

Moodle Integrated Mobile Learning Environment for Distance learning

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Abstract- Mobile Computing seems to be a current trend in the world where many of the human needs are served by a single touch on the screen on a mobile device. Such services, facilitate through variety of mobile apps, have become a great effect on increasing the usage of mobile devices among the people in the world [1]. This addiction of utilization of mobile devices is because of the interest which is created in human mind through the technologies [1] applied within such apps and the advanced hardware and software features and capabilities rely on those particular devices. By having such a technology with advanced capabilities, still we are in a delay of using them in Education enhancement of the people. In this effort our focus was to deliver an interactive virtual mobile learning environment for the students to facilitate distance learning by embedding existing features and functionalities in Learning Management Systems which are popular in many of the educational firms for keeping a blended learning mode in the education [2, 3].

Index Terms- Moodle mobile app; Blended learning; Distance learning

I. INTRODUCTION

To access the moodle, specially a learner needs his/her machine with internet access available. In this scenario, portability and loss of efficiency with low bandwidth are the main issues. Accessing to moodle through a mobile device is somewhat difficult with the existing capabilities and the limitations having in them such as space, storage, processing and power consumption [4]. If the device is not a high end device, the problem exists when it comes to viewing or downloading. Often the devices get stuck and the user won't be able to view the desired document properly. Most of the web browsers in the mobile phones are not much sophisticated to load the documents or to download the documents. Such types of issues reduce the productivity of the user. In this app, on which the reserch was carried out, it is capable of accessing the moodle contents specially the quiz activities, events, collaborative working tools [5,6] such as wikis and forums. Further it delivers students learning progress evaluating component and a mechanism of getting students feedbacks on the learning materials, by which the lecturer could then evaluate the students' interest towards the different types of quizzes and improve the lesson component. In the app we have extracted only the above functions from the moodle to deliver them in an interactive and meaningful manner through the mobile device for the student by facilitating them to involve with those activities in an enthusiastic manner [7].

Especially the app has been developed to support the students of Department of Electrical and Computer Engineering of the

Open University of Sri Lanka, to facilitate the distance learning. The main purpose here was, since most of the students are external students and the inability of them to participate on the face to face sessions regularly. Although the university maintains Learning Management System to support them with the supplementary materials, activities and learning references up to which level the students are keeping alert on them regular basis is a problem.

To assist this problem we took the advantage of providing portability of the above services by delivering the most important functionalities in the moodle through an interactive mobile app which they could be accessed through their mobile devices [4].

II. SURVEY ON USAGE OF MOBILE DEVICES AMONG STUDENTS

To ensure the feasibility of providing such solution the initial fact was to ensure whether all the students have their own smart phone through which they could access such type of app. To find the above requirement, we had a small survey to get the statistics of smart phone usage among the target population (That is randomly selected 100 students at Open University of Sri Lanka, Department of Electrical and Computer Engineering).

TABLE I: USAGE OF MOBILE DEVICES

Percentage of users	Device
73%	Smart phone
13%	Tab
11%	Smart phone and Tab
3%	No smart phone or Tab

III. DESIGN AND IMPLEMENTATION

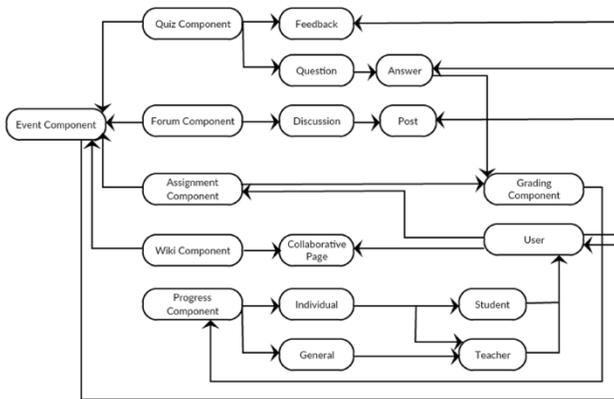


Figure 1: High Level Design of Mobile moodle app.

