Investigating the Adaptability Of mLMS Application for Learning Activity

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Abstract— ***The tremendous growth of Mobile technology paved a new trend in learning. The mobility and fastness of Mobile Learning replace traditional methods. It is an indispensable learning tool that is implemented in the Android platform. In our proposed model, we developed an mLMS application where the Learning Management System (LMS) acts as the back-end server. Learners can utilize many features from the mLMS application such as course creation, online exams, flashcards, etc. The students learning skills are improved widely because the mLMS is a learner-centric approach. mLMS contain push notification which provides day by day updates to the learners and tutors. The mLMS design is improved by Service Oriented Architecture (SOA). The mobile test encourages the learner to take many tests thereby develop their knowledge in the learning. We conducted a survey in different universities about the mLMS and its performance. Thus it became a complete educational tool for the learners to enhance their professional skills.***

Keywords— ***Android platform, LMS, mLMS, SOA.***

I. INTRODUCTION

The rapid development of Information Technology in recent years has injected new vitality into distance learning. At present, the desktop computer is still the most popular hardware being used all over the world where distance learning is concerned. At present, the desktop computer is still the most popular hardware being used all over the world where distance learning is concerned. Now, 4G communication technology has led to the evolution of mobile learning. The intelligent mobile phone using 4G technology not only has a wider coverage, is portable, has easy and convenient operating features but also has the characteristics of high data transmission speed and high data processing ability. Because the support is not enough for Flash, client script and the like, many mobile learning resources that do not use the Android use mainly the general picture, text, audio, video, etc., in describing static learning resources and it is difficult to display personalized interactive learning contents. However, with the popularity of portable devices using the Android operating system and the technology of the Internet of things, the problems will eventually be solved completely. Android is a Linux-based operating system designed primarily for touch-screen mobile devices such as smartphones and tablet computers. The android operating system has rich resources of hardware and software applications. The Android system supports various network protocols. Most importantly, it is an open-source operating system. Because of these characteristics, it has occupied a big part of the intelligent mobile phone market. Android developers have the authority to access the APIs framework. The system structural design application simplifies the process of its components reuses. Any application can develop its components and can also use these distributed components. To create the flexible environment for learner's/students with mobile computing where student-centred and network -the central concept are inbuilt for this orientation, many colleges and schools wish to build like this setup through which learner/Student can access any information from anywhere and in any form. M-learning is represented as a platform where learners/students can find job aids to courseware and it can be downloaded on to mobile phones. The M-

learning application is worked based on the web services architecture that was open, scalable, and global, with plug-and-play capabilities is utilized. The f of the architecture is an open, standards-based model that supports interoperability among different vendor solutions. Existing resources refer to resources which can be utilized for future work. For example, e-learning is an existing resource where numerous contents are available under each category. It is a good approach to using the existing resources, rather than creating new content for each topic which will consume more time. M-learning is a subset of e-learning, both rely on digital communication for teaching the students. It is necessary to find a way to utilize this content thereby reducing the cost and time of the content writer.

The paper is organized as follows, the literary works are reviewed in section II, our proposed model is explained clearly in section III, the experimental results and discussion are discussed in section IV, and at last in section V described the conclusion part.

II. LITERATURE REVIEW

Patrick et al[1], sharing an experience in students' usage of the mobile app in the LMS. In this paper, the study of using LMS with a mobile app is performed. The study includes the usage of LMS before and after the implementation of the mobile app, the usage pattern of the web interface and mobile app, and the distribution of functions used by students for the mobile app. Ruben et al[2], the proposed development of mobile technology and the increasing availability of wireless mobile devices in everyday life have created a new acronym known as mobile learning (m-learning) which has emerged as a potential educational environment to support learning and make significant contributions as an extension of e-learning. Taking into account the strengths and weaknesses of using m-learning and key factors for the successful adoption of mobile learning that is analyzed through this article, the paper focuses on the evaluation of the potential use of m-learning. Gustavo et al[9], the method was applied in the evaluation of three mobile applications for English teaching: Duolingo, Wingua, and Rosetta Stone. To evaluate these three applications, they have been tested by a specialist in the software quality area and for each of the applications, the proposed checklist was answered. From the results obtained, we can conclude that the method proposed is adequate for evaluating the quality of mobile learning applications. Ayhan et al [15], The Mobilim system has been developed to provide educational content through the Internet using mobile phones for engineering educators and students. System features have been evaluated by instructors and students. The system evaluation shows that Mobilim is a useful m-learning environment. The initial results of the system are encouraging the further development of the system. Besides, the use of open software for the development of this system makes it cost-effective. Mobilim pages can be accessed by mobile phones that have the XHTML browser feature.

