

Deploying an Interactive Mobile Learning System in the Classroom

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Abstract

The great development of mobile technologies has made instructional messages to be sent from the educators to the learners easily through their mobile devices such as Smartphones, Apple iPhones, Pocket Pcs, Mobile Computers, Android phones, Tablets, Ipads etc. Communication between the instructors and the students can be done through text messages, voice as well as through images. This paper presents the architecture and the implementation of an interactive mobile learning system to enhance learning in the classroom.

Keywords: *Mobile Learning, Mobile Devices, Interactive Mobile Learning, Classroom learning*

1. Introduction

Mobile learning (M-learning) has turned out to be one of the methods of learning used for educational purposes through the use of mobile devices [6]. An example of this illustration was demonstrated by Valk and Elder in [11] that showed how mobile devices have increased access to educational materials and services by the students in the rural and remote areas. M-learning according to [10, 12] has increasingly improved the vocabulary of the students through their mobile devices, Also, [7, 5] discussed on how the students' life in terms of grammar and communication has been transformed through learning with their mobile devices. Demouy & Kukulaska-Hulme [3] also expressed the advantage of mobile learning in terms of formal and informal way of interaction among students and lecturers through their mobile devices; this support social communication such as reviewing of contents, sending comments and comparing responses, which has proved to be a source of learning empowerment to the students and has enabled them to participate actively in collaborative learning environments.

In traditional classroom learning environments, instruction is conducted through lectures and activities provided by the teacher alongside with course books and audio-visual materials. Learners listen to their teachers' instructions while receiving visual cues through PowerPoint presentations, handouts, or whiteboard content before participating in learning activities or group discussions in the classroom, but in the case of M-learning, all these benefits can be realized anywhere and anytime i.e. in the classroom and outside the classroom.

Interactive mobile learning system (IMLS) according to [4] will help lecturers or instructors to eliminate writing of assignments on the board in the classroom, instead the assignments are being sent to the students through their mobile or handheld devices thereby enriching learning experience.

In a scenario where a lecturer in the classroom set up a quiz through an IMLS and then uploads the questions for students to answer within a specified time in the classroom, the students pick up their mobile devices and logon to IMLS to access the questions, answer

the questions and submit. The lecturer could then switch to another topic or submit answers to the questions before moving to another topic. Another scenario is when the lecturer at home sends lecture materials to be taught in the next class to the students and attach some questions to it, which must be answered and submitted before the traditional classroom learning; this enables the students to read ahead what will be taught in the class by the lecturer hence making the classroom experience more engaging and interactive in learning. Looking at the two scenarios, M- learning will make classroom learning to be more stimulating and interactive. The students will be engaged in student-centred learning, which will reduce the stress on the lecturers, especially in large class scenarios [1].

On the student part, a student may have something bothering or having a question he was not having enough courage to ask about in the classroom, such a student can send it through a message to the lecturers' post and he gets his answers without easily. Also, student can collaborate like forming a group to share their knowledge about a course they do not understand, this brings about unity among the student unlike in the traditional classroom learning.

IMLS allows ubiquitous learning in which student can informally engage in learning through use of Internet resources, multimedia technologies and virtual team skills, anywhere and anytime. Over the years, traditional learning has been the major learning system in the classroom which has not really supported student-centred learning. The challenges encountered with traditional classroom learning have given rise to the need for an interactive mobile learning system that will enhance learning. These challenges are:

Intimidation: This arises because interaction between student and lecturers are limited, impersonal and very brief. e.g. In Federal University of Technology, Akure (FUTA), courses like MTS 201, 204, GNS 102, CSC 102 are characterized with an unusual large classes and the flow of instruction is one way (unidirectional) from the teacher to the student with the ratio of one teacher to about four hundred students. If at all the students are allowed to engage in any routine discussion, time allocated to the course is usually brief and limits participation in the classroom. This has contributed to increase in failure rate in students' performance. IMLS supplemented with the traditional classroom learning can assist students to interact with their mobile devices to send and receive response from their lecturer.

