

A Cloud Based Mobile Learning Interface

Olutayo Boyinbode and Folake Akintade

Abstract --The invent of new technologies that support the creation of new generation applications that have the ability of running on and outside a wide range of devices; like mobile phones or Personal Digital Assistants have given birth to Mobile Cloud Computing. Mobile Cloud Computing is an enhanced technology where both the data processing and data storage take place outside the mobile device. Cloud computing can simply be described as a technology that helps in storing data outside the computer context. Storing and updating processes take place in the cloud. In higher education institutions of Africa, some students cannot afford to buy up to date text books, so they can easily have access to learning resources through cloud based mobile learning. This paper presents a cloud-based mobile learning interface that allows students to access learning materials through cloud 24/7 to enhance their learning.

Index Terms--- Mobile Learning, Cloud Computing, User Interface, Mobile devices

I. INTRODUCTION

Mobile learning is described as any form of learning or training that is delivered using different form of mobile devices. Also, O'Malley et al [2] describes mobile learning as "any sort of learning that happens when the learner is not in a fixed, pre-determined location, or learning that happens when the learners takes advantage of the learning opportunities offered by mobile technologies". As more sophisticated mobile devices are developed, and wireless networks become faster and more ubiquitous, learning with a mobile device has become an integral part of the populace to support technology-oriented learning. Several advantages of mobile learning are its mobility, connectivity, and multimedia capability; other unique characteristics are ubiquity, convenience, localization, and personalization [6].

Cloud computing is a technology that helps in storing data outside the computer context. All the storing and updating take place in the cloud. Cloud method of storing data has many advantages over the traditional way of storing data on the computer. It keeps your computer from being overloaded with numerous data. However, mobile learning combined with cloud computing allows learning contents to be stored on the cloud and access to the content through mobile devices.

However, there are limitations that are applicable to traditional mobile learning applications. These limitations are in terms of low network transmission rate and limited storage capacity. However, cloud based-learning application is introduced to solve these limitations.

Manuscript received June 18th, 2015; revised August 6th, 2015. Olutayo Boyinbode is a Senior Lecturer in the Department of Computer Science, Federal University of Technology, Akure, Nigeria (email: okboyinbode@gmail.com). Folake Akintade is a graduate student in Department of Computer Science, Federal University of Technology, Akure, Nigeria (email: folake@gmail.com).

Due to appealing multimedia features and connectivity of mobile devices, Devices are becoming a very powerful tool for learning. Mobile device is able to connect to the internet through Wifi, 3G, GPRS and Bluetooth. M-learning enables continuous learning process especially with the proliferation of mobile technologies and infrastructures.

In this mobile age, mobile phone has become a common tool for learners especially for adolescent and teenagers worldwide. Mobile devices are portable devices that students can easily carry about. These days, more and more learners choose to use mobile phones for mobile learning, but the existing issues of limited computing ability, small storage space in mobile phones has motivated the combination of mobile learning with cloud computing in this paper [1, 3]. In higher education institutions of Africa, some students cannot afford to buy up to date text book, so they can easily have access to learning material through cloud based mobile learning. This paper presents the design of a simple user interface that will enable learners access the cloud through mobile devices for the purpose of learning.

II. RELATED WORKS

The technological changes in the mobile and wireless industry have brought new and modern learning methods based on real world scenarios. Many students have perceived mobile devices in the learning process as a suitable supplement to traditional learning which enables unlimited access to information without being limited by space and time [1].

Velev [5] said mobile learning is not meant only for schools and universities, but is becoming a part of the workplace training experience. He also said that the increase in the use of smartphones, improved broadband access, increased mobile specific applications and extended use of digital textbooks have improved the learning process and learner s' collaboration.

Katz et al [4] mentioned the great hope involved in cloud-based mobile learning. It was noted that the adoption of cloud in higher education will greatly improve the learning process and collaboration. There will be movement of different learning activities to the cloud at different time.

III. THE ARCHITECTURE OF M-LEARNING BASED ON CLOUD

The architecture of M-Learning based on cloud computing is proposed in figure 1. The main objective of mobile learning in the cloud environment is the transfer of knowledge to the learners through their mobile devices from the centralized shared resources (cloud) at anytime and anywhere. The proposed architecture incorporates the communication between data center in a cloud computing environment and end-user devices. The devices can be

connected to the Infrastructure inside the University’s Local Area Network (LAN), or they can be connected to an external networks (the internet). In other to access learning materials, a user may access the platform directly from the University LAN or through the Internet.

