The Making of Mobile Learning as Learning Media Using MIT App Inventor 2 in Alternative Energy Course

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Abstract—This research aims at producing mobile learning for a student that uses smartphone-based Android as a learning media application in Alternative Energy course. The learning media is served through Android application in smartphone/tablet. The method for this research is Research and Development (R/D). The stages of this research are started with the making of learning media application using MIT Inventor 2 open-source web for Alternative Energy course that provides lesson material along with exercises in the application, next stage is application feasibility test. The indicators for evaluating the learning media are; (1) Material, (2) the quality of the design, and (3) language. This application is tested by media expert, lecturer, and college students. The result is the average percentage is 82.3% of evaluation scale so this learning media is categorized as very good. From the result, it is concluded that learning media which takes mobile application using MIT Inventor 2 and Android for the basis is very suitable for learning media of alternative energy course.

Index Terms—learning media, mobile learning, MIT App Inventor 2, alternative energy course

I. INTRODUCTION

Alternative energy course is an important course in electrical engineering study program, because of that, the learning process in this course becomes very important. The learning process in this course should be arranged as interesting as possible for igniting student’s seriousness in the learning process.

One of the things that play an important role in learning process is the learning media. The learning media must be arranged appropriately along with student’s needs and also follows the newest technology update. Based on the need analysis which is conducted in electrical engineering education department of Universitas Negeri Jakarta, 75% students feel the learning media which is used in alternative energy course, still cannot raise motivation for study further, so it needs a new variation for producing more leverage from the result of study.

According to the survey that is conducted to student from Electrical Engineering Education Study Program in Universitas Negeri Jakarta, shows 95% of students have smartphone with android as the basis, so it is needed to be developed learning media as android for the base or it is called mobile learning for this course.

The school sees the use of ICT as important in enhancing its potential to deliver optimal educational outcomes [1].

Based on the preface, this research purpose is to make learning media that follows newest technology update is mobile learning with android as the basis in this course which is using open-source web application MIT Inventor 2 which is provided by using smartphone/tablet, for motivating students to increase their willing for studying, so the increase of the study result can be reached.

II. THEORETICAL FRAMEWORK

A. Media

Media is originated from Latin language and plural form from “Medium” that means “mediator” that a mediator between a message source (a source) with a message receiver (a receiver), said Heinich, and friends [2].

B. Learning Media

According to Briggs (1977) learning media is a physical medium for delivering the lesson material such as: book, film, video, etc [3]. Next, according to National Education Association (1969) reveals the learning media is a communication medium in printed or hearing form, with hardware technology is also included [4]. Brown (1973) reveals learning media that is used in learning process can affect learning effectiveness.

C. Mobile Learning

Mobile learning is defined by Clark Quinn (2000) 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. E-Learning independent of location in time or space. Mobile learning or m-learning is often defined as e-
learning through mobile computation device [5]. Ally defines mobile learning as delivered learning in computation device so it can be accessed from anywhere and anytime [6].

D. MIT App Inventor 2

App Inventor for Android is an open-source web application originally provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT) [7]. MIT App Inventor is an innovative beginner’s introduction to programming and app creation that transforms the complex language of text-based coding into visual, drag-and-drop building blocks [8].

III. METHODOLOGY

The purpose from this research is to make mobile learning as learning media with android for the basis that shows variation of lesson material in alternative energy course.

A. Participants

A total of 15 participants were involved in this study; 1 expert media, 1 lecturer and 13 students.

B. Study Place

The place for the research is in Electrical Engineering Study Program, Engineering Faculty, Universitas Negeri Jakarta. The date for the research is in even semester 2016/2017 period.

C. Method

Method that is used for this research is Research and Development (R&D).

D. Research Design

Figure 1. Design flow chart of research.

To This research is divided into 3 steps (see Figure 1), there are planning, production, and evaluation:

1) Planning

The research begins with problem analysis to know what purposes of this research, also preparing learning material

2) Production

The production is making learning media with android as the base using MIT Inventor 2 open-source web application

3) Evaluation

The writer distributes questionnaires which are consisted of some questions that relate to the learning media. The questionnaires are given to media expert, lecturer, and students that take alternative energy course. The purpose from these questionnaires is to get an evaluation from media expert, lecturer, and students, which are in the final step this application, will be used for gaining evaluation scale of agreement and disagreement toward the questionnaires.