Inactive engagement: The normal way of learning in the classroom seems to be very boring and most of the students tend not to participate in the activities, instead they copy lecture notes without really understanding what they are copying. It makes student not to be current or have the desire to study their learning materials instead they piled them up and keep postponing when they should read. Also, when there is need for collaboration student find it difficult to share information.

Lack of information literacy: Lack of familiarity of the students with the new technologies. This is due to the traditional learning system in which they could not use their mobile

devices formally for educational purposes. If IMLS is supplemented with the traditional learning, the lectures will be greatly enhanced. The main objective of this project is to make traditional classroom learning more interactive by

- i. Comparing responses of the students via their devices.
- ii. Making student informally use their handheld devices for educational purposes.
- iii. Helping teachers more efficiently manage their classrooms and students' learning.
- iv. Creating a forum where student can share ideas based on a particular course.
- v. Creating an interactive classroom learning environment that should result in better student engagement and academic performance.

2. Related Works

Ashley Deal in [2] carried out a project on Classroom Response System (CRS) which entails the use of small remote transmitters called CLICKERS. These transmitters are used in sending signals to the participant or receiver who is connected to the lecturer's laptop. Software on the instructor's system immediately tabulates the students' responses into graphs and graphs which will be displayed on the presentation slide where students can compare their responses. CRS encourages reflection on students' existing knowledge, maintaining student attention and assisting instructors in accessing students' responses which will then be revisited in the next class. The apparent limitation of this system is that it does not support ubiquity (it is limited to the classroom alone)

Galis & Ross Malaga in [9] carried out a project to showcase the use of response system which is an interactive device for the students called CLICKERS. The clicker is like a TV remote used in transmitting data to the receiver that is directly linked to a connected system (Lecture's system) Students use clickers in answering questions that the instructor posed right in the classroom. The responses then showed up on the screen and the lecturer then decide the scores. This thereby promotes interactive learning in the classroom by giving the immediate feedback to students and to the instructor which then increase student's interest, engagement and attendance among the student. This system does not support ubiquity and mobility.

Shepherd & Reeves [8] carried out an experiment at K12 schools in USA by comparing the use of Laptop, Ipad with blackboard. In the process, students from the class that used laptop to access the blackboard are restricted to the class, unlike that of iPad class which had an easy and sweet way of accessing the Blackboard site anywhere all through the day and outside the classroom sessions. The students thereby concluded that the use of mobile devices has made their classroom learning content easier to access.

3. The Interactive Mobile Learning System (IMLS)

Interactive mobile learning system is an ubiquity type of learning system which combines two promising areas mobile computing (using mobile devices e.g. PDAs, laptops, Smartphone, ipads, palmtops, mobile phones, Smartphones, Apple iPhones, Pocket Pcs, Mobile Computers, Android phones, Tablets, video conferencing etc. for computing purposes) and E-Learning which is learning conducted over the internet in a dedicated area within a given time. This system will be helpful to lecturers to manage their classroom interaction as well as to engage the students in learning using their mobile devices.

Mobile learning being supplemented with the existing system will promote student literacy skills, especially in a scenario whereby the learning materials to be taught in the next class is sent to the student before the class with questions attached, during the classroom learning the lecturer will just discuss briefly on the learning materials and ask student to login into their mobile devices and answer a particular question based on the material and the class discussion e.g. These will increase and influence student-centred learning, where learners create their own learning experiences. With mobile learning supplemented with classroom learning, there will be good relationship among the lecturer and the students, because students that are scared to ask questions in the class can send it as a message to the lecturer, which will be answered and sent back to the student. These apparent advantages have motivated this project. Figure one below shows the architecture of the interactive mobile learning system implemented in this project.

