	62.7%	72.2%	53.3%	49.2%
	Motor bike	Count	2	6	2	6	16
		% within mode of transport	12.5%	37.5%	12.5%	37.5%	100.0%
		% within Frequency of public transport use	6.3%	10.2%	11.1%	40.0%	12.9%
Total		Count	32	59	18	15	124
		% within mode of transport	25.8%	47.6%	14.5%	12.1%	100.0%
		% within Frequency of public transport use	100.0%	100.0%	100.0%	100.0%	100.0%

5 CONCLUSION

5.1 Introduction

The aim of this research study was to explore the use of mobile technology for instructional purpose in Nigerian universities. The subject matter was approached solely from the perspective of the student. The study reviewed some learning theories and identified the suitable learning theory for the mobile technology. This selection was further corroborated by the result from the examination of some m – learning frameworks and studies carried out in the review of relevant literature. The result of the research questions (discussed in the first chapter) and those of the hypotheses (also discussed in the third chapter) were offered alongside data analysis for the study in chapter four. Further, the work examined with respect to the m - learning the awareness level, skill level, commuting habits, ownership of the mobile device, internet access, and willingness to adopt mobile learning as these were seen as necessary factors for the implementation of m - learning. This chapter concludes by presenting the significance of the study, discussions on the major findings, the limitations, further research and recommendations.

5.2 Significance of study

This work has only been able scratch the surface of the issue, but even at that, the cross sectional approach and the locality of the work indicate huge possibilities and promise for the m – learning concept in Nigeria and Africa at large.

The findings of this research is noteworthy in the sense that it can be used to enlighten and provide background information to other investigative work related to the use of M – learning in schools especially in developing countries.

In addition, the survey instrument used in this study can be applied to other universities within and outside Nigeria.

5.3 Major Findings

The research captures the wide spread use and ownership of a mobile phone by the Nigerian students. Majority of the students in the target population of this study own a mobile phone. This result attests to the current trend in the ubiquitous use of the mobile device in developing countries especially in the sub -Saharan Africa (Sharples, Taylor and Vavoula, 2005). Thereby supporting the argument put forward by Litchfield, Dyson, Lawrence and Zmijewska (2007) that the students ownership of and readiness to use their own mobile device is a critical success factor in the implementation of m- learning. This is so because, it phases out the issue of cost of providing the device for the students and resolves the issues concerned with usability which was earlier identified as a challenge to m - learning in the literature review. In addition, Corlett, Sharples, Bull and Chan (2005) confirm the significance in owning the mobile device as they observed in their study, a situation where students were loaned PDAs and were found to be unenthusiastic in devoting time and money in personalizing and extending the device. Zhang et. al (2010) maintains that the ubiquitous technology has resulted in a growing enthusiasm among educators with regards to exploiting the benefits of m learning.

In this study, travelling by bus was observed to have the highest frequency even though most of these fell into the category of students who travelled for less than an hour. There were still other modes of transportation. The idea here suggests that different types of learning activities can be designed to suit these different modes of travel to enable the students optimize learning opportunities.

A greater number of the courses required the use of internet for completion of course assignments and also a high percentage of the students in this study obtained information about m- learning via the internet which confirms the constant desire for information. The key benefit of m-learning is observed in the ability to obtain information that is suitable and meets the timely need. In addition to this is the fact that the burden of cognitive load which is now lessened during learning activities as well as increase in opportunities for interaction first with the technology and also with people. Consequently, this supports the social constructivist viewpoint which sees learning as a continual process of building, interpreting, and adapting symbols of reality as a result of experiences with reality.

