ANDROID PLATFORM OVERVIEW: M-LEARNING APPLICATION FOR COLLEGE EDUCATION

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ABSTRACT
On average, students of the Yogyakarta Nahdlatul Ulama University (UNU Yogyakarta) have difficulty accessing course materials and self-assessments from e-learning platforms without the internet. The author uses a qualitative method by using observation to get direct information about access to course material from the e-learning platform. The mobile learning (m-learning) application prototype was developed through the android platform using the Java programming language. As a result, the use of m-learning can be one of the best modules of mixed learning techniques. The author recommends that UNU Yogyakarta integrate it with their e-learning platform. This m-learning application intends to complement the e-learning system and make students whenever and wherever they want to gain knowledge without the internet via an android phone. Future researchers can connect the m-learning application and other aspects of the e-learning platform..

1. Introduction

The use of computerized technology for learning has been observed in various ways. In the last few decades, electronic learning or e-learning has been adopted and used by public schools and students in most countries. They are familiar with e-learning terminology and technology, but in recent years, rapid advances in mobile technology have created a new field, known as mobile learning technology.

Mobile learning (m-learning) is a learning model that adopts the development of mobile technology and mobile devices which are used as learning media [1]. Using Web services for mobile learning applications assists the development process by providing a standard way of communication between the client and the mobile server.

The aim of this article is to integrate mobile phones into computerized education that can provide students with more benefits than any other teaching technique. In this article the approach involves the Java platform and the android smartphone as a device. Application related software tools such as Android Studio IDE and Core Java.

The proposed project of the mobile learning application for the android platform was developed for the Yogyakarta Nahdlatul Ulama University (UNU Yogyakarta) as a case study to be used in the Computer Engineering Study Program. This application is a multiple choice quiz style and touch based application that asks students questions that are relevant to their module or course. The app also has self-assessment tutorials and exercises as well as practical exercises. Modules are categorized by unit. There are several different questions that can be asked from the tutorial. Quiz questions are prepared based on the tutorials given in the application. During the quiz game, students will be asked what their answer is, whether it is right or wrong. If the answer is wrong, the application immediately displays the correct answer along with the wrong answer for student correction. After the student completes the quiz, the individual score is displayed on the student's cell phone automatically. If the student reaches the best score from the previous score then the score will be updated with the new best score because this is only their learning application to do self-assessment. This application can be used completely offline, meaning that there is no need for the internet to use this mobile learning application.

2. Literature Review

Globally, more than 5.19 billion people now use mobile phones, with the number of users increasing by 124 million (2.4 percent) over the past year [2], Mobile technology is changing the way we live and is starting to change the way we learn. Mobile learning (m-learning) is defined as: the intersection of mobile computing and e-learning: accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment [3]. M-learning involves the use of mobile technology, either alone or in combination with other information and communication technology (ICT), to enable learning anytime and anywhere [4]. Learning can be done in a number of ways, for example people can use cell phones to access educational resources, connect with other people, or create content, both inside and outside the classroom. M-learning also includes efforts to support broad educational goals such as effective school system administration and better communication between schools and families [5]. Mobile is the main platform for innovation in Indonesia.

The number of smartphone users in Indonesia is estimated to reach 81.87 million users in 2020. Currently, Indonesia is the fourth largest smartphone market in the world after China, India and the United States [6]. Mobile subscriptions will continue to grow strongly in the period 2020-2025 after slowing down in 2018. The penetration rate of mobile subscriptions fell in 2018, after the government implemented new requirements for SIM registration in May 2018. The publisher expects growth to continue and increase again over the forecast period 2020- 2025 [7]. The Indonesian education system has moved towards student-centered education supported by technology integration. The use of technology enables better teaching. Better learning by way of students using digital, rich multimedia, and interactive lessons that enable independent and collaborative learning. In recent years, Indonesia has stepped up online learning to provide cost-effective, accessible and up-to-date education for all ages and social backgrounds, regardless of time and geography. Since the system began in Indonesian universities, 1,247,116 students graduated in 2018 [8].

