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Towards Developing an Online Social Media-based Mobile Learning System

[1]N.A. Ikhu-Omoregbe, [2]C.K. Ayo, [3]A.A. Azeta & [4]V. Macus
Department of Computer & Information Sciences
Covenant University
Ota Nigeria
[1]nomoregbe@covenantuniversity.edu.ng, [2]charles.ayo@covenantuniversity.edu.ng
[3]agbon.azeta@covenantuniversity.edu.ng, [4]macusvictoria2012@gmail.com

ABSTRACT
The advancement of Information and Communication Technology (ICT) and the Internet revolution gave rise to the several learning technologies on the web and mobile platform. During the last decade, the social media network became available for users to socialise and collaborate among peer group. Hence, The integration of e-learning and social media using mobile device as access point is to allow for learning and collaboration anytime, anywhere. This study seeks to provide learning on the social network platform for users to view the application on a mobile device and also foster collaboration among scholars. The system was developed using an open source Content Management System (CMS) Wordpress and Buddypress running on a WAMP or XAMPP server. MySQL was used as database. The usability of the System on the different mobile devices used was evaluated by identifying the usability attributes; designing a questionnaire based on those attributes and then analyzing the results with Statistical Package for Social Science (SPSS). The results showed that the learning system had a good usability score on mobile devices.
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Keywords- Collaboration, Mobile Learning, Social Media, Usability, VoiceXML

1. INTRODUCTION

The recent advances in mobile technology are changing the primary purpose of mobile devices from making or receiving calls to retrieving the latest information on any subject. In computer science, mobile computing is mainly about increasing the capability to physically move computing tools and services around [1]. Mobility offers the ability to engage learners of all ages anywhere, anytime [2]. New mobile technology, such as hand-held cellular based devices is playing a major role in redefining how we receive information. One issue is crystal clear and that is mobile learning is not just about learning using portable devices, but learning among peer and social groups of people [3].

Advances in computer and communication technologies has resulted in the development of portable digital devices such as cell phones, personal digital assistants, netbooks, iPods, video cameras, Moving Picture Expert Group3 (MPEG3) players, Global Positioning System (GPS), and portable e-books for enhanced participation in online communities of learners. Statistics has shown that 4.7 billion mobile cellular subscriptions exist globally in 2009 [4]. The pedagogical application of these devices has lead to the development of 'Mobile Learning', a rapidly expanding area of technology supported learning. Learners have indicated the need to use portable devices to learn on motion. As the most important social technology used worldwide, mobile device plays an important role in education.

A social media network platform is one that provides a medium for interaction by groups of people making it easy to share information (such as lecture materials, pictures and ideas) across a circle of people or groups. Statistics has shown that the use of social network such as Facebook, Twitter and LinkdIn is on the increase most especially among young individuals, the crop of which are students of tertiary institutions. The growth and popularity of online social networks has created a new world of collaboration and communication. More than a billion individuals around the world are connected and networked together to create, collaborate, and contribute their knowledge and wisdom. Despite the importance of online social networks, there is relatively little theory-driven empirical research available to address this new type of communication and interaction phenomena [5]. Social networking websites are virtual communities which allow people to connect and interact with each other on a particular subject or to just ''hang out" together online.

Students are heavily immersed in Web 2.0 technologies (i.e. Facebook, twitter, podcasts, wikis, blogs, chats, virtual worlds, video sharing and photo sharing). They are crafting on-line niches for themselves that seamlessly blend with their off-line world). Indeed, the Internet is playing an increasingly important role in not only students' social life, but also academic [6, 7]. Educators are now turning to Web 2.0 tools, drawing upon their ability to assist in creating, collaborating on and sharing content. As a result of this, the usage of social sharing sites is increasing daily [8].
Wireless devices are highly individualized with collaborative communications facility. This advancement give faculty flexible tools for complementing the existing technologies and extending the learning beyond the classrooms and homes from remote places like airports or trains where students do not have access to computers and the Internet [9]. A learning technology which is mostly used by the visually impaired learners is Voice-based e-learning application.