The theoretical reflections for this study and its hypotheses were based on the social constructivist concepts. The aim was not to validate the theories but rather to employ them in the investigation of the activities of the university stu-

dents. These activities comprised of those that occur in the formal, informal and non-formal learning environment. In summary, the data supported some of the hypotheses of the study and most importantly uncovered the fact that m - Learning is not used currently for instructional purpose in the Nigerian universities. Interestingly, the result from question 17 which highlighted the attitude of the students towards the use of social networking sites (presented earlier in chapter 4) depicts the students' favorable disposition towards interactive activities. Interaction was previously observed (in chapter 2) as an integral part of the social constructivist philosophies. Consequently, the theory provided a better understanding for the need in emphasizing instructional effectiveness in information retrieval and interaction activities among the students.

The managerial implication of this investigation is such that consequent to the fact that this study has shed some light on the activities of the students, it will be interesting to witness the creation of an active constructivist situation in the Nigerian schools where tools such as the mobile devices are enabled to provide systems for inquiry and social interaction. This will help the students to yield and foster cooperative as well as individual discovery abilities. Litchfield, Dyson, Lawrence and Zmijewska (2007) propose extensive and collaborative partnerships for future action research in m - learning projects in schools.

The notion of mobile learning for instructional purpose in education in Nigeria is basically an innovative idea and the intricacies involved will be too numerous to uncover in a single master's thesis. Nevertheless, it could be said that a reasonable amount of issues relevant to the subject matter were brought to light in such a manner as to provide answers to the questions presented.

In closing, this research into m-learning in Nigerian universities is in an exploratory phase and as such, there are still a number of learning as well as teaching issues that need to be scrutinized.

5.4 Limitations

Due to financial and time constraint, the survey instrument was only administered in two federal universities. This implies obtaining responses from more universities could possibly enrich the result beyond what was obtained but simultaneously could have resulted in increase in cost and extended data collection period. The use of gatekeepers was advantageous in limiting the data collection period to three weeks in each university and in ensuring high response rate.
Another perceived drawback in this study is the fact that a pilot study was not conducted prior to the main survey. As a result some of the problems that the respondents faced could not be resolved. For example, the word 'commuting' in question 9 of the survey was considered a typographical error and some re-

spondents edited it with their pen to become 'computing'. The use of a pilot study could have helped to improve the questionnaire by providing clarity to the respondents. The survey instrument could have been improved if designed to capture what type of learning activities the students would prefer to engage in with their phones. For example, their ideal type of learning activity while travelling to school, in the classroom or outside the physical environment of the school. This would have provided a better answer to the research question 1 and hypothesis 5.

Owing to the sample size, the number of variables and the combination techniques used in this study as well as the nature of the locality where this study was conducted, there may be differences in the result arrived at in other similar studies. Nevertheless, the findings of this research are consistent with the perspective of other studies and hence indicate the representativeness and validity of the work.

5.5   Further Research

Further research can be conducted to uncover the amount of learning that occurs during travels as well as how much learning takes place outside of the normal physical locations of learning. In addition, it will be interesting to find out how much time the students spend daily on calls, text messages, games and what proportion of their time is devoted to learning activities (for example spellings, language learning and others). These answers are crucial to the subject of mobile learning.

There is also a probability that the use of the qualitative paradigm could improve as well as substantiate the result in this study and further provide better insights of the education sector with regards to m- learning. In addition, a carefully stratified survey sample size representative of the faculties could be used to examine the concepts applied in this work.

Since this study does not disregard the role of the teachers in m - learning, it is pertinent to obtain the view of the teachers, their skills and attitude towards m – learning in the Nigerian universities. In the review of related studies earlier, limited research focused on the opinions and actions of the teachers in relation to m - learning. The aim of capturing this view is to acquire a holistic understanding in terms of issues based on the locality or culture that can foster the receptiveness of or those that can act as deterrent to this learning style. It was not possible to get a sizeable number of teachers willing to take part in this survey within the time limit required to complete this thesis hence the main focus of this work was totally from the student perspective.

