MOBILE LEARNING BASED-ON GUIDED INQUIRY: OPTIMIZATION OF STUDENTS' MOTIVATION

I Made Agus Wirawan[1], I Made Gede Sunarya[2], I Gusti Nyoman Tri Jayendra[3], and Aan Yudianto[4]

[123]Universitas Pendidikan Ganesha, Bali, Indonesia; [4]Politecnico Torino, Italy
E-mail: imade.aguswirawan@undiksha.ac.id

ABSTRACT

The learning media must be able to guide the students in every stage of learning to improve the students' activity in learning. Based on this problem, this study aims to: (1) design and implement the application of Mobile-Based Learning Based Learning for Computer Assembly Learning in Class X TKJ SMK N 2 Seririt. (2) determine the students' motivation to Mobile Learning Based Guided Inquiry Application for Computer Assembly Lesson in Class X TKJ SMK N 2 Seririt. The method used in this study was the Waterfall model. Subjects in this study were the students of class X TKJ SMK N 2 Seririt. The results of this study are applications that use the Java programming language with the editor of Android Studio. All the features contained in this educational media work well. Students' motivation using Mobile Based Guided Inquiry for Computer Assembly Lesson in Class X TKJ SMK N 2 Seririt is in a very good category.

Keywords: android, guided inquiry, students' motivation

INTRODUCTION

An effective learning process is the ability to produce expected changes to students' abilities and perceptions. Effective learning process depends on the selection and the use of learning methods in accordance with the purpose of teaching and learning process [1]. In the learning activities, there is a learning process that is basically a communication process. In the process of communication, the teacher acts as a communicator in charge of conveying the message of education (message) to the recipient of the message that is the learner. In order to educational messages submitted by teachers can be well received by the learners, then in the process of communication media required learning. The role of the media as in conveying messages from the sender to the recipient of the message is significant in stimulating the mind, feelings, and attention of students to achieve the goal of education [2].

One of the most widely used smartphone devices is android. Android is the most widely used smartphone in the manufacture of mobile media or mobile education media and refers to the e-learning system [3]. Characteristics of Android as a mobile learning tool has a high degree of flexibility and portability that allows students to access materials, directions and information related to learning anytime and anywhere [4]–[8]. Besides it can be accessed anytime and anywhere, the learning media that should also be able to guide learners in the learning process [9]–[12]. The learning model that guides the learners is a guided inquiry model.

The use of learning media can improve students' learning activities. SMKN 2 Seririt is located in Banjarasem village, Seririt District, Buleleng Regency, Bali, Indonesia. This is a private vocational school that has an ICT study program. Based on observations made at SMK Seririt 2 especially in computer assembly lessons, students still have obstacles in the learning process. This is due to the limited facilities that support the learning process, such as learning modules or learning resources in the form of books that students can use to understand the concepts of computer assembly lessons. Therefore, in the teaching and learning process, learning media that can help students is very necessary for learning at schools or outside

school hours. Based on exposure of the problem, researchers want to develop a mobile learning based-on guided inquiry model for the computer assembly in the class X TKJ SMKN 2 Seririt.

Inquiry means a series of learning activities that maximally engage all students' ability to search and investigate in a systematic, critical, logical, analytical way so that they can formulate their findings with confidence. Inquiry learning is oriented towards, maximum student involvement in the learning process, maximization of activities in the learning process, developing students' self-belief about what is found in the inquiry process [13], [14].

There are five steps taken in implementing inquiry learning, namely (1) formulate the problem to be solved by the student, (2) establish a temporary answer or better known as the hypothesis, (3) seek information, data, and facts needed to answer the hypothesis or problem, (4) draw conclusions or generalizations, and (5) apply the conclusions. The inquiry approach is divided into three types based on the amount of teacher intervention on the students or the amount of guidance given by the teacher to the students. The three types of inquiry approaches are as follows. The guided inquiry learning model is student-centered learning.

The inquiry model is a model that prepares learners in situations to conduct their experiments extensively to see what's going on, wants to do something, ask questions, and look for answers themselves. In this guided inquiry model, the students are more active in the learning process which has been conditioned to apply the thinking in their effort to explore the concepts to take the initiative in solving the problem, making decisions, and practicing the students' thinking in the learning problem. Guided inquiry learning model is a learning process based on discovery and searches through the systematic thinking process, where the teacher leads the students with the right stages [15], [16].