Basically there are seven components which interact with the users. They are: Quiz Component, Forum Component, Assignment Component, Progress Component, Wiki Component, Event Component and Grading Component which allows teacher to view students' performance on quizzes. Student and the teacher are the two user roles which could access these components;

Components such as Quiz, Forum, Wiki and Assignment are communicating with the Event Component. Through the Event Component the users are alerted on events which are having expiration dates associated with them. Quiz Component and Assignment Components are connected to the Grading Component which stores the results of each of them. This Grading Component gives grading data to the Progress Component which shows the progress of each student on the full course and progress of all the students on each activity.

Further, students are able to attempt on Quizzes through the Quiz Component and add their feedback and rate the quizzes according to their interest. Viewing forum posts and adding the posts to any given forum through the Forum component is another functionality which is facilitated through this app. Students are able to upload assignments through Assignment Component and to collaboratively participate on knowledge sharing through Wiki Component. Students' progress on quizzes could be graphically viewed by the both roles.

Whole system is implemented using Apache Cordova framework. Aim is to provide the benefit of platform independence. User Interface and interaction with the server side is maintained through java script and jquery whereas server side scripting is with php.

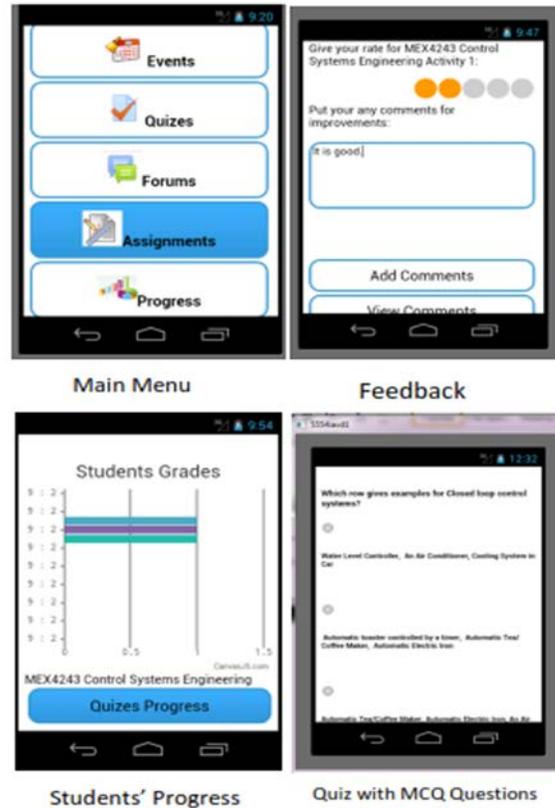


Figure 2: Sample Images of implemented App.

IV. EVALUATION AND RESULTS

Before releasing the product to the students, to measure the feasibility of utilizing the app by the students, a workshop was conducted with the staff members of the Faculty of Engineering in Open University of Sri Lanka. Throughout the workshop they were guided through some activities in the moodle through our mobile app and following findings have been discovered.

Workshop structure

A. Nature of the participants:

- Number of participants: 18
- All are first time users of the app.
- 10 of them are familiar with moodle server.

B. Questioner:

Following questioner has been distributed and collected their feedback at the end of the workshop.

1. How do you feel about the mobile moodle app?
2. What type of benefits do you see when using the app other than normal moodle environment?
3. Do you feel that it will be easy for the students to participate with the studies by having such an app more interactively?
4. Do you feel that it will be easy for you to transact with the students through this app?
5. Do you feel that this will be contributed for the learning performance enhancement of the students than in normal class room?

6. Any suggestions that you propose to improve this app to enhance learning performance of the students?
7. What type of things can you propose to address individual's learning interest through the app?

TABLE II: overall feedback on questioner

Question	Feedback
General feeling about the Mobile Moodle App	From the eighteen users, eleven of them have a positive feeling about the app, other six of the users have stated that there are issues to be fixed.
Benefits of the App	Easy to access Ability to access at any time anywhere Ability to get quick feedback from the students Attractive&Interesting Ability to give feedback easily Motivate students to access moodle Increase accessibility and availability Giving events to be done Portable
Ease of use for Students	14 users have agreed to that the app will be easy for the students to use and it will increase the efficiency of the students' learning process. The others have agreed with some conditions. One of them have stated that it will be easy for the students if the response time is decreased, , one other user stated that the easiness depends on the user, for the full time users it will be easy but not for the others
Ease of use for Teachers	seventeen out of the eighteen of the group have said yes that it will be easier for the teachers, but one user have mentioned since he was a Windows mobile user he will probably not use the Mobile Moodle App.
Learning Performance Enhancement through the app	All the users have stated that the app will definitely enhance the learning performance of the students. They mentioned that even though the students use but their participation is essential for the day schools as well. One of the staff member has commented that the app will enhance the learning process if students are not only focusing on passing the exam but also for learning