5.6 Recommendation

This research does not only advocate the implementation of m- learning in the Nigerian schools but also that the mobile educational practice could be leveraged from the existing mobile use, willingness to use and ownership of the device as observed in the findings. Course resources can be designed for delivery via the mobile device. In addition, it is pertinent to choose or adopt suitable pedagogical approaches to learning activities that are appropriate for use with the students own mobile phones.

REFERENCES

Abayomi, A.S. (2011). GSM Marketing Service Providers Operations And Customers Satisfaction In Nigeria: An Empirical Investigation. *Acta Universitatis Danubius.* Vol 7, No. 3, Pp. 77-103.

Adomi, E. E. (2005). Mobile Telephony in Nigeria. *Library Hi Tech News.* Number 4, 2005, pp. 18 -21.

Ajadi, T.O., Salawu, I.O., & Adeoye F.A. (2008). E – learning and Distance Education in Nigeria. *The Turkish Online Journal of Educational Technology.* 7(4), Article 7.

Alzouma, G. (2005). Myths of digital technology in Africa: Leapfrogging development? *Global Media and Communication.* Volume 1(3): 339–356.

Attewell, J. & Savill-Smith, C.(2003). Mobile learning and social inclusion: focusing on learners and learning. *Mlearn 2003 Conference.* The Learning and Skills Development Agency, United Kingdom. Pp. 3 – 11.

Bryman, A. & Cramer, D., (2001). *Quantitative Data Analysis with SPSS Release 10 for Windows: A guide for social scientists.* (1st Ed.). Routledge. Taylor & Francis Inc.

Bryman, A., Bell, Emma., Mills, A.J., & Yue, A.R. (2011). *Business Research Methods.* Canadian Edition. Oxford University Press.

Buckingham, A. & Saunders, P. (2004). *The survey methods workbook: From design to analysis.* (1st Ed.) Polity press Ltd.

Bull, S. & Reid, E. (2003). Individualised revision material for use on a handheld computer. *Mlearn 2003 Conference.* The Learning and Skills Development Agency, United Kingdom. Pp. 35 – 42.

Chandler, P. & Sweller J. (1991). Cognitive Load Theory and the Format of Instruction. *Cognition and Instruction.* Vol. 8(4), pp. 293-332. Accessed April 13, 2013 http://www.jstor.org/stable/pdfplus/3233596.pdf

Colley, J. & Stead, G. (2003). Take a bite: producing accessible learning materials for mobile devices. *Mlearn 2003 Conference.* The Learning and Skills Development Agency, United Kingdom. Pp. 43 – 46.

Corlett, D., Sharples, M., Bull, S. & Chan, T. (2005). Evaluation of a mobile learning organiser for university students. *Journal of Computer Assisted learning,* 21, pp.162–170.

Costabile, M,F., De Angeli, A., Lanzilotti, R., Ardito, C., Buono, P. & Pederson, T. (2008). Explore! Possibilities and Challenges of Mobile Learning. *CHI 2008 Proceedings, Florence, Italy.*

Creswell, J.W., (2003). *Research design: Qualitative, quantitative and mixed method approaches.* (2nd Ed.). Sage Publications, Inc.

Danielsson, K., Hedestig, U., Juslin, M. & Orre, C.J. (2003). Participatory design in the development of mobile learning environments. *Mlearn 2003 Conference.* The Learning and Skills Development Agency, United Kingdom. Pp. 47 – 53.

Dawabi,P., Wessner, M. & Neuhold, E. (2003). Using mobile devices for the classroom of the future *Mlearn 2003 Conference.* The Learning and Skills Development Agency, United Kingdom. Pp. 55 – 59.