The learning process today is more varied. Many learning models and tools can be used. One of them is the use of learning media as a tool and guided inquiry model in the delivery of learning materials. Implementation of inquiry on learning media trains students to acquire and obtain information by solving problems of questions or problem formulations using the ability of critical and logical thinking. Implementation of a guided inquiry model in instructional media has seen in the way of delivery of learning materials.

In contrast to the learning media that usually directly display all the learning materials at the beginning, this guided inquiry-based learning media begins with only one material that can be accessed by students. For the access to the next material, students must successfully answer the questions given at each end of the material. This is to arouse students' curiosity and provide opportunities and direct students to find the problems themselves faced through the material provided in the learning media. With the presentation of the material mentioned above are expected students will be aroused to think in determining the answer to the question. By finding the answers themselves, students will more easily remember and understand the material contained in the media learning.

The steps of applying guided inquiry in the learning media are as follows (1) students open the first material available in the learning media, (2) students learn about the material in the first chapter, (3) after the students have finished learning and already understood the material learned, students do the quiz to measure their understanding of the material, and (4) after the students do the quiz the system will check the score of the student, if the student score exceeds the Minimum Completion Criteria also known as *Kriteria Ketuntasan Minimal* (KKM) then the student is considered already understand on the first material, and the system will open the second material [10]. However, if the student scores are

still below the KKM, then the system will direct the students to re-learning by display a notification message. The process is repeated until the students understand the material being studied and scored above the KKM.

Mobile learning is one of the interactive educational media that is currently developing. Learning will be more interesting if packaged through media that utilize technologies such as smartphones that can be used as a means of implementation of m-learning. In the learning activities, there is a learning process that is basically a communication process. In the process of communication, the teacher acts as a communicator in charge of delivering messages of education (message) to the recipient of the message (communication), i.e., children. In order to educational messages submitted by the teacher can be well received by the students, and then in the process of educational communication, it is required media education/learning.

The learning process contains five communication components, teachers (communicators), learning materials, educational media, students (communicant), and learning objectives. The media are the various types of components in the student environment that can stimulate them to learn. Educational media is a non-personal (non-human) means used or provided by faculty who play an important role in teaching and learning, to achieve instructional goals. The characteristics of this mobile learning device have a high degree of flexibility and portability that allows students to access materials, direction, and information related to learning anytime and anywhere. This will increase students' attention to learning materials [8]

METHOD

The development phase of this teaching module used the waterfall model. This model is the most widely used model by software developers. This model suggests a systematic and sequential approach in software

development that starts at the system level and moves forward starting from the stage of analysis, design, coding, testing, operation, and maintenance. As the name implies waterfall (waterfall), the stages in this model are arranged in stages, each stage in this model is done sequentially, one before the other (see arrow sign). Development of teaching module with waterfall model can be seen in Figure 1.
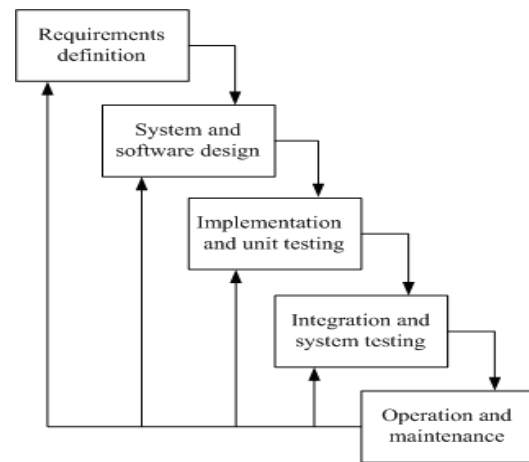

Figure 1. Waterfall Model Design

The general system architecture can be seen in Figure 2. The user (Mobile Device) accesses the server to download the new database, the result of the admin database update, then the admin (website) access the database to manage mobile learning data.
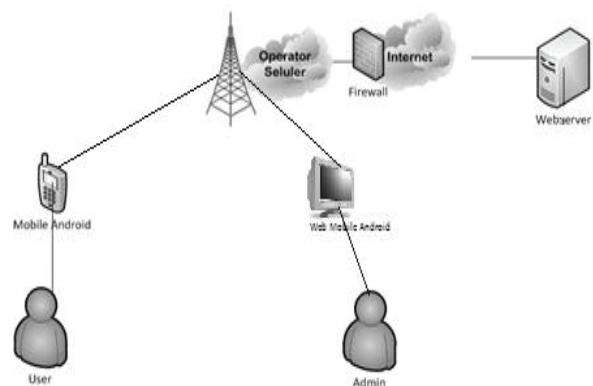