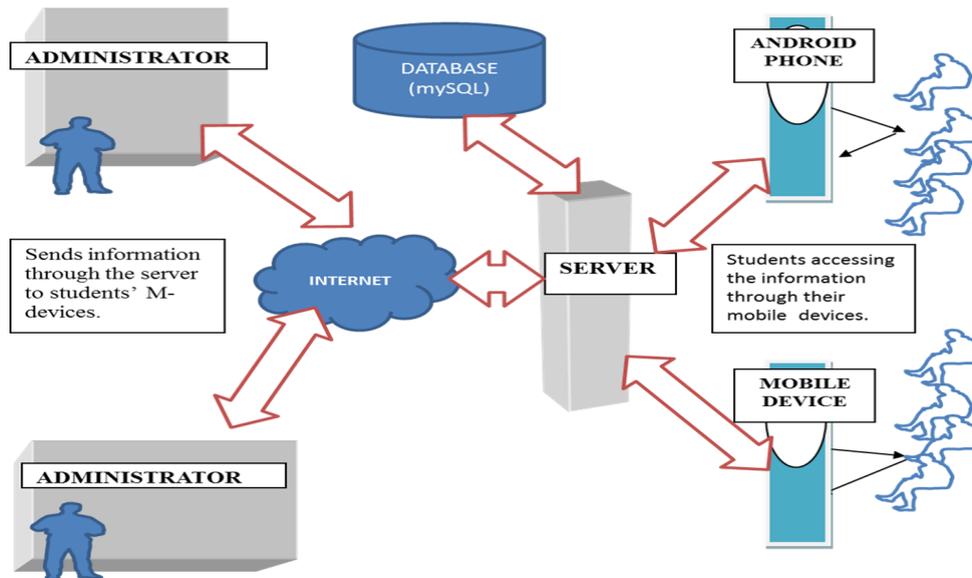


Figure 1. Interactive Mobile Learning System (IMLS)

The use of MYSQL database and Aptana studio 2003 combined with an easy to use programming language (PHP, output interface (HTML) and also the use of SQLite which is the default database of Android application to generate the mobile application.

The features employed in this system to provide current, updated information and ensure user convenience and easy accessibility includes:

- i. **Simple Design:** The design of the administrator panel allows the lecturer the opportunity to quickly upload materials, set quiz questions and grade with ease.
- ii. **User Friendliness:** The system's simple design and layout makes interaction between the lecturer panel and the student panel easy for novice to use the system with little or no help.

4. Implementation

A network is first established between the user and the backend server. The system is accessed on the internet by typing in the URL of the web application unto the address bar of a web browser. The index page of the page where the home page is hosted is displayed as it is being hosted on the page; the home page is displayed as shown below.

The home page shows the detailed instructions to follow in using IMLS. This is the home page of the interactive mobile learning system which gives the details about the registration form (see Figure 2).



Figure 2. The Home Page

This interface comes up after the mobile application has been installed on an Android phone (See Figure 3).





Figure 3. IMLS on Android Phone

- 1) This interface allows the student to register their details e.g. the matric number, the username, password and gender (see Figure 4).

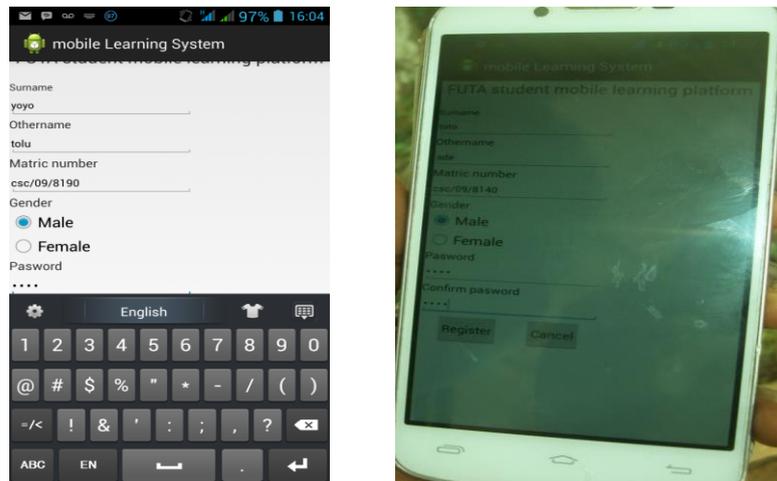


Figure 4. Student Registration Page

This interface displays the login page where the student will input their username and password again to verify if the data they enter earlier was right (see Figure 5).