For media that is already built can reach the maximize result, it needs evaluation steps that are consisted of:

a) Validation, Media that is already made, needed to be shown first to lecturer and media expert, they will give a feedback toward the media, is it already decent to be tested or it still needs revision

b) Revision, the media perfection based on feedback and suggestion in validation stage for media can be developed into optimal result [9].

c) Field Test, is a media test stage to student that takes this course, is filled with opinion questionnaires toward the media that is already made, these questionnaires are also given to lecturer and media expert for giving an opinion toward final revision of the media. The result from opinion questionnaires will be calculated into a percentage.

IV. RESULT

The process is consisted many stages, such as:

A. The Selection of Lesson Material

Material is made based of the core from alternative energy course

1) Competency standard

It explains about alternative energy that is known in Indonesia such as solar energy, water energy, geothermal energy and air energy.

a. Competency Basis:

➢ It explains about the definition of solar energy, water energy, geothermal energy and air energy
➢ It can explain about energy transformation into electrical
➢ It can solve exercises about alternative energy
B. The Making of Learning Media

1) Dashboard
Dashboard is a page to manage the application, this is an open-source web application by visiting http://ai2.appinventor.mit.edu. The dashboard is divided into two parts, that is designer and block.
- Designer, control page that will appear in real application if it has been installed in smartphone (see Fig. 2)

![Figure 2. Designer](image1)

- Blocks, a control page to manage the instructions of application (see Fig. 3)

![Figure 3. Blocks](image2)

2) Main screen

The main screen is the second appearance when the application is opened (see Fig. 4). In this screen, it consists of many menus like solar energy, water energy, geothermal energy and air energy.

3) Material screen
Inside of material button, there are many lesson materials such as solar energy, water energy, geothermal energy and air energy material. (see Fig. 5)

![Figure 5. Material preview screen](image3)

4) Exercises screen
In this screen, there is an exercise button that will bring the user to quiz screen. (see Fig. 6)

![Figure 6. Exercises preview screen](image4)
C. The Application Feasibility Test

This application will be tested by expert media, lecturer which is the head of electrical engineering study program, and also students who take this course. This feasibility test is conducted to know the quality level and the media itself.

D. Validation (validity) by Learning Media Expert

This application is tested by 1 person that is learning media expert. Learning media expert questionnaire is consisted of 10 questions regarding design aspect from the media. Evaluation scale from 1-5 with range like:

1 = Very Disagree
2 = Disagree
3 = doubt
4 = Agree
5 = Very Agree

With using score interpretation from 0%-100% with range like:

0%-20% = Very bad
21%-40% = Not Good
41%-60% = Enough
61%-80% = Good
81%-100% = Very Good

This application is suitable for alternative course learning media. It interpreted this application has a very good score, and it shows the final result from students is 81.1%, so it can be concluded that evaluation from material expert is 80%, program study lecturer is 85.8%, and evaluation from students is 81.1%. From these three evaluations, it reaches average 82.3%, so this learning media is very good for the conclusion and can be used in alternative energy course learning process.

From Table II above, it shows final result 85.8 %, which means the learning media is very good to be used by students for helping alternative energy course study process.

F. Validation Test (validity) by Students

This test is conducted by Electrical Engineering students that take alternative energy course in this semester 2016/2017 term and the total of the students who take this test is 13 students.

TABLE III. QUESTIONNAIRES RESULT OF STUDENTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicators</th>
<th>Percentage</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Media Technical</td>
<td>81.3%</td>
<td>Very Good</td>
</tr>
<tr>
<td>2</td>
<td>Material</td>
<td>82.1%</td>
<td>Very Good</td>
</tr>
<tr>
<td>3</td>
<td>Language in Media</td>
<td>80%</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Overall Average</td>
<td>81.1%</td>
<td>Very Good</td>
</tr>
</tbody>
</table>

According from the result in the Table III above, it shows the final result from students is 81.1%, so it can be interpreted this application has a very good score, and it is suitable for alternative course learning media.

V. CONCLUSION

Based on the result from the research, mobile learning as learning media with android for the basis with using App Inventor 2 it can be concluded that evaluation from material expert is 80%, program study lecturer is 85.8%, and evaluation from students is 81.1%. From these three evaluations, it reaches average 82.3%, so this learning media is very good for the conclusion and can be used in alternative energy course learning process.

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