



## WEB SERVICES EXTENSION FOR ACCESSING QUIZ ON MOODLE MOBILE APPLICATION

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### ABSTRACT

Mobile applications utilizing wireless mobile technology such as smart mobile phones/smartphones and tablet-pc (ipad/android) has penetrated into various fields. Applications ranging from entertainment, business, health, life-style and do not miss in the field of education. The convergence of computing technologies, multimedia content and wireless communications (3G/4G/Wifi) has changed many lifestyles including education in the form of mobile learning applications. Moodle e-learning platform has been prepared to be used also as a mobile learning platform. In this paper, the extension of mobile Quiz access has been built that enrich existing Mobile Moodle. A web services extension has been built to facilitate the creation and execution of quiz online directly on Moodle Mobile application. A series of experiments have been conducted using android smartphone. Making Quiz could be done through mobile applications of the modified Moodle. Likewise, students can take the quiz through their mobile browser of their smartphone. With the availability of the quiz feature of Moodle mobile application, the tutors and students are easy to access online quizzes.

**Keyword:** mobile moodle, web services, android, quiz, M-Learning.

### INTRODUCTION

The widespread use of hand-held devices (smart phones, tablets, etc.) in addition to the large deployment of wireless and mobile technologies providing internet access, It Has been a promising solution to increase students access to the mobile LMS (Learning Management System). Students and Tutors can access the LMS from their mobile devices "anywhere and everywhere".

Moodle is an open source LMS. It has been used in many types of learning environments such as education [1], training and development, and business settings [2]. In education it is used as a e-learning platform providing the interaction and collaboration between students and tutors. Moodle includes varieties of tools such as: assignment submission, online quiz, grading, forums, file sharing, instant messaging, Wiki, etc[3].

The official Moodle Mobile apps was developed by Juan Leyva [4] with support from Jerome Mouneyrac, Moodle Headquarter (HQ) and others. Moodle Mobile Apps Features includes: 1) Responsive design for phone and tablets, 2) Upload a picture into your private file area, 3) Record an audio file and upload it into your private file area, 4) Send a private message to a course participant (can be done offline), 5) Take a personal note about a course participant (can be done offline), 6) Add a course participant to your phone contact, 7) Call a course participant touching the phone number, 8) Locate a course participant address on Google map, 9) Download and view some resources, 10) Quick access to course contents.

Although these many features provided by the mobile moodle apps could attract and increase student access to moodle LMS, the application still do not completely provide direct access of Quiz through the application. The quiz still could not be accessed directly from the apps, rather it will be directed to launch mobile web browser to access quiz. It seems that the kind of

access is not user friendly. The quiz access is not fully integrated yet in the moodle mobile apps. Quiz access feature plays an important role in the learning process. Therefore, the quiz should be easily accessible by students. Similarly, the quiz-making by the tutor should be easily accessible via mobile devices. When it is needed, tutors can add a collection of questions, make and launch a quiz through their mobile applications.

In this paper, we developed an extension of web services and do some modification of the moodle mobile apps providing direct access to the quiz. The organization of the rest of the paper is as follows. Section 2 reviews moodle mobile technology and some of the necessary supporting technologies, followed by the web services design and implementation. The paper will end up with a conclusions.

### MOODLE MOBILE LEARNING

Moodle-based Electronic Learning has been widely used to provide student collaboration and access to learning materials via the web. With the presence of mobile technology, moodle e-learning is shifted into mobile learning (m-learning) in a form of mobile apps called Moodle Mobile [5]. Moodle Mobile (MM) is the official mobile app for Moodle. MM is an HTML5 app that uses common web technologies. The MM apps basically are a Web Services client that uses REST as protocol to obtain and send information to Moodle site(s).

The MM layout is created using HTML5 and CSS3. The MM interaction with the phone and packaging is done using Phonegap platform. For calling the Web Services, manipulating the DOM and interacting with Phonegap, it use jQuery as its Javascript framework [4].

Moodle Mobile uses Phonegap for accessing hardware/software features like Camera, Audio/video recorder, access to the file system, etc. Phonegap is loaded

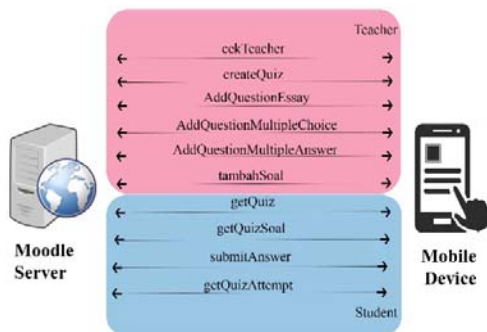


in the index page of the apps. The main library of the app is using JQuery libs which are loaded in the index page. MM uses standard Moodle Web Services for getting and sending information to Moodle site. It uses AJAX (jQuery) and REST + JSON technologies [4].