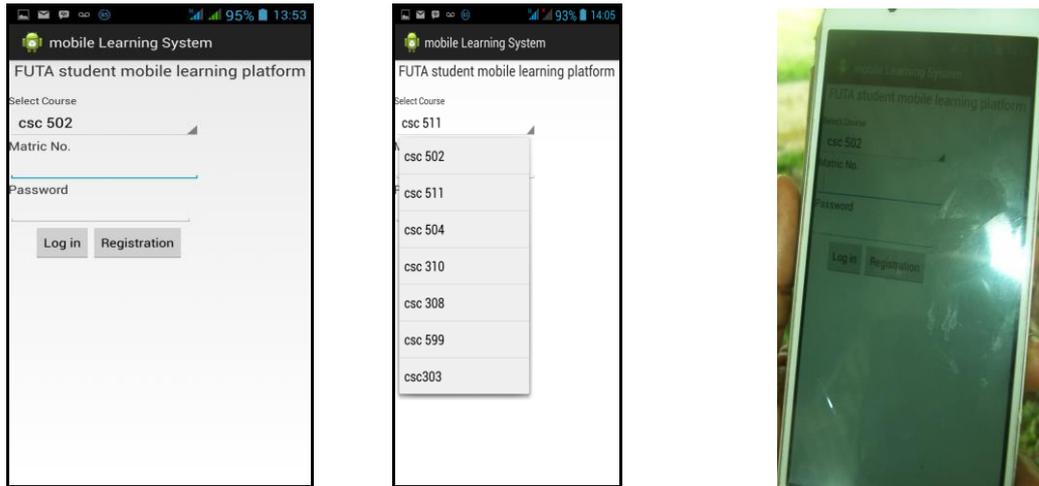


Figure 5. Student Login page

This interface displays the operations that will be performed as that of the Administrator page. When you click on the lecture note then the next interface shows (see Figure 6).

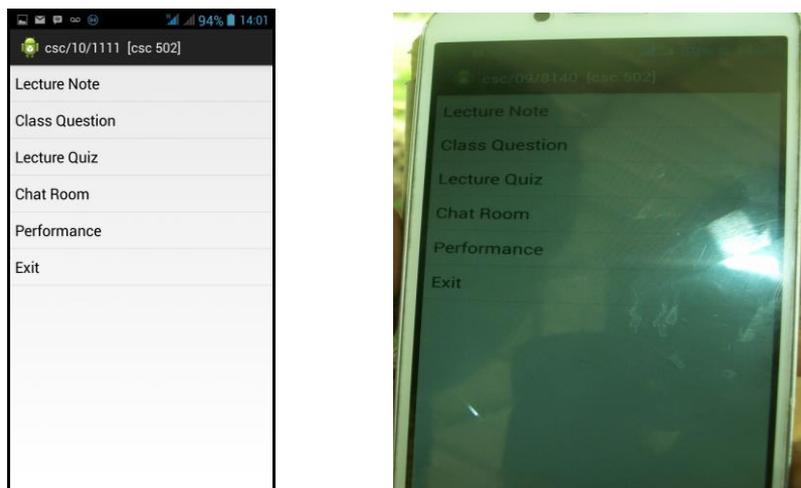


Figure 6. Operation page

This interface displayed the lecture materials uploaded by the lecturer/administrator with questions attached (see Figure 7)

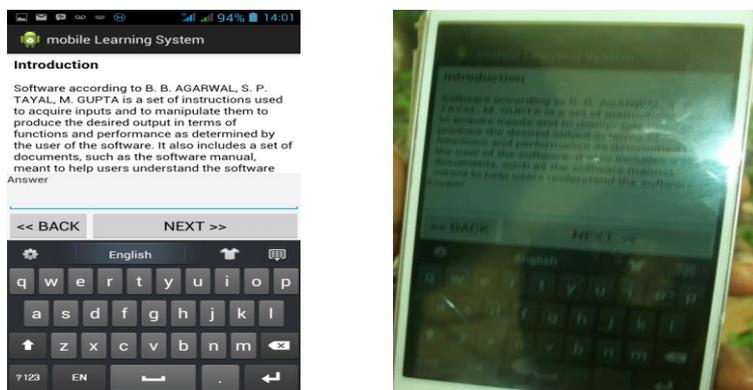


Figure 7. Lecture Note and Material Question page

The next interface display the class question as it has been listed in the operation table where the student put answers to the questions the lecturer has saved in the database (see Figure 8).