III. PROPOSED SYSTEM

mLMS is the application that is installed into mobile devices and utilized for the learning purpose. The learning content is retrieved from the backend server also known as LMS which is depicted in Fig.1.

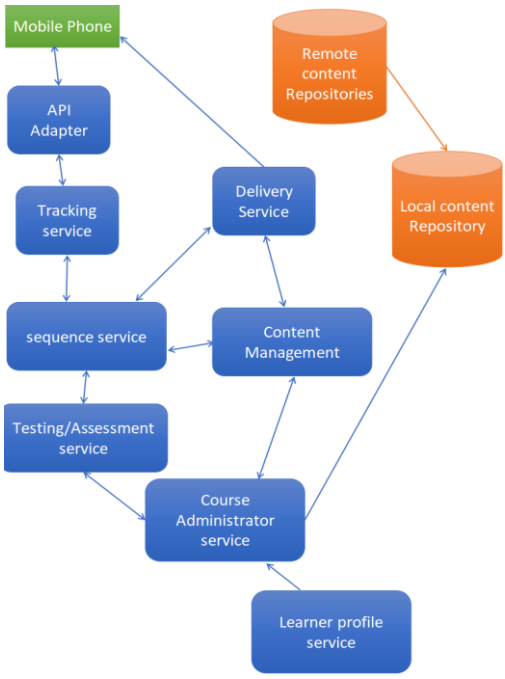

Fig.1.Architecture Model of Learning Management System

The learning content can be access anywhere from the system. The mLMS is designed based on technical and pedagogical principles. To learn in a fast manner, the mLMS is developed based on the flashcard and micro contents. The graph is plotted based on the learner's performance which is monitored by the tutors and provides feedback to improvise the performance. Aforementioned the mLMS is integrated with the LMS, the learner can take tests and quiz which make a good interaction with the system. In the traditional method, the tutors have to take some time for correcting all the answers and provides the result to the students. It is a time-consuming process that is solved in the proposed model. The tutors have to upload numerous questions and their answers to the server. At the end of each class, the mLMS itself organize the questions and provide a test to the learners. Based on their performance the system allocates the grades to the learners. Due to these features, the system can easily conduct numerous tests simultaneously. The learners can easily access the learning content using any type of device. The content is extracted from the repository. The middleware platform is developed by PHP and MYSQL. The learner content is available in different formats such as text, audio, video and other multimedia where MYSQL is acting as a database. After the successful deployment of the proposed model, we planned to launch the application for the window and iOS platform. The application can run as the stand-alone on the client-side. Application Programmable Interface (API) Adapter is used to interface the application and device. The Remote content Repositories stored the recent access file details and provide sequence services.

A. Learning Management System

LMS is web-based software which tracks and deploy the online training. The tutor has to upload the learning content to the LMS and can be easily accessible by the learners. It acts as the repositories for storing the learning content. A login id is provided to the user, admin, and tutors. The learners can search for any topics and learn the courses based on their perspectives. It depends upon the organization’s objectives, online training strategy, and desired outcomes, there is some institution who have already deployed the LMS for E-learning where a student can access these online training resources whenever and wherever.

