

Towards the Design of a Standard Mobile Learning (M-Learning) Model for the Provision of Learning, Training, Research and Educational Resources for the National Open University of Nigeria (NOUN).

Onwodi, G.

Department of Computer Science
National Open University of Nigeria
Abuja, FCT, Nigeria
E-mail: gonwodi@noun.edu.ng
Tel: +2347032036365

ABSTRACT

Few Nigerian adults have access to higher education due to difficulty in gaining admission into the limited tertiary Institutions, cost of conventional university education, or that they could not sacrifice job for education, consequently there is need to design more affordable methods or models of increasing access to education. Also, similarly being witnessed is an unprecedented explosion of mobile devices being produced, particularly mobile phones. The technology which is the commonest means of communication, could help in extending education, in formal and informal settings and to a large extent, address the problem of limited access to tertiary education in Nigeria. In this paper, we elucidate a research agenda set out to address the challenges with access to higher education through the development of a standard Mobile Learning (M-Learning) model for the provision of learning, training, research and educational resources using the national open university of Nigeria as a reference case. We present the research direction in this discourse.

Keywords: Mobile Learning, Model, training, research, educational resources, Open University, NOUN, Nigeria.

CISDI Journal Reference Format

Onwodi, G. (2017): Towards the Design of a Standard Mobile Learning (M-Learning) Model for the Provision of Learning, Training, Research and Educational Resources for the National Open University of Nigeria (NOUN). *Computing, Information Systems, Development Informatics & Allied Research Journal*. Vol 8 No 2. Pp 139-146. Available online at www.cisdijournal.org

1. INTRODUCTION

Mobile Learning (M-Learning) has been simply defined as learning that takes place with the help of mobile devices (Quinn, 2003). Similarly, (Traxler, 2005) commented that mLearning can be defined as educational provision where the sole or dominant technologies are handheld or palmtop devices. Historically, (Sharples, 2002) singled out Alan Kay's Dyna book conceived in the early 1970s, as the first serious attempt to design a computer-mediated mLearning platform. Basically, mLearning deals with the use of mobile or wireless devices for the purpose of learning while in motion. It is also said that electronic organizers capable of three line text-only display were available in the 1990s. Palm Pilot PDAs, introduced in 1996, were the first multi-purpose, customizable handheld devices suitable for a range of creative learning activities. The grant of more than 100 palm education pioneers (PEP) awarded in 2001 by SRI International (USA) to US teachers who had a vision of how palm handhelds could be used to improve teaching and learning was another milestone. Many of the findings of the PEP grants have been confirmed by later "handheld learning" studies. Examples of pertinent findings include the strengths and weaknesses of various models for allocating handheld computers to students, to the degree of success with which various learning activities can be accomplished using handheld devices (Saipunidzam, et.al, 2010).

Ellen Wagner (2005) proclaimed that the mobile revolution had finally arrived:

"Wherever one looks, evidence of mobile penetration is irrefutable: cell phones, PDAs, MP3 players, portable game devices, handhelds, tablets, and laptops abound. No demographic is immune from this phenomenon. From toddlers to senior people are increasingly connected and are digitally communicating with each other in ways that would have been impossible only a few years ago".

Recently, many researchers have focused on mLearning and its environment, such as users' acceptance of mLearning (Phuangthong & Malisawan, 2005; Liu, 2009), setting the environment for mLearning (Chao & Chen, 2009; Brown et al., 2006; Liu, 2008), and the application of mLearning in developed countries (Paul, 2008). Although most of the developing countries are still in the first phase or perhaps in the research and development phase in implementing this type of learning environment, Kyun Baek and Uk Cheong as well as Barker, Krull and Mallinson as reported by (Saipunidzam, et.al. 2010) had proved that developing countries will soon catch up with this new learning paradigm.