C. Suggestions for improvement of the app

Through the workshop, following Suggestions are made by the participants to improve the app

1. When a quiz or assignment is there, if students want any help before answering the questions suggest an option to get necessary information from the teacher
2. Make sure all the options given are working properly
3. Rectify compatibility issues
4. Make the app compatible for different OSs eg; Windows
5. Improve as “Cosera”
6. Make it more attractive, user friendly
7. Suggest to include an option to upload videos

D. Suggestions to improve learning interest of the students through app

To increase learning interest of the students, the following suggestions are selected.

1. Make it more attractive using interactive and colorful themes
2. Use novel and attractive materials
3. Make it possible to view video materials
4. Material update should happen regularly
5. Conduct discussions with students through the app, give images related to feedback remarks to students answers
6. Suggest adding shared option to discussions or relevant materials.

V. RELATED WORKS

Existing Mobilemoodle app allows the moodle functionalities through web services. Mostly facilitate with course contents, event notifications, forums etc. From moodle APIs through web services [2, 8, 13], it is difficult to access some of the contents and functionalities in the moodle environment. In this app we facilitate Open University students to engage with moodle quizzes as well. Further there are some other quiz apps. Most of them are standalone ones and not combined with moodle quizzes. Other than that, they are not open source and developed to support with android platform.

Socrative, eClicker , The Answer Pad, PollDaddy are some of the standalone apps for real time interaction among student and the teacher.(ex: for class room polls and quizzes) [9,10].

From apps such as riddle, moodle, learningpod, simultaneously the student can involve with quizzes and teacher could view the students' progress on activities and evaluate and give feedbacks on them [10, 12, 13]. They are standalone apps [10]. Moodle integration is not there. Most of them need special devices to access the apps like tablets or ipads. Further, most of them are android apps (supports only on android devices). To achieve platform independence in here, we used the Apache Cordova as the development framework.

VI. CONCLUSION AND FUTURE WORKS

Main aim was to facilitate the Open University students with distance learning, enabling moodle activities through a mobile app. specially engaging with moodle quizzes with various question types, use of moodle forums, notifications on the events, graphical view of the progress on marks of the quizzes, collaborative works with wikis and giving feedback [11, 8] on the moodle activities are allowed for the students. Finally through this app it has been achieved most of the targets that are focused at the planning stage which could be proved by these deliverables.

Table III: deliverables of the app

Objective	How it has been achieved
Collaborative working	Wikis, forums are there for collaboration [25]
Knowledge enhancement	Participating with moodle quiz activities and assignments
Contribution of students in supporting lecturer to build learning materials.	Facilitated feedback mechanism on activities
Self-evaluation on performance	Facilitate with graphical representation of student's progress on scores.
On time aware with the studies	Alerting with moodle events
Interactivity	Providing existing moodle features in interactive way[19]. (ex: progress by graphs, feedbacks, view moodle quizzes in a proper way in mobile devices, use of breadcrumbs to resolve the ambiguity with navigation through the app[19], proper alert and error messages at relevant places)

From this app we are aiming at customizing the app by providing device independency and platform independency. Further some standalone apps that have been developed for mathematical calculations by the use of the technique of random number generation are expected to be embedded here.

According to the workshop most of the users have stated that the app will be popular amongst students because, most of the students of their university are not full time students, even though one of the users have mentioned that the app will be easier for the full time students but not for the others. When we consider the overall feedback, we can see that most of the staff members have a positive attitude towards the Mobile Moodle

App. According to the comments on benefits, we could see that even though the tested group is first time users,

they have identified many interesting benefits of the app. We are aiming at improving the app to be compatible for any android device as they have suggested. We will focus on integrating options to view videos through the app as well. To make the users interested in the app, we will make the app more attractive and user friendly.

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