Middleware plays a role in storing the data in a separate database. For example, it stores the user profile detail in a separate server and the learning content of the user is stored in another database, thereby providing the separating database will prevent the complexity of retrieving the information from anywhere. Middleware delivers the messaging services thereby enabling the different applications to communicate by utilizing the message framework such as Web services, Simple Object Access Protocol (SOAP), JavaScript Object Notation (JSON) and Representational State Transfer (REST). This makes the middleware to work regularly whenever the user put forth the request from different hardware and software platform, it can accept the request without any constraints. The initial and continuing learners are tracked for their activity to motivate the learning knowledge. But the remedial learning students are not tracked due to the self-interest of their domain. They will not be forced to learn because they willingly move for each topic without any external motivation. They take the assessment and check their level in each domain. Their main aim is to develop their skill and knowledge in any particular domain. The integration of LMS with the mobile device is depicted in Fig 2. it provides many services and features to the learners. The integration and interoperability provide new approaches to utilize the facility. The Service-Oriented Architecture (SOA) is an interoperable software that separates the services and underlying implementation. It helps to access the learning content which is depicted in Fig 2. Many web services are integrated with the application for transport mechanisms. The main aim of SOA is to interface the external learning application with LMS resources. Point 1 represents the basic services provided by LMS (authentication).

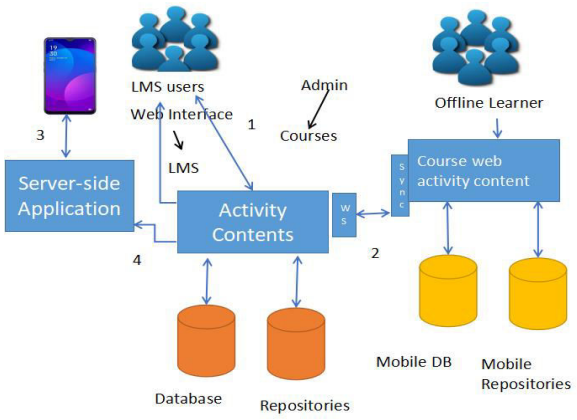

Fig.2.Architecture to integrate LMS with external mobile applications

The web services are designed based on JSON. These web services help the developer to build an advanced mobile application through which the client can access the LMS resources and activities. The combination of M-Learning and LMS creates an mLMS application. The learners can also update the videos by taking it through mobile phone and upload it to the server. It is considered as the server-side application. Based on the authentication authorization, a user can access the specific content from the LMS. The activity content such as courses and LMS content will be transfer to the user devices. The client can use any type of Android device for activating the usability of mLMS. It is an independent platform. The offline accessibility is also implemented for the client which may not possible for other applications. [10] discussed about Nanorobots Control Activation For Stenosed Coronary Occlusion, this paper presents the study of nanorobots control activation for stenosed coronary occlusion, with the practical use of chemical and thermal gradients for biomedical problems. The recent developments on nanotechnology new materials allied with electronics device miniaturization may enable nanorobots for the next few years. New possibilities for medicine are expected with the development of nanorobots. It may help to advance the treatment of a wide number of diseases: cardiovascular problems, neurosurgery,

cancer, diabetes and new cell therapies. The implementation of new methodologies to help on manufacturing analyses and system design for the development of nanoscale molecular machine is one of the most important fields for research. The use of 3D physically based simulation in conjunction with clinical data may provide ways to design practical approaches for control and transducers development.

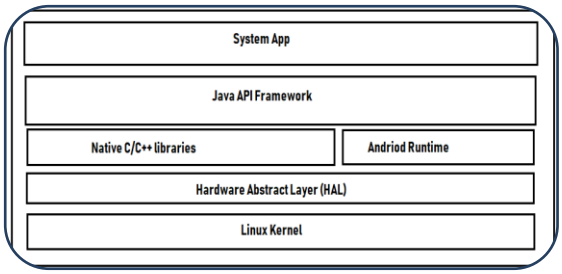

Fig.3. The Android Software Stack

This Android Software stack is depicted in Fig.3. The Stack consists of system App, Java API framework, Native Libraries, Android run-time, Linux kernel, Hardware Abstract Layer (HAL). These modules enable the usage of the Bluetooth camera, etc. The dashboard has differed for the users, admin, and tutors. The learners can easily handle the application without any confusion.

IV. RESULTS AND DISCUSSION

We conducted a survey about mLMS among 75 volunteers. The integration of mLMS with extra application adaptability and its performance is discussed.