Duit, R. & Treagust D. F. (1998). Learning in Science – From Behaviourism Towards Social Constructivism and Beyond. International Handbook of Educational Science. Kluver Academic Publishers. Pp. 3 – 25. Retrieved in May 2013 from http://content.schweitzer-online.de/static/content/catalog/newbooks/978/079/233/9780792335313/9780792335313_Excerpt_001.pdf

Ekundayo, M.S., & Ekundayo, J.M. (2009). Capacity Constraints in Developing Countries: A Need for More E-learning Space? The Case of Nigeria. In Same places, different spaces. *Proceedings ascilite Auckland 2009.* http://www.ascilite.org.au/conferences/auckland09/procs/ekundayo.pdf

Evans C., (2007). The effectiveness of m-learning in the form of podcast revision lectures in higher education. *Computers & Education.* 50 (2008) 491– 498.

Fink, A. (1995). *How To Analyze Survey Data*. (1st Ed.). Sage Publications, Inc.

Fink, A. (2003). *The Survey Handbook*. (2nd Ed.). Sage Publications, Inc.

Grabinger, R.S.& Dunlap. J.C. (1995). Rich environments for active learning: A definition. *Research in learning Technology.* Volume 3 (2) Pp. 5 – 34. Accessed January 5, 2013. http://www.researchinlearningtechnology.net/index.php/rlt/article/viewFile/9606/11214

Holzinger, A., Nischelwitzer, A., & Meisenberger, M. (2005). Mobile Phones as a challenge for m –Learning: Examples for Mobile Interactive Learning Objects (MILOs). *Proceedings of the 3rd International Conference on Pervasive Computing and Communications Workshops*. 307-311.

Kalba, K. (2008). The Adoption of Mobile Phones in Emerging Markets: Global Diffusion and the Rural Challenge. *International Journal of Communication* 2 (2008), 631-661.

Kearney, M., Schuck, S., Burden, K., & Aubusson, P. (2012). Viewing mobile learning from a pedagogical perspective. *Research in Learning Technology.* Vol. 20, 2012 retrieved on April 10th 2013 from http://researchinlearningtechnology.net/index.php/rlt/article/view/14406.

Kirschner, P.A., Sweller, J. & Clark R.E. (2006). Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching. *Educational Psychologist*, 41(2), 75-86. Accessed in July 2013 from http://www.tandfonline.com/doi/pdf/10.1207/s15326985ep4102_1

Koole, M.L (2006). *Framework for Rational Analysis of Mobile Education (FRAME): An Evaluation of Mobile Devices for Distance Education*. Master's Thesis in Distance Education. Athabasca University.

Laal, M., & Salamati, P. (2012). Lifelong learning; why do we need it? *Procedia - Social and Behavioral Sciences.* 31 (2012) 399 – 403.

Lai, C.H., Yang, J.C., Chen, F.C., Ho, C.W., & Chan T.W. (2007). Affordances of mobile technologies for experiential learning: the interplay of technology and pedagogical practices. *Journal of Computer Assisted Learning*, 23, 326–337.

Latchman, S.J., (1997). Learning Is a Process: Toward an improved Definition of Learning. *The Journal of Psychology*, 1997, 131(5), 477 – 480.

Leung,C.H. & Chan, Y.Y. (2003). Mobile Learning: A new paradigm in electronic learning. *Proceedings of the 3rd IEEE International Conference on Advanced Learning Technologies (ICALT '03)*. 76 -80.

Litchfield, A., Dyson, L.E., Lawrence, E., & Zmijewska .A. (2007). Directions for m-learning research to enhance active learning in ICT: Providing choices for learners and learning. *Proceedings ascilite Singapore 2007*. Pp. 587 – 596. Accessed October 14, 2011.
http://www.ascilite.org.au/conferences/singapore07/procs/litchfield.pdf

Looi, C. K., Seow, P., Zhang, B., So, H.J., Chen, W., & Wong, L.H. (2010). Leveraging mobile technology for sustainable seamless learning: A research agenda. *British Journal of Educational Technology*, 41 (2) 154 – 169.

Mcconatha, D., Praul, M., & Lynch, M.J. (2008). Mobile Learning In Higher Education: An Empirical Assessment of A New Educational Tool. *The Turkish Online Journal of Educational Technology*, 7(4), Article.