This shows that this new learning paradigm will evolve mobile devices with the rapid usage and ownership among the users. In Nigeria, mLearning have been experimented by tutors and experts through partnerships between the University of Ibadan and Educational Advancement Centre to guarantee outstanding results in the Joint Admission and Matriculation Board (JAMB UTME) available for secondary school students (SS1, SS2, SS3 and retake students) (www.mobilelearn.mobi/index.php) Research on mLearning has emphasized and repeated the advantage of using mobile technology because of the characteristics and opportunities that mLearning offers. Common characteristics that are brought up in many research papers around mLearning are those of ubiquity, nomadicy, personalization, interactivity, and collaboration. The technology itself allows for these characteristics because of its size, weight and portability. The small screen size has been noted as a drawback. Being a part of most people's daily lives, mobile technology doesn't need to be taught and so learning can be integrated quickly and easily into a persons' everyday life (Al - Hmouz, et.al, 2010; Cavus, et.al, 2009; Ozdamli, et.al, 2011; Rogers, et.al, 2009).

2. RELATED LITERATURE

MLearning is a new educational paradigm which is more flexible than learning using the desktop computers. It is moveable from one environment to another such as classroom to outdoors and vice versa. Hence, a seamless learning potential is realized, where the technology mediates between the learners and the learning content; the learning is flexible and adaptable so that teachers and students are not bound to a particular learning space. Learning while being mobile and through the use of mobile devices (such as Mobile phones, PDAs, Smart Phones, Tablets, Palmtop, Laptop or even digital cameras) are considered to be independent of time and location, as it could occur at any time and in any place. It also provides access on demand of learning content to learners. (Akinyede, 2010). MLearning technology is portable as the name suggests and it is wireless. Learners are able to move around with these learning tools. MLearning can be viewed as the focal point, where mobile technologies and web-based learning intersect to offer anywhere anytime instant on-demand educational information. It can be generally defined as the acquisition of any knowledge and skills through the use of mobile devices anywhere anytime that results in an alteration in behavior. According to (Brown, 2005) "mobile technologies have the power to make learning even more widely available and accessible than we are used to in existing web-based learning environments".

According to the report NCC of 2011, more than 90% of Nigerians own at least one mobile phone and mobile phone usage peaks in the range from 16 to 45 years, where 70% of this age group regularly uses a mobile phone. The majority of Nigerian University Students fall in this age group thus making mobile phones the most commonly used device among University Students. Therefore, National Open University of Nigeria should take up the challenge to use these mobile devices, specifically mobile phones to provide and offer learning services. New technologies are constantly being developed and produced; examples of different mobile devices that could be used for learning today include; Mobile phones, Ipads, Mp3, Mp4, PDAs, GPS, and Organizers to mention a few. With the rapid advancement of new technologies, you generally will only need one mobile device which will be capable of integrating many features to support learning. Therefore, learners need not have multiple devices but rather one mobile device which will be able to meet their needs, as a standard phone in today's market is equipped with much functionality which if used effectively, can make learning an easy process. Most hi-tech mobile phones, currently available like the 3G iPhone, the Android, the Google G-1 phone or any smart phone, contain the functionalities to help the users perform many tasks and allow them have access to information as required anytime and from anywhere. This access to information is normally achieved in an interactive way, where the mobile phone user feels in control of handling the accessibility, management and sharing of resources. Today mobile devices have some unique features which make them an efficient device capable of providing, sharing and exchanging of learning content.

Some of these features are as follows:

- Portability and Mobility: Mobile devices are small size lightweight devices, students find them convenient to use and carry with them.
- Flexibility: Students and teachers can access the server from almost anywhere.
- Convenience: Whenever students need to connect teachers or urgently need information from the Internet, remote access is available to them. In particular accessing the server through WAP (Wireless Application Protocol).
- Remote Accessibility: Students can add or update information remotely.
- Ease of Use: Using an iPhone provides a larger screen than an ordinary mobile phone and it's convenient for learners input.
- Utility: Most of the smart phones provide almost all of the capabilities of a standard computer such as processing and storing data.

2.1 MLearning Characteristics

The mLearning characteristics discussed here give a picture of what is contained in mLearning and how it can be used most effectively to bring about learning. First this study looks at the portability of mobile phones, which is categorized within nomadicy. Being nomadic in nature leads into the ubiquitous nature of mobile technology, the idea of instant connectivity and the ability to connect in any situation.