TABLE 1
EMPIRICAL EVALUATION OF M-LEARNING APPLICATION BASED ON THE QUALITY FACTOR

Criteria	1st option	2nd option	3rd option	4th option
No of Students	55	10	5	5
No of Teachers	60	10	3	2
No of Administrator	50	15	5	5

The benefits of the mLMS are discussed based on the different questions. The questions are based on evaluating the pedagogical and technical principles of the mLMS. The user learning process, learning opportunities, and learning outcomes are evaluated in the pedagogical principle. User experience using mLMS is determined is categorized under the technical principle. The overall mLMS quality factor is evaluated and depicted in Table 1 and the graph is plotted in Fig 4. The usability evaluation takes place based on the functionality of the mLMS application. Based on these three evaluation the mLMS application is evaluated and the result is predicated. Through online evaluation, students, admin, and teachers are responding to our survey. We got more positive feedback from the learners, admin, and tutors on the mLMS quality. From the graph is clearly understood that the no of students (55), no of

teachers (60) and no of administrators (50) mostly have chosen the first option. From this analysis, the volunteers support the quality of mLMS application.

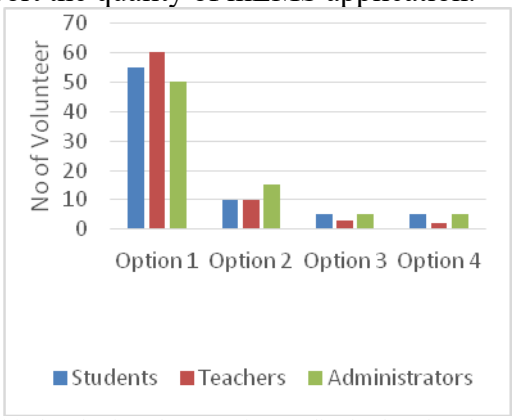

Fig.4. Empirical evaluation of M-Learning Application based on the quality factor

The pedagogical principles of mLMS application are evaluated which is depicted in Fig 5. The volunteers are most supportive of the mLMS application. They accepted that the mLMS support the pedagogical principles. We measure the time spent by each learner in Mobile. [6] proposed a novel method for secure transportation of railway systems has been proposed in this project. In existing methods, most of the methods are manual resulting in a lot of human errors. This project proposes a system which can be controlled automatically without any outside help. This project has a model concerning two train sections and a gate section. The railway sections are used to show the movement of trains and a gate section is used to show the happenings in the railway crossings. The scope of this project is to monitor the train sections to prevent collisions between two trains or between humans and trains and to avoid accidents in the railway crossings. Also an additional approach towards effective power utilization has been discussed. Five topics are discussed in this project : 1) Detection of obstacles in front of the train;2) Detection of cracks and movements in the tracks;3) Detection of human presence inside the train and controlling the electrical devices accordingly 4) Updating the location of train and sharing it with other trains automatically 5) Controlling the gate section during railway crossing. This project can be used to avoid accidents in the railway tracks.