Voice-based social network is used to search for ad-hoc information, documentation and sharing of images and video, and access to social networking sites. VoiceXML-based mobile application allows users to connect to a Internet or Intranet server by simply dialing a telephone number for a mobile phone. VoiceXML is also known as VXML. It is one of the tools for developing voice-enabled e-learning applications. It is a web-based markup language for representing human-computer dialogs, just like the HyperText Markup Language (HTML). But while HTML assumes a graphical web browser, with display, keyboard and mouse, VoiceXML assumes a voice browser with audio output (computer-synthesized and/or recorded), and audio input (voice and/or keypad tones) [10]. VoiceXML technology allows a user to interact with the Internet through voice-recognition technology by using a voice browser and/or the telephone. The major goal of VoiceXML is to bring the advantage of web-based development and content delivery to Interactive Voice Response (IVR) system [11].

There are several social media technologies that promote e-learning. They include: Edublogs Campus, Elgg, Google collaborative tools. They offer the potential to encourage collaboration; enable user-generated content or input; provide effective way to share resources; and facilitate informal or formal learning [12]. There exist several social e-learning systems such as Moodle, Sakai, Claroline, Ilias, Cramster, Cloudworks, Mixable amongst others.

The main contribution in this study is to show how the convergence of social network application and mobile learning has enhanced the accessibility of e-learning system. The objective of the study is to provide access to e-learning content across two different platforms to allow for effective collaboration of peer groups in e-learning.

2. RELATED LITERATURE

Social networking is built on the idea of interaction and sharing. However, such information sharing and collaboration has some teething problems such as privacy issues and integrity of friends on social networking sites. It may also cause health challenges as a result of staying too long sitting in one place browsing the Internet. This tends to affect the operation of genes in the body system. Additionally, social media interaction when used for learning does not give sufficient room for explanation and clarification [13]. It is no gain saying the fact that most youths use mobile device to access social network sites on the Internet. Despite the high popularity of personal use of online social media, a low percentage of students and instructors use them for educational purposes [14]. However, some online social media-based learning resources have been reported in [15] and [14].

People use the social media for several other activities including: communicating, collaborating, seeking expert advice, sharing multimedia, presenting opinions, sharing reviews, entertainment, Public health [17], Tax Administration[18], Insurance [19] and business growth [20]. An increasing number of people are using social media in their buying decisions. It is so because social media helps them filter the large amount of information available by being able to rely on comments from their friends and like-minded individuals [19]. In terms of outreach, social media allows individuals, companies, organizations, governments, and parliamentarians, to reach large numbers of people[22].

Recent technological advancement has proved that learning has moved from being web-based to mobile learning platform. Reason being that the Internet service for web-based technology may not always be available everywhere, every time, on real time basis. With this in mind, it becomes questionable to only rely on web-based learning to provide all the required social learning needs. In the field of behavioural psychology, social learning is defined as the kind of learning by individuals that happens through observation or interaction with their social context [23]. One of the key attributes of social learning is collaboration. Social learning uses behavioural and observational learning technique to attain collaboration. It is believed that the behaviour of a learner is influenced by observing other learners among peer groups.

3. SYSTEMS DESIGN AND ARCHTECTURE

The design of the system as presented in this section contains a process model and architecture of the system. The process model of the system shown in Figure 1 contains the sequence of activity of the system. The symbols used in the model are Business Process Modeling (BPM) notations which are also close to flowchart symbols. In Figure 1, a rectangle represented an activity, rhombus as decision, rectangle with round edges as action, circle as event and directed arrow as sequence of process flow. A mobile user login into the system using a mobile phone via graphical user interface (GUI). The login profile of the user is authenticated and the service type is determined. If service type is Group, then Courseware is pulled for the user. If forum is selected, then comments are ready to be posted. If members are selected, then chat/messages services are available. The architecture of the system shown in Figure 2 was drawn using schematic architectural design.