A. System Design

Below are the functions implemented in this design:

User Registration: Students are required to login into the system for registration. In this stage students are expected to enter their email address as the username, matriculation number, surname, other names, password and confirm the password (see figure 2a and figure 2b).

User Authentication: Students are expected to retype their email address which is the username and the password; this is to confirm that the student is the owner of the data supplied previously (see figure 3).

B. Implementation

This mobile learning application software was developed using PHP, HTML and MySQL. These have the ability of

integrating rich immersive media graphics, rich text and web services. In the implementation stage, the students must download the application and launch it on their mobile phones. When the application is launched, it requests for the username (your email address) and password, then you select the course you want to learn from (see figure 4). Users can access learning materials from the cloud through their mobile phones as long as there is internet service (see figure 5).

IV. CONCLUSION

Cloud based mobile learning is described as any form of learning and training that is delivered through the cloud using different types of mobile devices. In higher education institutions of Africa, some students cannot afford to buy up to date text books, so they can easily have access to learning material through cloud based mobile learning. This paper presents the design and development of a user friendly interface for cloud based mobile learning that allows learners to access the cloud anywhere and at any time with their mobile devices. This will provide a sort of supplement to the traditional learning for students of higher educational institutions of Africa, in scenarios where students cannot afford to buy up to date text books.