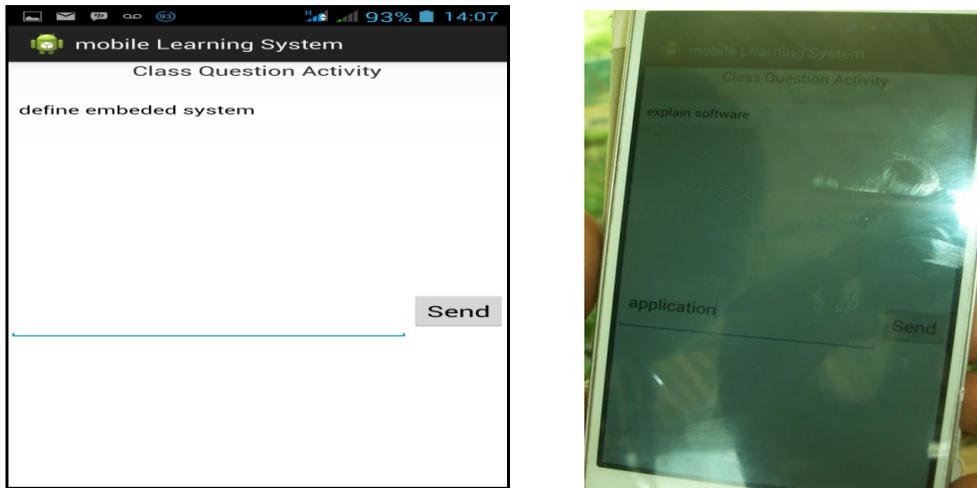


Figure 8. Class question page

This interface shows the quiz platform otherwise known as assessment which will be answered within a specified time limit. Just like when we write the paper based test you cannot write a test twice so as long as the user/student answers the quiz, he/she cannot go back again. It has four options (see Figure 9).

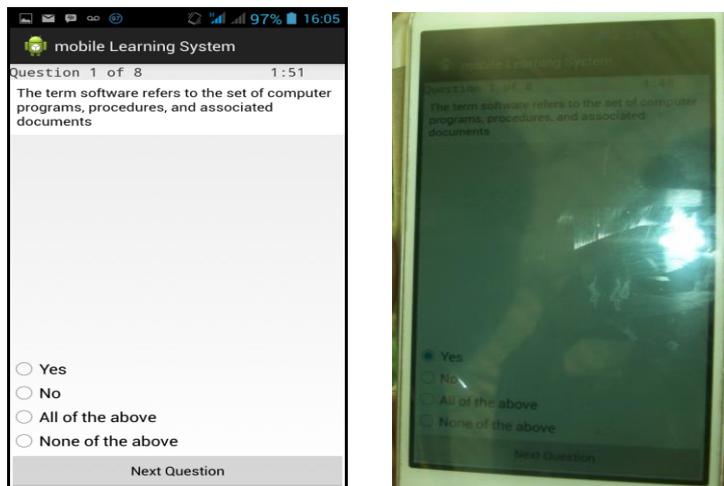


Figure 9. Quiz page

This interface displays the student's score as soon as the time elapses or submits (see figure 10).