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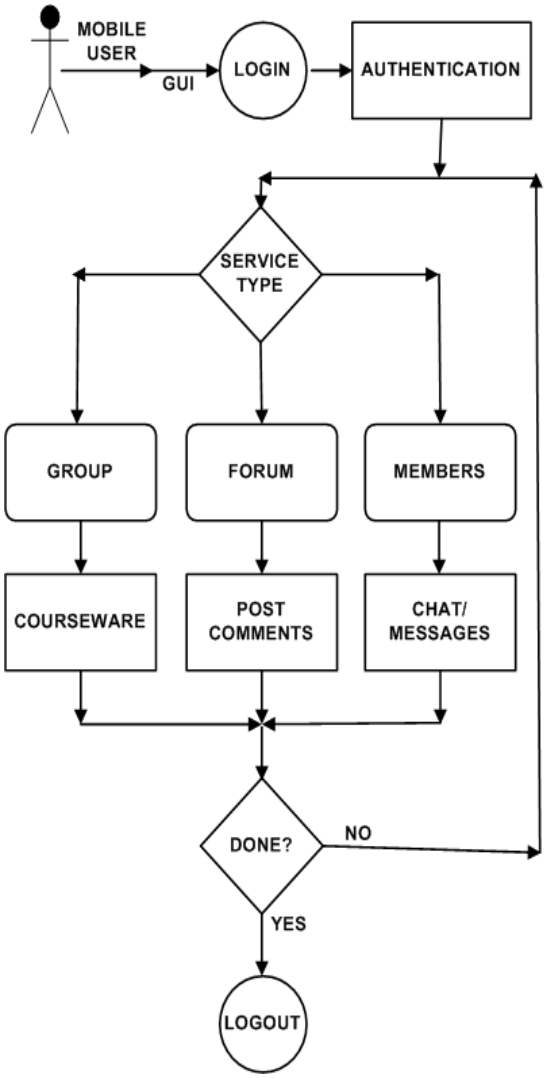

Figure 1: Process Model of the System

The description of the architecture in Figure 2 is presented as follows: The learner connects with the logic layer using a smartphones. The access path for the application is through HyperText Transmission Protocol (HTTP).

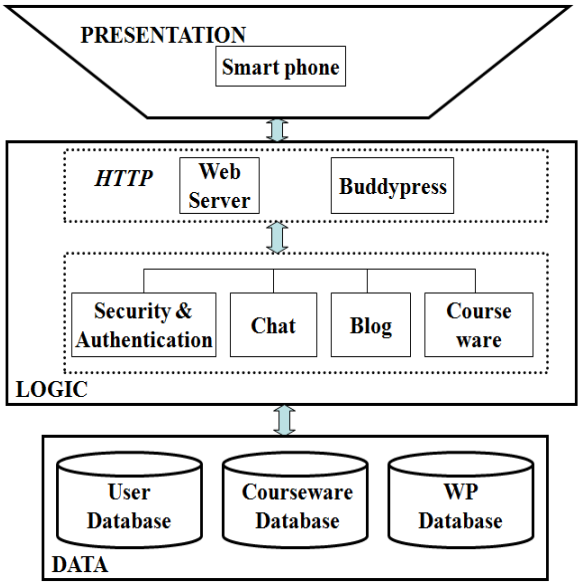

Figure 2: The Architecture of the System

The system was developed using an open source Content Management System (CMS) Wordpress and Buddypress running on a WAMP or XAMPP server. JavaScript and AJAX (the scripting language which helps to detect which device is used to access the application whether laptop or mobile). MySQL will be used to manage the database of the application. The usability of the System on the different mobile devices used was evaluated by identifying the usability attributes; designing a questionnaire based on those attributes and then analyzing the results with SPSS software. The results showed that overall the learning system had a good usability score on the mobile devices used.

4. SYSTEMS IMPLEMENTATION

The Welcome Page (see Figure 3) shows where a user gets to after logging into the System. It gives a brief history of the users' personal activity on the system. It also allows a user start getting used to the system by posting comments, uploading pictures and other activities that shows the user is active on the System.