Nigerian Communications Commission (2013). Subscriber Data, Accessed July 15 2013.
http://www.ncc.gov.ng/index.php?option=com_content&view=article&id=125&Itemid=73

Nigerian Universities Commission (2013). List of Nigerian Universities and Years Founded. Accessed July 15, 2013.
http://www.nuc.edu.ng/pages/universities.asp?ty=1&order=inst_name

Onasanya, S.A., Fakomogbon, M.A., Shehu, R.A., & Soetan, A.K. (2010). Learning Information and Communications Technology Skills and the subject Context of Introductory Technology Learning in Nigeria. *Journal of Artificial Intelligence*, 3(2), 59 -66.

Park, Y. (2011). A Pedagogical Framework for Mobile Learning: Categorizing Educational Applications of Mobile Technologies into Four Types. *The International Review of Research in Open and Distance Learning*, Vol 12, No 2 (2011).

Powell, K.C & Kalina C. J. (2009). Cognitive and Social Constructivism: Developing Tools For An Effective Classroom. *Education* Vol. 130 No. 2, Pp. 241 – 250. Accessed June 2, 2013 from http://www.edpsycinteractive.org/articles/2009-powell-kalina-cognitive-and-social-constructivism.pdf

Rau P.L.P., Gao Q., & Wu L.M. (2006). Using mobile communication technology in high school education: Motivation, pressure, and learning performance. *Computers & Education*, 50 (2008) 1–22.

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Roschelle, J., (2003). Unlocking the Learning Value of Wireless Mobile Devices. *Journal of Computer Assisted Learning* (2003), 19, 260 -272.

Schunk, D.H. (2000). *Learning Theories: An Educational Perspective*. (3rd ed.). Upper Saddle River (N.J): Merrill.

Sharma, S.K & Kitchens, F.L. (2004). Web Services Architecture for M-Learning. Electronic Journal on e-Learning Volume 2 Issue 1 (February 2004) 203-216. Accessed December 6, 2012. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.122.1699&rep=rep1&type=pdf

Sharples, M. (2000). The design of personal mobile technologies for lifelong learning. *Computers & Education* 34 (2000) 177-193.

Sharples, M. (2002). Disruptive devices: Mobile technology for conversational learning. *International Journal of Continuing Engineering Education and Lifelong Learning*, 12(5/6), 504-520.

Sharples, M., Taylor, J., & Vavoula, G. (2005). Towards a Theory of Mobile Learning. Retrieved November 5, 2012 http://www.mlearn.org/mlearn2005/CD/papers/Sharples-%20Theory%20of%20Mobile.pdf.

Shuell, T.J. (1986). Cognitive Conceptions of Learning. *Review of educational Research*, Vol. 56, No. 4, Pp. 411-436. Retrieved June 7, 2013 http://rer.aera.net

Syvänen, A., Pehkonen, M. & Turunen, H. (2003). Fragmentation in mobile learning *Mlearn 2003 Conference.* The Learning and Skills Development Agency, United Kingdom. Pp. 155 – 165.

Thomas G.P. (2001). Toward Effective Computer Use in High School Science Education: Where to from Here? *Education and Information Technologies* 6 (1), 29 – 41.

Yen, J.C., & Lee C.Y. (2011). Exploring problem solving patterns and their impact on learning achievement in a blended learning environment. *Computers and Education* 56 (2011) 138–145.

Yusuf, M. O. (2005). Information and communication Technology and Education: Analysing the Nigerian National Policy for Information Technology. *International Education Journal*, 2005, 6(3), 316 – 321.

World Bank (2011). Accessed November 11, 2011 http://www.worldbank.org/.

Zhang, B. H., Looi C,K., Seow, P., Chia, G., Wong, LH., Chen, W., So H.,Y, Soloway, E., & Norris, C. (2010). Deconstructing and reconstructing: Transforming primary science learning via a mobilized curriculum. *Computers & Education* 55 (2010) 1504–1523.

