ATLANTIS PRESS

Advances in Intelligent Systems Research (AISR), volume 144

2017 International Conference on Education and Technology (2017 ICEduTech)

Mobile Media Development Based Learning to Improve Student Learning Asynchronous Multimedia Content in Vocational High School

[1]Andika Bagus Nur Rahma Putra, [1]Achmad Mursyidun Nidhom, [2]Kirya Mateeke Moses

[1]Faculty of Engineering, State University of Malang, Indonesia

[2]College of Business and Management Sciences, Makerere University, Kampala, Uganda

andika.bagus.ft@um.ac.id, nidhom.ft@um.ac.id, kiryamosesm@gmail.com

***Abstract*—currently, the utilization of mobile phone technology is increasingly affordable by the community with various types of technology. Today, the development of mobile phone technology is still not maximized utilization in the process of spreading. Multimedia lesson is one of the main subjects that deal directly with the development of mobile phone technology. Limited teaching materials for subjects Introduction Multimedia becomes one of the obstacles for students in the learning process. This study aims to make learning media more user-friendly, flexible and easy to use for learning outside the classroom (Asynchronous). The research method used is the method Research & Development (R & D) uses a development model that is reduced to 3-D. The development of this medium used JQuery Mobile framework that enables this teaching medium to run on various mobile devices. Research shows that: 1) mobile-based multimedia learning media proven to improve students' asynchronous learning in vocational high schools; 2) there are significant differences in learning outcomes between students using mobile-based multimedia learning media with students who do not use mobile-based multimedia learning media, and 3) mobile-based learning media proved to improve student learning outcomes.**

Keywords—mobile media; multimedia introduction; mobile app.; framework JQuery Mobile

I. INTRODUCTION

The use of media in the learning process is one of the efforts to create a more meaningful and quality learning. The use of media in the learning process aims for the learning process can take place appropriately and efficient so that the quality of education can be improved [1]. In the last few decades, mobile device ownership has been increasing. This is due to the increasingly affordable price of these devices by the public. Utilization of mobile phone technology has been not only focused as a means of communication, or entertainment but has been used as a medium of learning [2]. Everything that can be used to stimulate the thoughts, feelings, attention, and skills or skills of students to encourage the learning process. Communication will not work without the aid of messengers or media. Benefits of learning media in the learning process of students are: (1) learning will attract more students so apart grow motivation to learn [3]; (2) learning materials will be more clear meaning and more readily understood by students to enable them to master and achieve learning objectives [2]; (3) teaching methods will be more varied, not merely verbal communication through the words by the teacher, so that students are not bored and the teacher does not run out of energy, mainly when the teacher teaches at every hour of study [4]; and (4)students can do more learning activities (independent) because not only listen to the teacher's description, but also other activities such as observing and performing or demonstrating [5].

Mobile app systems are interpreted with applications that can be used even if the user moves quickly from one place to another without breaking or disconnecting communication [6]. Evident from several studies that utilize mobile phone technology as a medium of learning. However, the utilization of the mobile application is still far from expectations [7]. Also, mobile phone technology is also used in education, such as research Android Application Development As Media Learning Mathematics In Material Dimensions Three For High School Grade X. Therefore, this research is devoted to developing media teaching Introduction Multimedia class XI-based mobile applications. Mobile applications have not been maximally utilized by the community. In fact, the function of the mobile application that is an application, application, and usage.

Directly, the mobile app has enough ready-made programs designed to perform a function for other users or applications and can be used by the intended destination whereas mobile can be interpreted as moving from one place to another. Then a mobile app can be defined as an application program that can be run or used even though the user moves from one place to another and has a small size [4]. This mobile app can be accessed via wireless devices, pagers, PDAs, cell phones, smartphones, and similar devices. jQuery Mobile is an HTML5 based user interface system designed to make websites and apps accessible to all smartphone, tablet and desktop devices. By using jQuery Mobile, it can develop various mobile solutions that work well in various mobile software. Examples of jQuery Mobile supported software include Android, Blackberry, Fennec (Mozilla), WebOS from HP (Palm), iOS (iPhone, iPad, iPod Touch), as well as Opera

[9]. jQuery Mobile is built using the highly popular HTML5, CSS3, and jQuery JavaScript libraries.