With the idea of being nomadic and ubiquitous it is then important to consider the context sensitivity of mobile learning. Within these contexts the next characteristic to consider is the interaction and collaboration that mLearning can afford. Finally, mLearning also considers personalisation or the individuality of the user, their preferences etc. Figure 2.1 illustrates the major characteristics and contexts of mLearning that are discussed here.

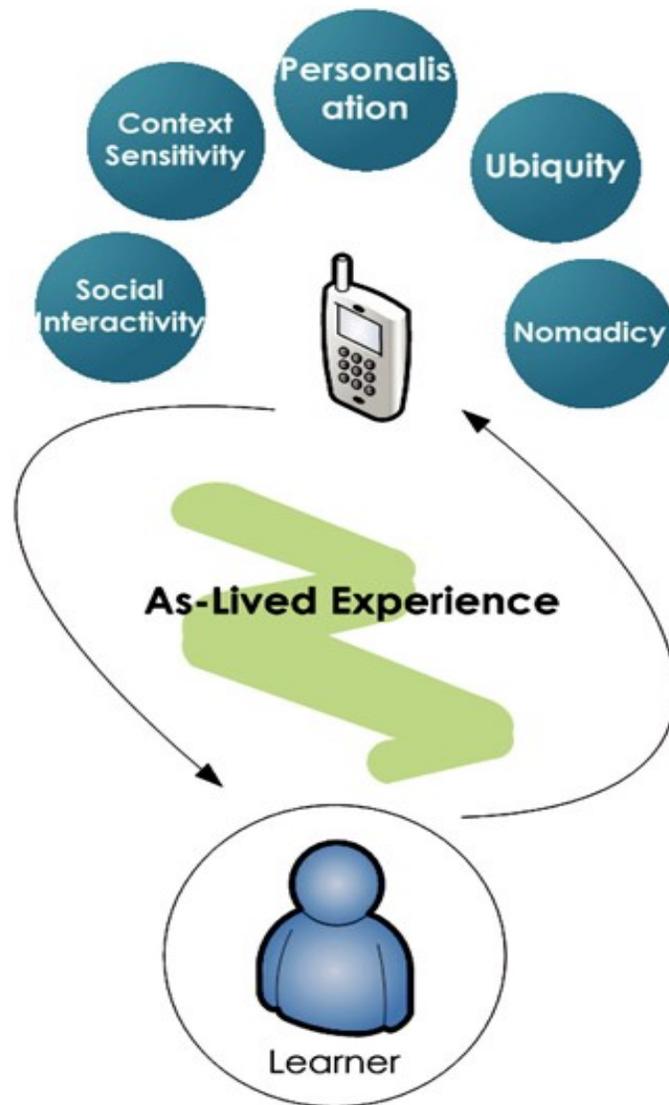


Figure 2.1: Contexts and characteristics of mobile learning paradigm
 (Source: Cavus, et.al, 2011)

3. RESEARCH DIRECTION

3.1 Problem Statement

At the National Open University of Nigeria (NOUN), most students are meant to read and understand their course materials independently. Students are only facilitated when they are up to fifty (50) or more in a class thus making it difficult for those students, who are not taught, to comprehend most of their course materials. Hence, the need for NOUN to develop an interactive online video conferencing platform from which students can interact anytime with their course facilitators and each other on their mobile devices, irrespective of how many they are or where they are located. In Nigeria, the problem of accessing education poses a major challenge to development. Lack of adequate Information and Communications Technology (ICT) infrastructure hampers the efforts of governments to give citizens some essential services, such as education.

National mLearning Model through Interactive Education Satellite (NEduSat) is a project which focuses on tackling this problem. The limitation of learning locations reduces access to knowledge and formal education. In Nigeria some states have terrains that make it difficult for Governments and Non-Governmental Organizations (NGOs) to make delivery of conventional education easy. Some places are not easy to reach in the highlands therefore resulting in lack of essential basic services as electricity which could be used to power some teaching aids e.g. computers.

The mLearning model focuses on taking education to Nigerians, no matter how difficult their terrain, through the use of battery powered Mobile devices. The greater percentages of Nigerian populations are young adults very few of these Nigerian youths have access to higher education due to difficulty in gaining admission into the limited tertiary Institutions available and cost of conventional education (Boyinbode, et.al, 2008).