Today, computerized devices are ubiquitous on college campuses from notebook computers to cordless phones. Computerized equipment and the rapidly increasing capabilities of the internet have changed the nature of higher education [9]. Before the emergence of android, contacting lecturers via text messaging applications was taboo and was considered an impolite attitude. In the era after the emergence of android, contacting lecturers via text message applications in academic matters is considered a normal thing to do [10]. Android is an operating system for cellular phones based on Linux. Android is software for mobile devices that includes an operating system, middleware and key applications [11]. The Android system provides an open platform that can be used by developers to improve the quality of their products so that applications built can be of higher quality. Computer Assisted Learning (CAL) has also grown rapidly in recent decades with the use of the internet, email, multimedia technology, and smart tutoring systems on campus. The CAL application is able to motivate students to study Banks and Non-Bank Financial Institutions (BLKBB) [12].

3. Method

This article was created with the following steps:
- a. Conduct literature study to study and understand mobile learning applications that have been researched by other researchers.
- b. Explore and analyze the e-learning platform of the Yogyakarta Nahdlatul Ulama University (UNU Yogyakarta) as a case study in this article. The analysis was carried out to find out how the tutorial and self-assessment are currently being carried out.
- c. Summarize the results of implementation by performing a stage conversion to summarize the purpose of the article and answer the problem.

4. Results and Discussion

This article aims to give an overview of the m-learning application on the Android platform.
a. What is the overview of the m-learning application?
b. What technology is used?
c. How is the system design at UNU Yogyakarta?.

4.1 Overview of M-Learning Applications

Mobile learning (m-learning) applications can only be installed on android platform phones. This application consists of real-time e-learning which provides a reliable m-learning application. This application is used offline. This means that there is no need for internet connectivity to use this application. Basically, this app consists of three sections first has tutorial section where learning content is placed and in second part is available chat rooms for users [13]. If a user has a question it will be activated in the chat room. Users on the other hand will provide solutions at user requests so that this application is a real-time application and provides free e-learning[14]. Applications developed to reduce some of the shortcomings of the existing system [15]. This app is basically based on an android smart phone.

The m-learning application can make it easier for students and lecturers to access the m-learning system anytime anywhere, delivery of announcements and lecture activities such as assignments, and delivery of material and quizzes can be accessed in real-time through the menus contained in the android m-learning application [16]. This application covers a wider range of sections and provides a reliable and convenient way of m-learning.
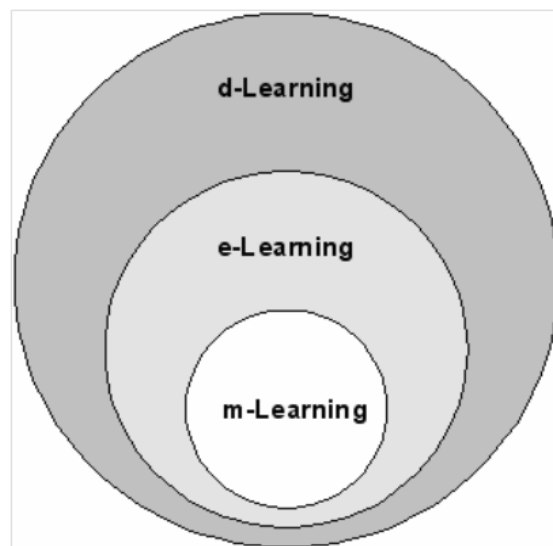
Fig. 1: Schematic Of M-learning Form

Figure 1, it can be seen clearly that the main difference between e-learning and m-learning is in the way of presentation rather than content, apart from the performance side which is not much different, which requires network connectivity to access material and process data [17].

4.2. Technology Used

In this mobile learning (m-learning) application, the following technologies are used.

4.2.1 Android Studio IDE

Android Studio Integrated Development Environment (IDE), which also includes the Android Software Development Kit (SDK). The Android Studio IDE includes Windows tools, code editors, designer tools, cloud-based file storage, and an Integrated Firebase-Real-time Database. Apart from that, the Android Studio IDE also covers Google Play-specific topics such as implementing maps using the Google Maps Android API, in-app billing, and submitting apps to the Google Play Developer Console. Android Studio advanced features such as Gradle build configuration and build variant implementation to target multiple types of android devices from a single project codebase [18].