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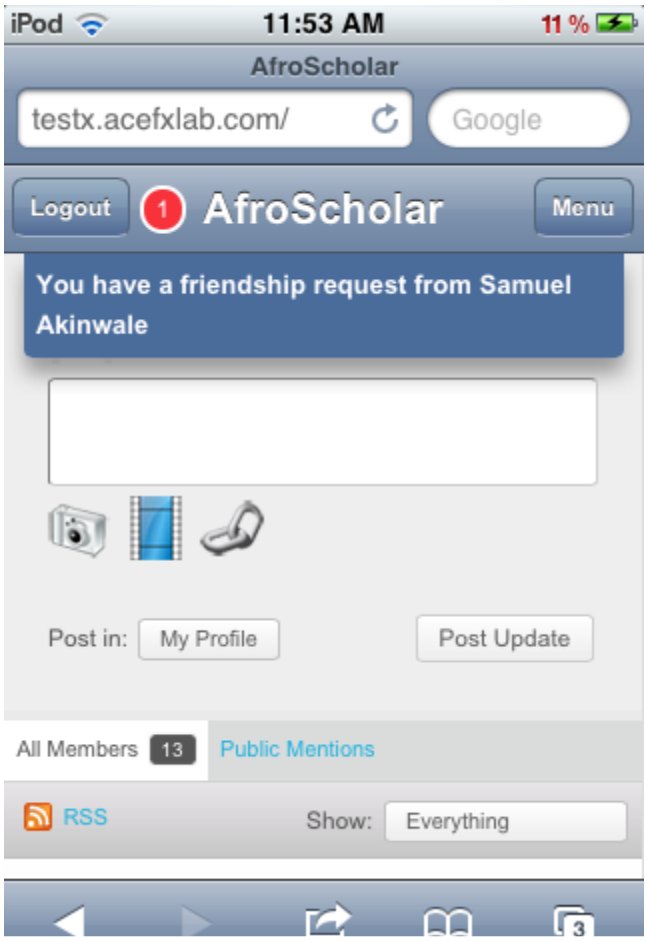

Figure 3: Welcome page on iPod

The Profile Menu page (see Figure 4) consists of Activity, Profile, Messages, Friends, Groups, Forums, and Settings. Each of these links shows users personal activities and gives general information of users profile. The Profile menu is located as a drop-down link under the main menu on top right corner of the welcome page (for the Blackberry phone) and a direct click on the Profile link for the iPad.

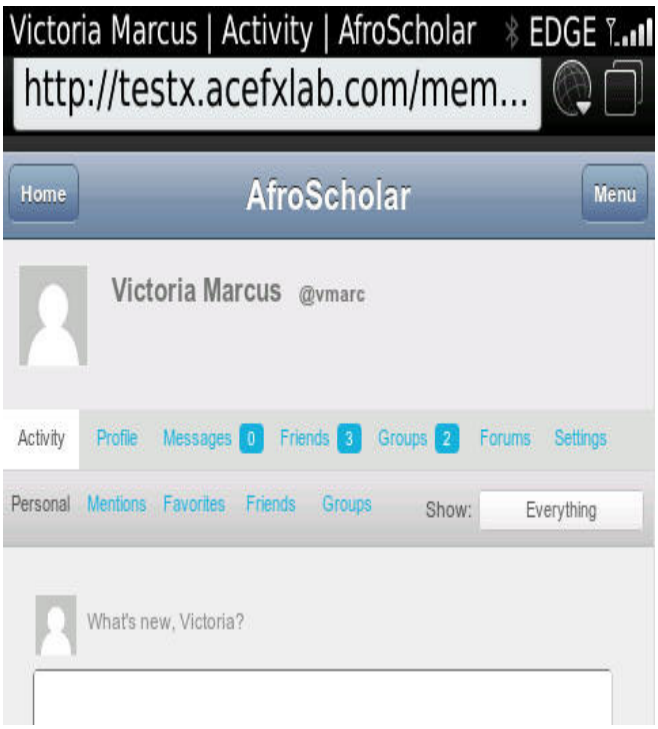

Figure 4. The Profile Menu Page on Blackberry

The usability of the System on the different mobile devices used was evaluated by identifying the usability attributes; designing a questionnaire based on those attributes and then analyzing the results with SPSS. The results showed that overall the learning system had a good usability score on the mobile devices used.