The global geometrical growth of mobile phone subscriptions in recent years has sparked interest in how mobile phones in particular might enhance Open and Distance Learning (ODL). In Nigeria, little is being said about mLearning despite the level of penetration of mobile network to most of the rural areas in the country and the availability of phones. In fact, 58.5 per cent of Nigerians in the rural population now have access to mobile phones. Nigerian Communication Commission (NCC) report of 2011

3.2 Research Thrust

The main aim of this work is to design a Standard MLearning Model for the provision of learning, training, research and Educational Resources for National Open University of Nigeria's Community (Staff and Students).

The specific objectives are to:

- i) compare mLearning models and identify their strengths and weaknesses.
- ii) design a mLearning model/infrastructure for NOUN
- iii) implement multimedia data transmissions in (ii)
- iv) evaluate the performance of the implementation in (iii) with three protocols over Ad-hoc network.

4. MODEL DEVELOPMENT

The proposed infrastructure can be accomplished with the existing Nigeria Communication Satellite-1R (NigComSat-1R). The communication satellite uses beams that cover the entire West African Region. To provide local broadcast coverage, channels intended for only one local area (INSTITUTION) are scrambled so users elsewhere cannot view them. NigComSat-1R is designed to project spot beams at selected areas, allowing the same radio frequencies to be reused in different areas, thus increasing the channel capacity.

mLearning Broadcasting Station

The generic framework of the National mLearning infrastructure as illustrated in figure 10 could be used by any Institution. This framework is a generic method for building a satellite based mLearning system. The framework consists of three major components; these are:

Centralized Broadcasting Center (CBC)

In order to reduce the cost of satellite communication, and media production and editing, the proposed framework suggests the centralization of such facilities which can be used later on the basis of time sharing. The central facility consists of several sub-components such as live and recorded broadcasting facility, earth station, a satellite channel connected to NigComSat-1R, video servers and storage devices, web servers, SMS servers and so forth.

Client Side

This enables the Institution to be connected to the centralized broadcasting center (CBC) and can share the resources for reception and broadcasting of educational materials. The setting required by the Institution is minimal and consists of a satellite dish connected to a transceiver (Rx/Tx) module with Digital Video Recorders (DVR). It requires dedicated internet connection. A mobile broadcasting van can be readily made available for live broadcasting and live event coverage.

Communication and Broadcasting Channels

Three types of communication channels are required to provide broadcasting, reception and interaction namely; interactive channel (upload and download channel), satellite reception on client (Institution) side and satellite broadcasting.

This is a regular Internet connection between the user and the central broadcasting channel. It consists of two channels:

- i) Upload Channel: will be used for uploading interactivity signals initiated by the user (online queries, requests and responses); therefore, small bandwidth is fair enough to satisfy user needs.
- ii) Download channel: requires a high speed connection for passively downloading requested videos.

Satellite Reception: This is a satellite receiver and a satellite dish through which a client can view live broadcasting. Satellite Broadcasting: Broadcasting can take place from the centralized broadcasting center using the dedicated earth station or by using the mobile broadcasting stations (broadcasting van) located temporarily on the client side. In order to implement this mLearning model for any Institution, first it is required to establish a satellite broadcasting capability by constructing an earth station connected to a spot beam satellite (NigComSat-1R), a broadcasting center and a production and auditing center are to be established and may well be integrated with the Institution’s centralized hub.