APPENDIX 1

<u>A STUDY OF THE USE OF MOBILE LEARNING FOR INSTRUCTIONAL PURPOSES IN NIGERIAN UNIVERSITIES</u>.

Mobile learning is the point at which mobile computing and electronic learning intersect to produce an anytime, anywhere learning experience.

Please fill in the answers and tick (X) for every question in the space provided.

1. Please indicate your course of study/ Department: _____
2. Current year of study: year 1( ) year 2( ) year 3( ) year 4( ) year 5( ) other:_____
3. Gender: male ( ) Female ( )
4. Age range: Less than 18years ( ) 19 – 22 ( ) 23 – 26 ( ) 27 – 30 ( ) Above 30years
5. Do you work alongside study? Yes ( ) No ( )
6. If yes, how many hours do you work per week? 10 hours ( ) 11 -20 hours ( ) 20 – 40 hours ( ) Above 40 hours ( )
7. How do you get to school each day? Walk ( ) Bicycle ( ) Bus ( ) Motor bike ( ) Others:_____
8. How often do you use the public transport per day? Once ( ) twice ( ) thrice ( ) more: _____
9. How much time do you spend commuting per day? less than 1 hour( ) 2-3 hours( ) 3-4 hours ( ) More: _____
10. Do you have access to the internet? Yes ( ) No ( )
11. How often do you think you go on the internet daily? very often ( ) slightly often ( ) rarely ( )
12. How do you access the internet? Cybercafés ( ) Home computer ( ) Friend's computer( ) my laptop ( ) my phone ( ) school computer ( )
13. How many hours do you think you spend on the internet daily? less than 1hour ( ) 2- 3 hours ( ) 3-4 hours ( ) Above 4 hours ( )
14. I have course assignments that require the use of the internet for completion. Yes ( ) No ( )
15. How many courses currently require the use of the internet? None( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) above 4( )
16. Please indicate your level of skill as concerns the following:

	No skill	Poor skill	Average skill	good skill	Very good skill
Word processing (example : Ms Word)					
Email use					

	strongly disagree	disagree	indifferent	agree	strongly agree
Surfing the internet					
Downloading software online					

17. Please tick X in the spaces below as appropriate. (SNS = Social Networking Sites e.g. Facebook)

	strongly disagree	disagree	indifferent	agree	strongly agree
I use SNS					
I use SNS to connect with other people					
I use SNS to keep abreast with happenings					
I use SNS because everyone does					

18. Please tick X in the spaces below as appropriate.

	Strongly disagree	disagree	Indifferent	Agree	strongly Agree
I find the use of the internet clear and understandable					
I find it easy to navigate and obtain information from the internet					
I find it easy to do what I want on the internet					

19. Do you have a mobile phone? Yes ( ) No ( )

20. Can your mobile phone access the internet? Yes ( ) No ( )

21. Can your mobile phone access data services? Yes ( ) No ( )

22. Are you willing to use your mobile phone for learning? Yes ( ) No ( )

23. Have you heard about Mobile Learning before now? Yes ( ) No ( )

24. Where did you hear about it? TV ( ) Internet ( ) Magazine ( ) Newspaper ( )

25. I believe learning can be improved using mobile learning. Yes ( ) No ( ) Maybe ( )

APPENDIX 2

Table i: Frequency of public transport use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	once	32	23.7	25.6	25.6
	twice	60	44.4	48.0	73.6
	thrice	18	13.3	14.4	88.0
	more	15	11.1	12.0	100.0
	Total	125	92.6	100.0	
Missing	System	10	7.4		
Total		135	100.0		

Table ii: Where you heard about mobile learning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	TV	16	11.9	21.6	21.6
	Internet	34	25.2	45.9	67.6
	Magazine	9	6.7	12.2	79.7
	Newspaper	5	3.7	6.8	86.5
	Internet and others	8	5.9	10.8	97.3
	combination of others	2	1.5	2.7	100.0
	Total	74	54.8	100.0	
Missing	System	61	45.2		
Total		135	100.0		