### QUIZ WEB SERVICES DEVELOPMENT

The existing Moodle Web Services Architecture provides only basic services such as course enrolment, group and user management, access to activity modules, etc [6]. Yet it does not provide services to access additional Moodle features such as quiz modules or other plugins.

Our project is to design an extension of the Moodle Web Services that provides access to the quiz features for mobile applications. The Features include the making of quizzes and composing or adding quiz questions by the teacher. In term of students, we need to provide a feature to see available quizzes as well as choosing and taking the quiz. Students complete to work the quiz and send the results to the Moodle site. He/she must also be able to see his/her result. Figure-1 illustrates the design of quiz extension web services that the author created.



**Figure-1.** Web services architecture.

CekTeacher Web service will be used to check whether the user's status as a student or teacher. Parameter passed to the web server is courseID and token of the user who logged in on the mobile device. If the user is a teacher, so he has an access to create a quiz and compose questions. Service createQuiz will be used to create a quiz conducted by the user as a teacher via mobile devices. The parameter sent by a mobile device is: courseID, tokens, sectionNo, name, and description. While the Service to make an essay questions is AddQuestionEssay. If teacher want to add some question, it available the service of AddQuestionMultipleChoice (multiple choises

with single answer) or AddQuestionMultipleAnswer. The Service of tambahSoal is used to add a question that has been made into the database. The parameters that are sent include courseID, tokens, and ContentID.

Meanwhile on the side of student, there are severnal services has been created. The Service of getQuiz quiz is used to retrieve quiz information in the database requested by the application on the mobile device. The parameters that are sent include courseID, tokens, and ContentID and it return values to obtain quizId, name, intro, teacher, and attempts. The Service of getQuizSoal will be used to retrieve questions to be work out. Whike the service of submitAnswer is used to store the answers that have been done by student to the database. After the submission, the system on Moodle server will perform the calculation to grade the quiz submission. We also provide the service of getQuizAttempt that will be used to obtain detailed quiz attempt made by the user.

The web services that already existing in Moodle are also be used such as core\_course\_get\_content, etc. These services have parameters of courseId and wstoken. The return value of the services is the contents, which is owned by the class content that has been created. Services token is used to log in to the system, and the parameters involved are the username, password, and service, the return value is a token of a given user. The complete list of the web services we designed is depicted on Table-1.

### RESULTS AND DISCUSSIONS

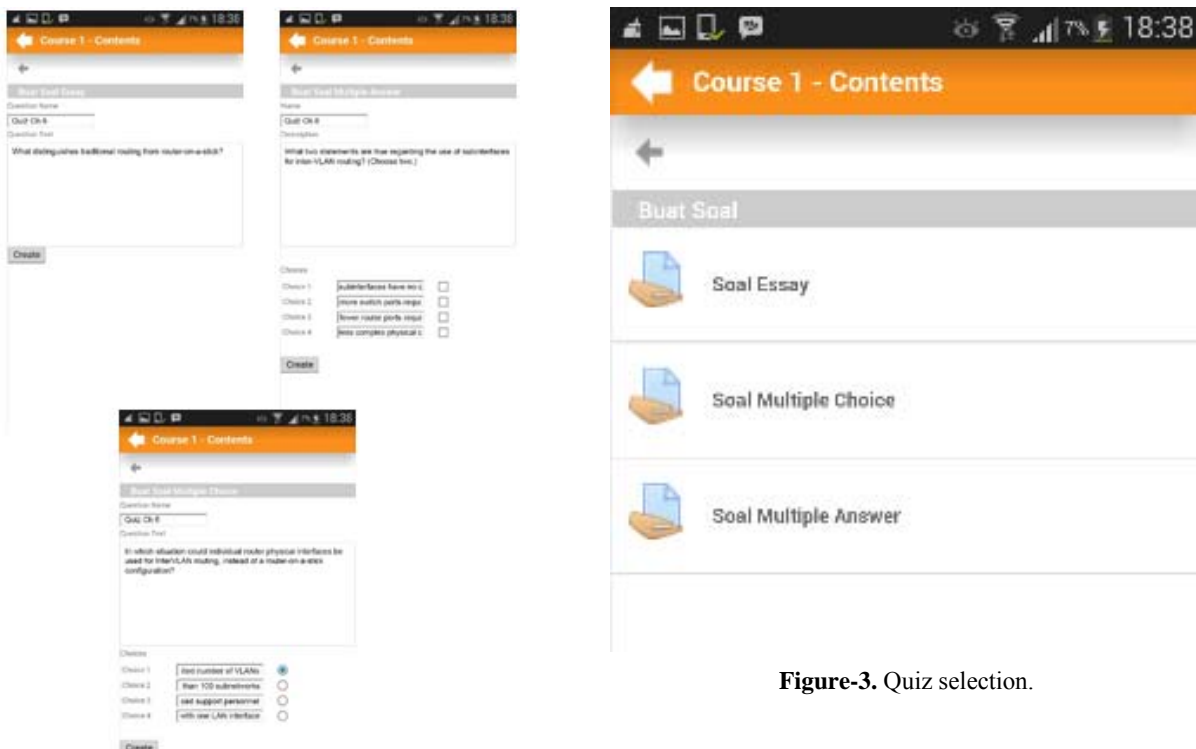
The web services that we designed, then it has been implemented in the form of PHP programming code. The program code is placed on the Moodle web server in addition to the existing web services. We tested the services by doing a simple modification to the mobile moodle apps. We provide additional forms for creating quizzes and quiz-taking for testing purposes. We made a quiz associated with the subject of Computer Networks (Figure-2). We also created and published quizzes for students. Through the mobile application, students can select (Figure-3) and take a quiz as displayed in Figure-4. Quiz feature testing was carried out using various types of android smartphones. The test results showed that the making of the quiz and the addition of text-based questions by the tutor can be carried out smoothly. Likewise students also can take a quiz as well.