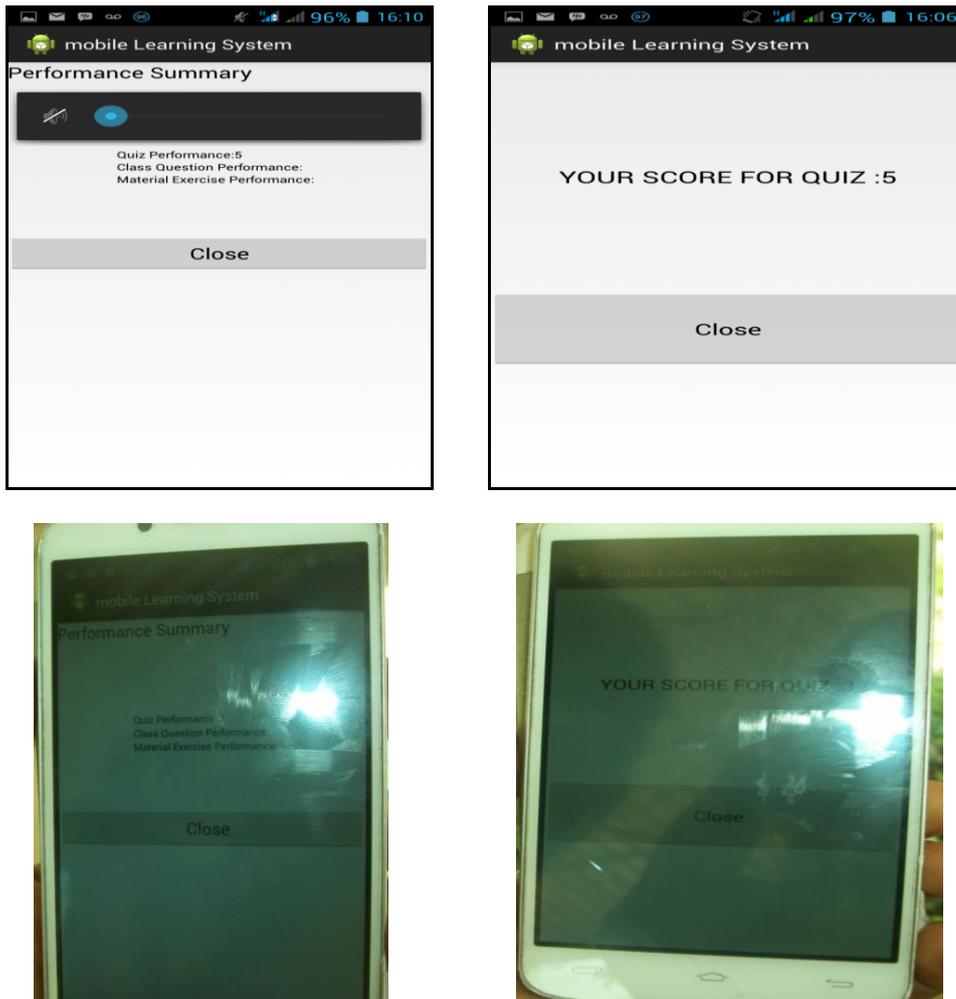


Figure 10. Performance Page

This is the chat room interface where student can interact either on/off campus. It is like WHATSAPP panel where student can share their knowledge about a particular course or display important information (see Figure 11).

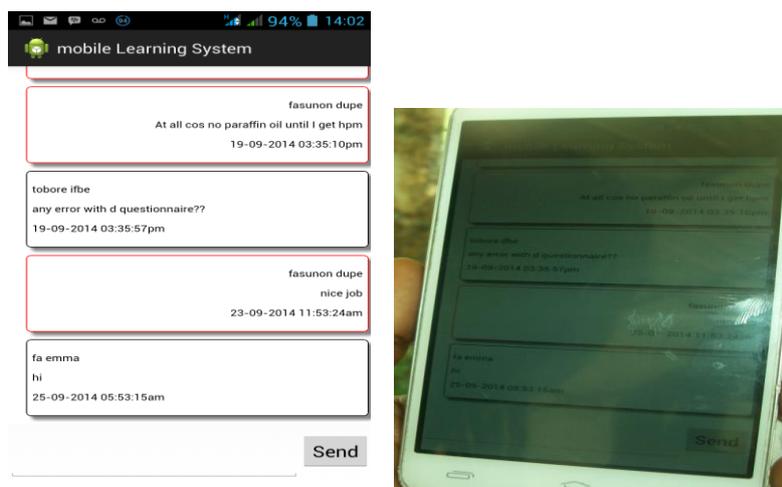


Figure 11. Chat Room Page

5. Conclusion

Conclusively, this project work has implemented an interactive mobile learning system with a web based IMLS that is suitable for use as supplement with FUTA traditional classroom learning system. In the course of this project, questionnaires were administered among 300 level and 500 level students of computer science department. This analysis showed that students actually approve of M-Learning as a supplement to the classroom learning. If IMLS is implemented, it will make classroom learning more interactive, relief lecturer fatigue, improve student engagement and their literacy skills.

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