Figure 2. Design of Software Architecture (Client Server)

RESULTS AND DISCUSSION

Implementation of the application interface is done in accordance with the design

of the interface that has been made and in accordance with the stage of guided inquiry model. This system consists of 2 sub-systems, (1) mobile-based subsystem and (2) web-based subsystem. Mobile-based subsystem was developed using android language, while web-based subsystem using the PHP language. The database used is MySQL.

Mobile-based subsystems are used by students in the learning process. It consists of the following app menu views: (1) The Login menu, (2) content list, (3) Detail Content and (4) Problem Evaluation. Before the learning, students do the login process. If they do not have an account, the students can do the registration process first, implementation of Interface List of Matter.

After the login process is successful, the mobile application will display the material in each chapter. The chapter that students can access is the most basic chapter while other chapters cannot be accessed (locked). The details of the form will present the material from one of the selected sub-materials. The material presented consists of text, images, and video. After the students have finished studying and already understood the material learned, the students perform a quiz to measure their understanding of the material. The exercise consists of several randomized questions. The score will appear when the question is answered. Teachers use a web-based subsystem in managing learning materials. Here are some app menu views. It consists of the following app menu views: (1) The Login menu, (2) Content Management, and (3) Question Management

The Login interface consists of views for admin to input username and password. The content Management Interface is used by teachers to manage material data. There are options for adding, modifying, and deleting material. Question Management Interface is used to manage question data. There are options to add, change, and delete practice questions.

To measuring the validation and verification of a system, testing needs to be done. The testing is conducted with white box testing, black box testing, media expert testing, expert testing of content and user response testing. White box testing was performed by system developers, and black box testing was done by developers and system users (students and teachers) while two experts do the expert testing.

To test the response done to the students is done by 20 students of the X class of Engineering and Vocational Department at SMK N 2 Seririt who follow Computer assembling learning. The dispatching questionnaire consisted of 10 statements. The questionnaire given has a maximum score of 5 and a minimum score of 1. The way the calculation is the number of values obtained will be divided by the highest amount of weight multiplied by the number of items. After calculating the questionnaire given by the media expert and the user response, the assessment criteria of the value obtained can be described as shown in Table 1.

Table 1. Rate Achievement Conversion with a Likert Scale

Achievement Level (%)	Qualification
90 to 100	Very good
80 to 89	Good
65 to 79	Enough
55 to 64	Less
0 to 54	Very less

The percentage of the user response test result is 90.2%, mean test result of audience response in range very good. Based on that percentage, it can be concluded that Mobile Based Inquiry Learning Applied for Computer Assembly in Class X TKJ SMK N 2 Seririt succeeded. The results of this study indicate that mobile learning based on guided inquiry is effective in learning. It is easy to use, and it can increase student interest in learning.

The results are in line with the theory delivered by Yuniati & Lukita [8], where the characteristics of mobile learning devices have a high degree of flexibility and portability that allows students to access materials, direction and information related to learning anytime and anywhere. This will increase students' attention

to the subject matter thus the students' response to the application is very good.

Based on the results of student responses, the use of this application can encourage students to systematically learn because it is guided by guided inquiry features that are implemented in this application. This statement is in accordance with Sena [10], Djatmiko & Pradoto [11], and Munir [12] who mention that guided inquiry learning model is a learning process based on discovery and search through the systematic thinking process, where the teacher leads the students with the correct stages.

Based on the results of the students' responses, several things need to be studied further. It is related to feature improvements, especially the image display feature in order to zoom in. Besides, it needs to be studied further whether it has a positive impact on learning outcomes.

CONCLUSION

In conclusion, the Mobile Based Instructional Based Learning App Development for Computer Assembly Lesson in Class X TKJ SMK N 2 Seririt has been successfully developed. Students' motivation using applications on computer assembly lessons are in a very good category. In order to the presentation features of the material can be refined. It is expected that further research can conduct experimental research related to the use of this media.

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