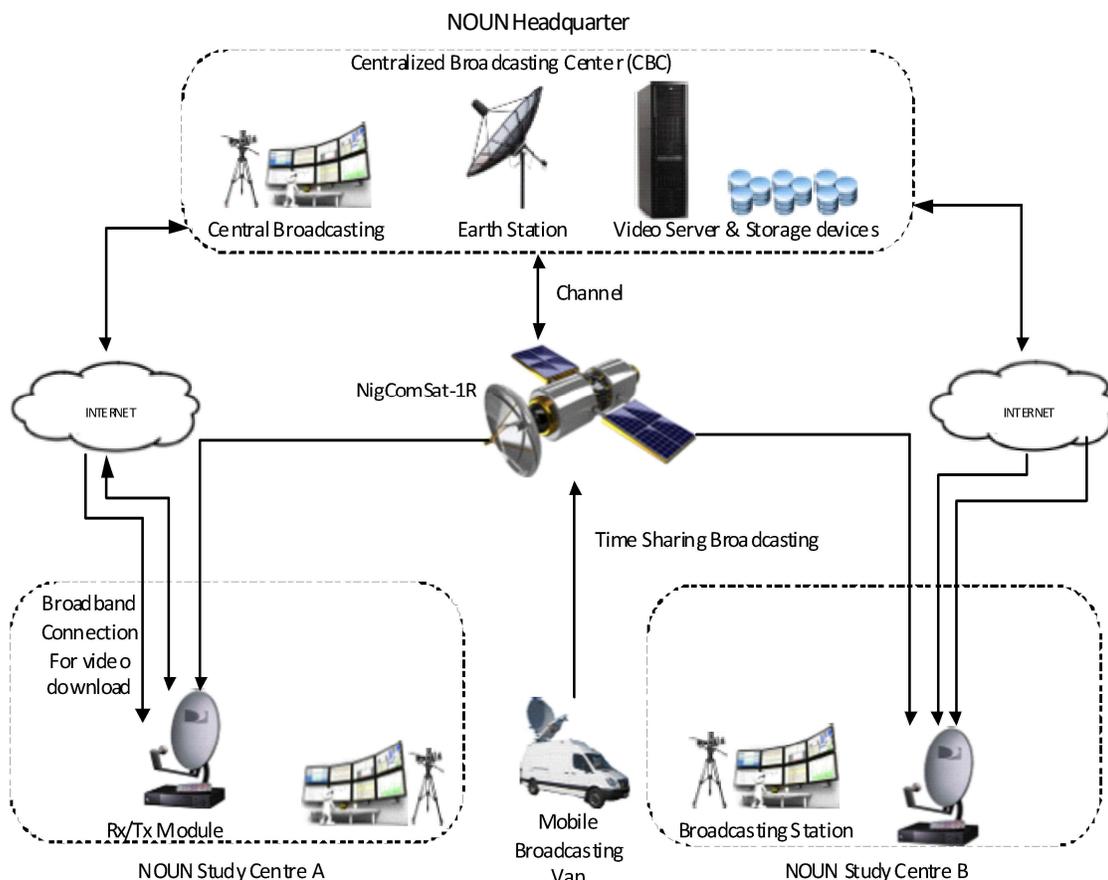


Figure 3.1: Framework of a CBC providing NOUN with time shared broadcast and VoD services.

The components of this model will be fully discussed in future disseminations.

5. RESEARCH SCOPE AND SIGNIFICANCE

Variants of mLearning model exist with bias for learner centered or driven framework. Some researchers also try to incorporate various concepts or theories of learning in the mlearning model. This work is limited to designing a mobile learning model that hinges on the pedagogical aspect of education based on a Satellite education Infrastructure. A seemingly effective way of rapidly building a critical mass of the necessary human capacity is through a distance learning scheme. It offers the best opportunity for African countries to take their rightful place in the global economy. It is now recognized that distance education is an additional method to provide quality education to a large number of students spread over wide geographical areas in a short period of time (Akinyede, 2010). mLearning is gradually taking a central stage, and the new mlearning model (NeduSat) will facilitate the implementation of an mLearning System via satellite, that will systematically increase access to education for several learners across the nation, including the nomads/almajeris. Consequently a large mass of human capacity/capital would be developed.

6. EXPECTED CONTRIBUTIONS TO KNOWLEDGE

At the end of the research, it is expected that:

- i. The proposed mLearning model will provide a novel mLearning framework for NOUN community (Students and Staff) and extend education to everybody interested no matter where they are located.
- ii. It will equally serve as a building block for future models of mlearning.
- iii. Researchers in mLearning will equally benefit from this research project as it will serve as a bench mark for future mlearning designs and system implementation.

We will report progression as we advance with the research.

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