Table iii: Mobile learning will improve the learning experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	89	65.9	69.5	69.5
	no	4	3.0	3.1	72.7
	maybe	35	25.9	27.3	100.0
	Total	128	94.8	100.0	
Missing	System	7	5.2		
Total		135	100.0		

Table iv: Statistics

		Use of SNS	SNS to connect with people	SNS to keep abreast with happenings	SNS because other people use it
N	Valid	133	133	131	132
	Missing	2	2	4	3
Mean		4.35	4.29	4.01	2.81
Std. Deviation		.844	.796	.973	1.478

Table v: Use of SNS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	3.0	3.0	3.0
	disagree	2	1.5	1.5	4.5
	indifferent	2	1.5	1.5	6.0
	agree	61	45.2	45.9	51.9
	strongly agree	64	47.4	48.1	100.0
	Total	133	98.5	100.0	
Missing	System	2	1.5		
Total		135	100.0		

Table vi: SNS to connect with people

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	2	1.5	1.5	1.5
	disagree	3	2.2	2.3	3.8
	indifferent	7	5.2	5.3	9.0
	agree	63	46.7	47.4	56.4
	strongly agree	58	43.0	43.6	100.0
	Total	133	98.5	100.0	
Missing	System	2	1.5		
Total		135	100.0		

Table vii: SNS to keep abreast with happenings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	3.0	3.1	3.1
	disagree	5	3.7	3.8	6.9
	indifferent	22	16.3	16.8	23.7
	agree	55	40.7	42.0	65.6
	strongly agree	45	33.3	34.4	100.0
	Total	131	97.0	100.0	
Missing	System	4	3.0		
Total		135	100.0		

Table viii: SNS because other people use it

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	1	.7	.8	.8
	strongly disagree	31	23.0	23.5	24.2
	disagree	33	24.4	25.0	49.2
	indifferent	20	14.8	15.2	64.4
	agree	21	15.6	15.9	80.3
	strongly agree	26	19.3	19.7	100.0
	Total	132	97.8	100.0	
Missing	System	3	2.2		
Total		135	100.0		

Table ix: Chi-Square Tests for table 12

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.012[a]	5	.075
Likelihood Ratio	11.218	5	.047
Linear-by-Linear Association	1.308	1	.253
N of Valid Cases	127		

a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is 2.92.

Table x: Chi-Square Tests for table 13

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	50.484[a]	35	.044
Likelihood Ratio	49.064	35	.058
Linear-by-Linear Association	9.080	1	.003
N of Valid Cases	133		

a. 41 cells (85.4%) have expected count less than 5. The minimum expected count is .05.

Table xi: Chi-Square Tests for table 14

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.346a	20	.064
Likelihood Ratio	28.541	20	.097
Linear-by-Linear Association	1.315	1	.251
N of Valid Cases	130		

a. 22 cells (73.3%) have expected count less than 5. The minimum expected count is .11.

Table xii: Chi-Square Tests for table 17

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.330[a]	12	.587
Likelihood Ratio	12.188	12	.431
Linear-by-Linear Association	1.531	1	.216
N of Valid Cases	124		

a. 13 cells (65.0%) have expected count less than 5. The minimum expected count is .02.

Table xiii: Chi-Square Tests for table 18

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	61.484[a]	9	.000
Likelihood Ratio	60.825	9	.000
Linear-by-Linear Association	36.904	1	.000
N of Valid Cases	124		

a. 8 cells (50.0%) have expected count less than 5. The minimum expected count is 1.81.

Table xiv: Chi-Square Tests for table xv

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.650[a]	20	.955
Likelihood Ratio	12.195	20	.909
Linear-by-Linear Association	.000	1	.991
N of Valid Cases	122		

a. 21 cells (70.0%) have expected count less than 5. The minimum expected count is .17.