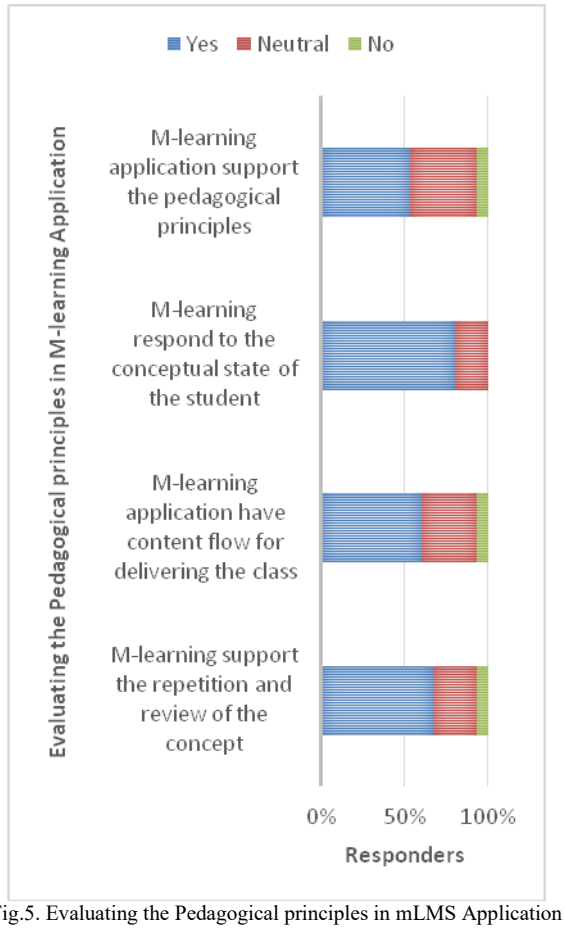

Fig.5. Evaluating the Pedagogical principles in mLMS Application

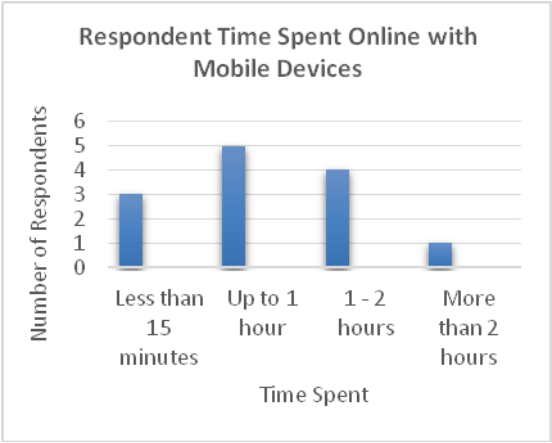

Fig.6.Respondent Time Spent Online with Mobile Devices

From the analysis, it is understood that the mobile usage of the learners is more than 1-2 hours which is depicted in Fig.6.

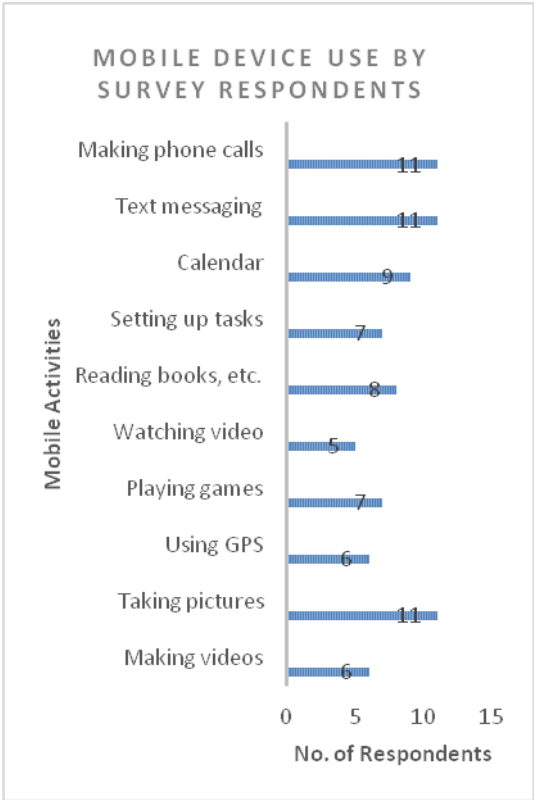

Fig.7.Mobile Devices Usage by Survey Respondents

The Mobile Activities of the learners are evaluated. Most of the learners are spending their time on mobile by watching the video, taking pictures, calendar and text messaging, etc... which is depicted in Fig.7. The evaluation is conducted directly for 12 volunteers.

V. . CONCLUSION

In our proposed model, we implemented the mLMS application in the Android platform. The model enhances learning in the educational sector. This framework is tested in different scenarios. The speed and visualization of the framework are checked and investigated which is better than the traditional approaches. The LMS provides essential learning content to the mLMS application and supports the learner-centric approach. The learner gets day by day notification from the application. The learner's performance is monitored and the graph is automatically plotted which is easy for visualization purposes. The proposed model changes the learning activity by shifting from a web browser to a mobile application. Nevertheless, it is highly worthwhile to keep such a framework in mind since the proposed approach is highly promising for the future.

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