5. SYSTEMS EVALUATION

To test the performance of the system users were told to use their mobile device to access the system in order to observe its performance i.e which features were accessible on the devices. After testing the System's functionality on the mobile platforms, the findings are summarised in Table 3:

Table 1: Experiment Findings

System Functionality	iPad	iPod Touch	Blackberry Phone	Android Tablet/Phone	Nokia Phone
Create Account	✓	✓	✓	✓	✓
Login	✓	✓	✓	✓	✓
Add Friend	✓	✓	✓	✓	✓
View Member Profile and location	✓	✓	✓	✓	x
Create Forum	✓	✓	x	✓	✓
Make comments to existing discussions	✓	✓	✓	✓	✓
Chat/Messages	✓	✓	✓	✓	✓
Join Groups	✓	✓	✓	✓	✓
Courseware	✓	✓	✓	✓	✓
Edit Profile	✓	✓	✓	✓	✓
Save Profile	✓	✓	✓	✓	✓
View System Activity	✓	✓	✓	✓	✓
Logout	✓	✓	✓	✓	✓

According to the ISO 9241-11 standard, usability refers to "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use". In evaluating this System, the following usability factors were considered: Attractiveness/ Interestingness, Simplicity, Browserbility, Navigability, Completeness, Interactivity and satisfaction. A total of 26 people participated in the usability study. According to [21], this is a suitable number required for such usability study. The table gives the descriptive analysis of the data gathered from the questionnaire.

Table 2: Descriptive Statistical Analysis of Questionnaire Data

Usability Attributes	Mean Rating	Standard Deviation	Variance
Attractiveness	4.38	0.590	0.348
Simplicity	4.43	0.598	0.357
Browserbility	4.43	0.507	0.257
Navigability	4.19	0.602	0.362
Completeness	4.05	0.805	0.648
Interactivity	4.19	0.512	0.262
Satisfaction	4.19	0.680	0.462

Numerous usability studies suggest that a System with 'Good Usability' should have a mean rating of 4 on a 1-5 scale and 5.6 on a 1-7 scale [22]. The 1 – 5 scale approach was used for testing the usability of this work. We can therefore conclude that this System has 'Good Usability' based on the mean ratings of the usability attributes, shown in Table 4 above.

6. CONCLUSION AND FUTURE RESEARCH

With the on-line social media-based mobile learning system provided in this study, scholars and instructors can now have a platform where effective teaching and learning can take place. The system will allow for collaboration and interaction because of the integration of the social media concept which is a tool that is widely used especially by young scholars. Furthermore, due to the increasing trend towards development and usage of smartphones, this System can be accessed by mobile devices bringing knowledge closer to learners and enhancing information sharing at any given time.

Areas that require further research include Ethical, legal and privacy issues and a number of pedagogical limitations affecting e-learning and social media [4]. The impact of social media usage habits on the effectiveness of e-learning platforms has not been examined yet especially in the light of cultural differences [23]. Social learning theory and analysis will also be considered in the system implementation and evaluation.

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Authors Brief

Dr. Ikhu-Omoregbe, Nicholas has a B.Sc degree in Computer science from the University of Benin, Benin city, an M.Sc degree in Computer Sciences from the University of Lagos, and a PhD degree in Computer Science from Covenant University, Ota, Nigeria. His research interests include: Software Engineering, Mobile Computing, Mobile Healthcare and Telemedicine Systems, and Soft Computing. He currently lectures at Covenant University. He is a member of the Institution of Electrical and Electronics Engineers

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Prof Charles K. Ayo is the Vice Chancellor Covenant University, Ota, Nigeria. He holds the B.Sc., M.Sc. and Ph.D degrees in Computer Science. His research interests include mobile computing, Internet programming, e-business and government, and object oriented design and development. He is a member of the Nigerian Computer Society (NCS), and Computer Professional Registration Council of Nigeria (CPN). He is a Professor of Computer Science and MIS, Covenant University, Ota, Ogun State, Nigeria.

Dr. Azeta, A. Ambrose is a lecturer in the Department of Computer and Information Sciences, Covenant University, Ota, Nigeria. He holds B.Sc., M.Sc. and Ph.D in Computer Science from University of Benin, University of Lagos and Covenant University respectively. His current research interests are in the following areas: Software Engineering, Algorithm Design and Mobile Computing. He currently lectures at Covenant University. He is a member of the Nigerian Computer Society (NCS) and Computer Professional Registration Council of Nigeria (CPN).