Table xv: Cross tabulation between faculty and students ability to navigate and obtain information from internet

			Faculty						
			Enginee-ring	Medicine, pharmacy, dentistry,	social sciences	Sciences	Art and humanities	Agriculture	Total
Navigate and obtain information from internet	strongly disagree	Count	1	0	0	1	1	1	4
		% within Faculty	7.7%	.0%	.0%	1.7%	5.3%	7.7%	3.3%
	disagree	Count	0	0	0	2	1	0	3
		% within Faculty	.0%	.0%	.0%	3.4%	5.3%	.0%	2.5%
	indifferent	Count	1	1	0	2	2	1	7
		% within Faculty	7.7%	9.1%	.0%	3.4%	10.5%	7.7%	5.7%
	agree	Count	8	7	3	29	7	7	61
		% within Faculty	61.5%	63.6%	42.9%	49.2%	36.8%	53.8%	50.0%
	strongly agree	Count	3	3	4	25	8	4	47
		% within Faculty	23.1%	27.3%	57.1%	42.4%	42.1%	30.8%	38.5%
Total		Count	13	11	7	59	19	13	122
		% within Faculty	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table xvi: Correlation matrix for multiple pairs of variable

		Gender	Frequency of internet use	Faculty	Access to internet	Age	internet surfing skill	Navigate and obtain information from internet	Where you heard about mobile learning
Gender	Pearson Correlation	1	.136	.151	.128	.003	-.043	-.219*	-.295*
	Sig. (2-tailed)		.128	.088	.147	.976	.633	.016	.012
	N	130	127	129	129	126	126	120	71
Frequency of internet use	Pearson Correlation	.136	1	.131	.277**	-.175*	-.454**	-.337**	.067
	Sig. (2-tailed)	.128		.135	.001	.048	.000	.000	.573
	N	127	132	131	131	128	128	121	73
Faculty	Pearson Correlation	.151	.131	1	-.005	-.109	-.101	.001	-.123
	Sig. (2-tailed)	.088	.135		.955	.215	.253	.992	.302
	N	129	131	134	133	130	130	122	73
Access to internet	Pearson Correlation	.128	.277**	-.005	1	-.080	-.199*	-.230*	.103
	Sig. (2-tailed)	.147	.001	.955		.367	.023	.011	.386
	N	129	131	133	134	130	130	122	73
Age	Pearson Correlation	.003	-.175*	-.109	-.080	1	.074	.072	.054
	Sig. (2-tailed)	.976	.048	.215	.367		.404	.435	.655
	N	126	128	130	130	131	128	120	72

internet surfing skill	Pearson Correlation	-.043	-.454**	-.101	-.199*	.074	1	.429**	-.114
	Sig. (2-tailed)	.633	.000	.253	.023	.404		.000	.342
	N	126	128	130	130	128	131	121	72
Navigate and obtain information from internet	Pearson Correlation	-.219*	-.337**	.001	-.230*	.072	.429**	1	.355**
	Sig. (2-tailed)	.016	.000	.992	.011	.435	.000		.003
	N	120	121	122	122	120	121	123	70
Where you heard about mobile learning	Pearson Correlation	-.295*	.067	-.123	.103	.054	-.114	.355**	1
	Sig. (2-tailed)	.012	.573	.302	.386	.655	.342	.003	
	N	71	73	73	73	72	72	70	74

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table xvii: Descriptive Statistics for correlation table xvi

	Mean	Std. Deviation	N
Gender	1.44	.498	130
Frequency of internet use	1.64	.783	132
Faculty	3.81	1.448	134
Access to internet	1.07	.251	134
Age	2.20	.684	131
internet surfing skill	3.94	.983	131
Navigate and obtain information from internet	4.18	.897	123
Where you heard about mobile learning	2.47	1.347	74