4.2.2 Java

Java is an object-oriented and multithreaded programming language developed by Sun Microsystems in 1991. Java is designed to be small, simple and portable across multiple platforms and operating systems. Java's popularity is due to its unique technology designed around three main elements, namely the use of applets, robust programming language constructs, and a significant set of object classes. When a Java program is compiled, the three main elements are translated into machine or processor code - a specific instruction from the processor. In the Java development environment there are two parts, namely the Java Compiler and the Java Interpreter [19]. The compiler generates byte code or a set of instructions that resembles machine code but is not specific to any processor instead of machine code and the interpreter executes Java programs [17]. In this article, Java is used to perform server-side or back-end operations.

4.2.3 eXtensible Markup Language (XML)

XML is a buzzword that will be seen everywhere on the internet, but it is also a fast-growing technology with powerful real-world applications, especially for data management, display and organization. According to W3Schools: XML (eXtensible Markup Language) is a markup language such as Hypertext Markup Language (HTML) which is designed to store and deliver data [20]. In this article, XML is used to design the user interface.

4.2.4 Shared Preferences

Shared preferences is the simplest data saving option available on android which stores data in key value pairs. Data is stored in XML files in the data / data / <package-name> / shared-prefs folder. Any primitive data: Boolean, float, int, long, and String can be stored. This data will persist in the entire user session even if the application is shut down. In this article, shared preferences are used to store the user's highest score [21].

4.2.5 Firebase

Firebase can power backend applications including data storage, user authentication, static hosting, and more. Focus on creating great user experiences, building native web and mobile applications across platforms with the Android SDK, iOS and JavaScript. Firebase can be connected to an existing backend using server-side libraries or the Representational State Transfer Application Programming Interface (REST API) [22] [23].

4.2.5.1 Firebase Features

a. Real-time Database - Firebase supports JavaScript Object Notation (JSON) data and all users connected to it receive an immediate update after each change.

b. Authentication - Can use anonymous, password or different social authentication.

c. Hosting - Applications can be deployed via a secure connection to Firebase servers.

4.2.5.2 Advantages of Firebase

a. Simple and user friendly. No need for complicated configuration.

b. Real-time data; any changes will automatically update the connected clients.

c. Firebase offers a simple control dashboard.

d. A number of useful services to choose from.

4.2.5.3 Firebase Limits

a. Firebase's free plan is limited to 50 Connections and 100MB of storage.

In this article, Firebase Real-time Database has been used to implement real-time chat rooms.

4.3 System Design

4.3.1 Running System

Currently, there are various methods that have been applied for the purpose of student learning at the University Nahdlatul Ulama Yogyakarta (UNU Yogyakarta). In addition to the way of learning in which students generally sit in class and study or look for books to read, e-learning has also been included to support this way of learning. In some cases, the two systems work together and provide a service to the user. But due to some problems, both systems lost popularity. In the case of a learning system where in general, students will only study if there is a lecturer but cannot do additional studies because the material is only available in class. In e-learning, the drawbacks arise when students cannot do extra practice, self-assessment such as quizzes or research without being connected to the internet.

4.3.2 Proposed System

The m-learning application consists of the real-time m-learning concept that provides a reliable m-learning application. If you are offline, students can also learn from this application. This application basically consists of four parts, the first has a tutorial section where the learning material is placed, namely in the second part there are practices or exercises for users, in the third part there are quizzes and the fourth part chat rooms have been integrated. If there is a question that appears to the user then he will delete it in the lecturer chat room. Lecturers on the other hand will provide solutions to user requests so that this application is a real-time application and provides free m-learning. The proposed system is being implemented through a conversion stage.

5. Conclusion

Mobile application development is a difficult task. In this article, the main steps in developing a mobile learning (m-learning) application for Android are presented. This app is not yet available on the Google Play Store for download. Evaluation of the prototype will be carried out to assess the efficiency and effectiveness of learning from this system. The system will continue to evolve and future work will include improving the system content by adding more modules, real-time class assessment quizzes, chat forums and more interactive learning options for the system. Continuous refinement of the system to suit student needs and further experiments will be carried out for a longer period of time.

The mobile learning (m-learning) application can be useful for students of the Yogyakarta Nahdlatul Ulama University (UNU Yogyakarta) to study subjects at their own pace anywhere and anytime without having to have internet on their android smartphone. It is recommended to UNU Yogyakarta to try to implement it.

Acknowledgement

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