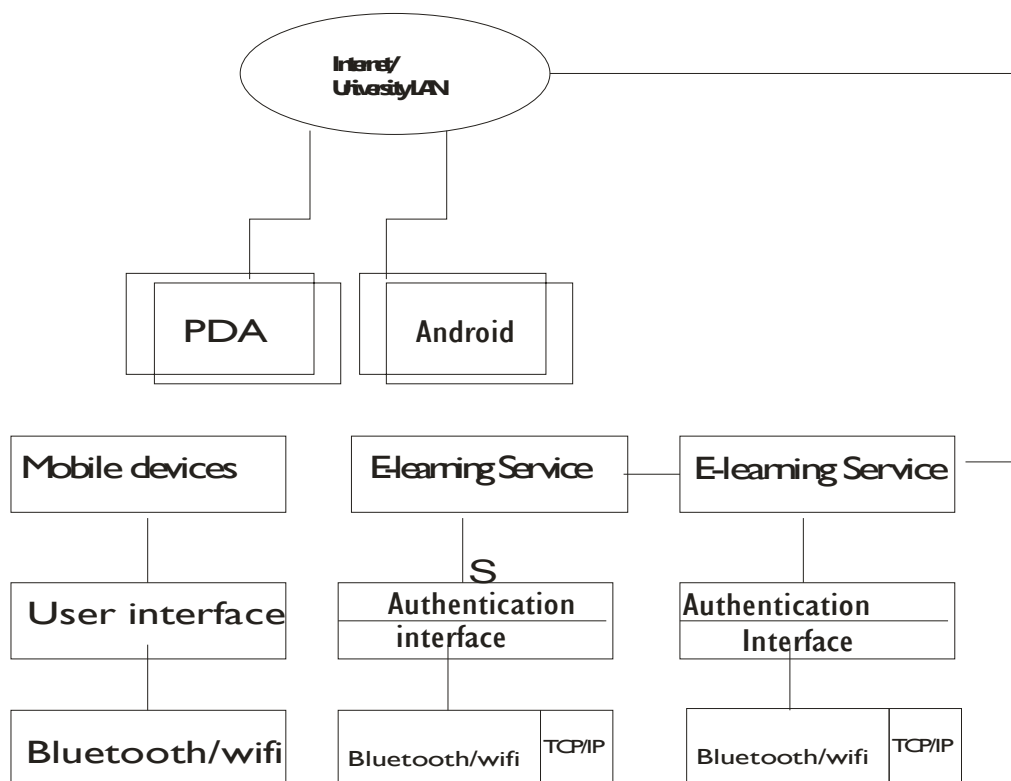


Fig 1 Proposed Architecture for Cloud Based M-Learning

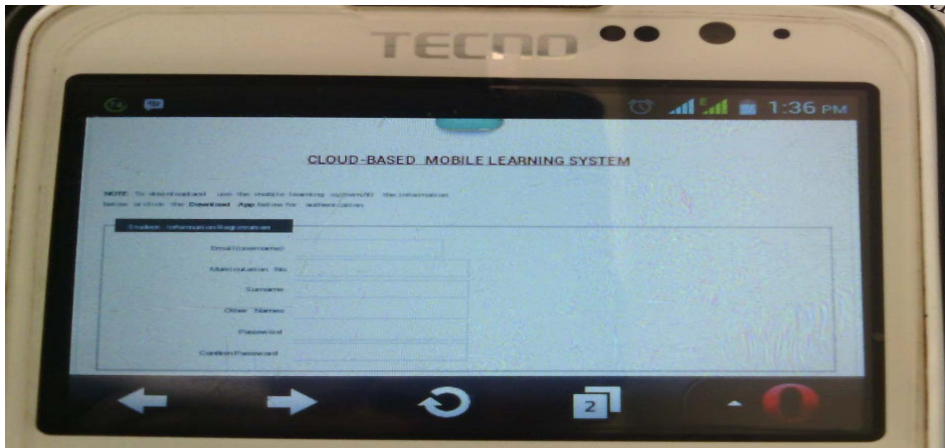


Fig 2a User registration interface on a Techno phone

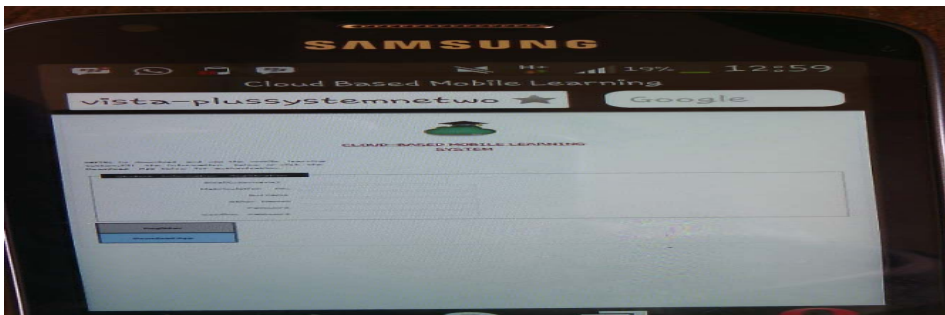


Fig 2b User registration on a Samsung phone

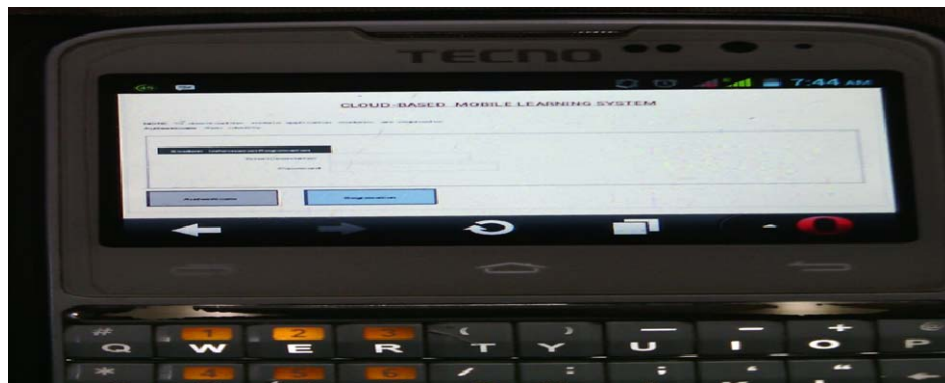


Fig 3 User authentication screen on a Techno phone

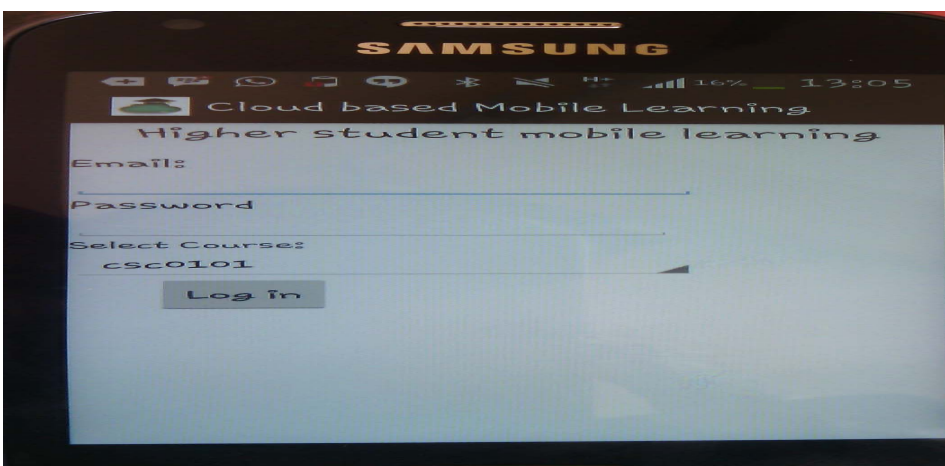


Fig 4 The login interface on a Samsung phone

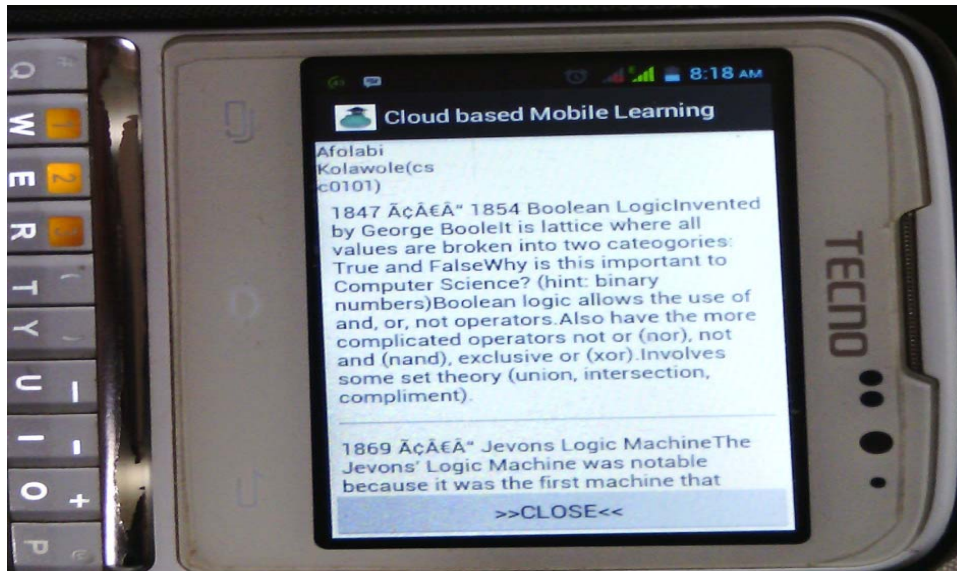


Fig 5 A snapshot of the cloud content on a Techno phone

REFERENCES

- [1] Butoi, A., Tomai, N., & Mocean, L. (2013). Cloud-Based Mobile Learning. *Informatica Economică*, 17(2), 27-40.
- [2] O'Malley, C., Vavoula, G., Glew, J., Taylor, J., Sharples, M., Lefrere, P. & Waycott, J. (2005). Guidelines for learning/teaching/tutoring in a mobile environment.
- [3] Lakshminarayanan, R., Kumar, B., & Raju, M. (2013). Cloud Computing Benefits for Educational Institutions. *arXiv preprint arXiv:1305.2616*.
- [4] Katz, R., Goldstein, P., Yanosky, R., & Rushlo, B. (2010). Cloud computing in higher education. In *EDUCAUSE*. [Online], [Retrieved December 2014], http://net.educause.edu/section_params/conf/CCW (Vol. 10).
- [5] Velev, D. G. (2014). Challenges and Opportunities of Cloud-Based Mobile Learning. *International Journal of Information & Education Technology*, 4(1).
- [6] Motiwalla, L. F. (2007). Mobile learning: A framework and evaluation. *Computers & Education*, 49(3), 581-596.