There is still an obstacle, such as pictorial questions still can not be accessed by students through their mobile applications. We still have not found the location of the picture's folder on Moodle server so that the image could not be displayed.



**Table-1.** List of Quiz extension Web services.

Web Services	Input	Output	Description
cekTeacher	courseId,token	teacher	check <i>users</i> status
createQuiz	courseId, token, name, dan description	status succes	Create a Quiz
AddQuestionEssay	courseId, token, name, dan questiontext	status succes	Create a Question Essay
AddQuestionMultipleChoice	courseId, token, name, questiontext, choice1, choice2, choice3, choice4, dan answer	status succes	Create a Question Multiple Choice
AddQuestionMultipleAnswer	courseId, token, nname, questiontext, choice1, choice2, choice3, choice 4, answer1, answer2, answer3, dan answer4	status succes	Create a Question Multiple Answer
tambahSoal	courseId, token, dan contentId	status succes	Add Question to Quiz
getQuiz	courseId, token, dan contentId	quizId, name, intro, teacher, dan attempts	get data Quiz
getQuizSoal	courseId, token, contentId	quizId, name, soal, teacher, dan attempts	Taking the Question that exist in the Quiz
submitAnswer	courseId, token, dan contentId	status succes	Send the answer has been answered
getQuizAttempt	courseId, token, contentId, dan attemptId	quizId, name, intro, soal, user, dan teacher	Submitting the status of the user is working on Quiz



**Figure-2.** Composing questions.

**Figure-3.** Quiz selection.

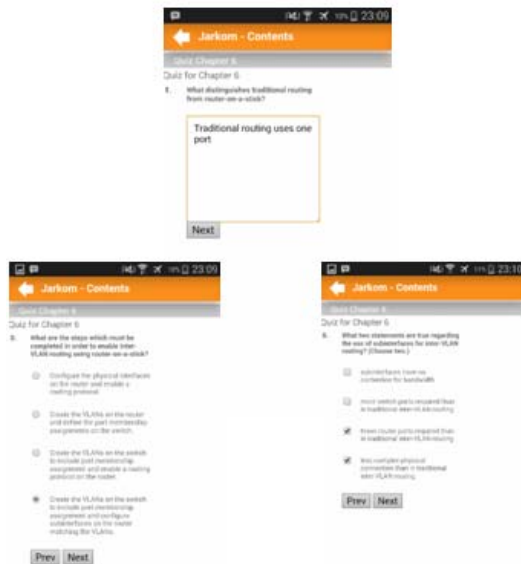


Figure-4. Quiz taking.

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## CONCLUSIONS

The extension of web services for quiz access on moodle mobile apps has been developed. The application can retrieve quiz smoothly. Quiz Making has been done through the mobile applications. Likewise, students can take the quiz through their mobile devices. With the availability of the quiz feature of Moodle Mobile application, the tutors and students are easy to access online quizzes. It will enrich the existing Moodle Mobile apps.

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