The multimedia introductory course is one of the new subjects that appears in the 2013 revision curriculum of 2016. This Multimedia Introduction contains a collection from subjects included in other C3, such as KD 3.1 in this multimedia introduction (Understanding the basics of graphic) is a KD taken from Graphic Design subjects in the 2013 curriculum before the revision. Based on these reasons it is known that textbooks from Introduction to Multimedia are quite difficult to find because the material used is taken from several different sources. In its development, this textbook is developed with mobile-based applications that are expected to simplify the deployment and use further. The purpose of this study is to support the learning process and provide teaching medium Introduction Multimedia class XI by the structure of the latest curriculum (Curriculum 2013 revision 2016) which can be used as a reference in learning. Furthermore, it is hoped with the existence of this mobile application-based teaching media can increase students' learning interest and become interactive teaching media. Also, with a user-friendly design is expected to facilitate students in its use further.

II. METHOD

This type of research is research development (Research and Development). The design of development of teaching media based on the mobile application in this research using 4-D development model developed by Thiagarajan, Semmel, and Semmel adopted by Ibrahim that is 4-D model (Four D Models) which is reduced to 3-D. The development of this model consists of four stages, namely Define, Design, Development. The application product developed is a Multimedia Classroom Introduction to Mobile Class XI. This teaching medium can run on a variety of user tools, such as desktop computers, notebooks, tablets, or smartphones. However, the primary target of this product is mobile devices such as smartphones and tablets. This teaching medium is devoted to students of SMK multimedia class XI that require teaching materials Introduction Multimedia. However, it is possible that this teaching medium is also needed in the vocational school other than multimedia, teachers, institutions and also the wider community as a reference in learning Introduction Multimedia.

At the stage of analysis and design has been done identification needs and product design. The next stage is an implementation that aims to translate the results of analysis and design to an application. The design will be good if the design accommodates or contains all the requirements described in the analysis phase. A form of interface display design from media teaching Introduction Mobile-based multimedia for class XI can be seen in Fig. 1.

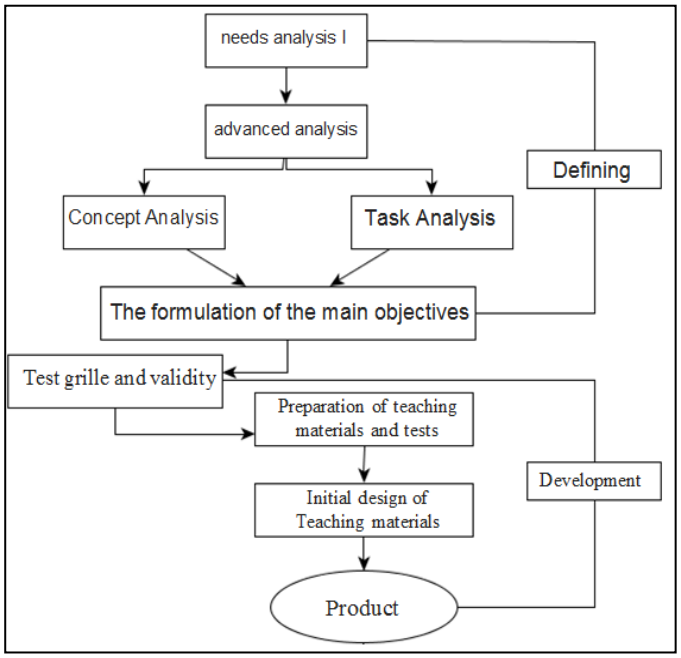

Fig. 1. Research Scheme

The subjects of this research are students of Informatics Engineering Education and Informatics Engineering students of Malang State University. The data collection instruments that were conducted in this study included validation sheet and questionnaire. The data already obtained were analyzed and presented in the form of graphs and tables of criteria scores, percentages, and average scores. The questionnaire used to know the response or responses of students of Informatics Engineering and Information Engineering students of State University of Malang as many as 20 students. This instrument is a list of questions in writing that must be answered by the respondent. The technique of collecting data in this research is done by using questionnaire method. Questionnaires or questionnaires used in this study is a type of questionnaire or direct questionnaire that is closed because the respondent only left to sign on one of the answers that are considered correct. Furthermore, the effectiveness tested product. Samples were taken with non-random sampling technique. The sample was set consisting of 2 classes, namely 1 control class as many as 29 students and 1 experimental class as many as 29 students.

III. RESULTS

At the stage of analysis and design has been done identification needs and product design. The next stage is an implementation that aims to translate the results of analysis and design to an application. The design will be good if the design accommodates or contains all the requirements described in the analysis phase. A form of interface display design from media teaching Introduction Mobile-based multimedia for class XI is as follows:

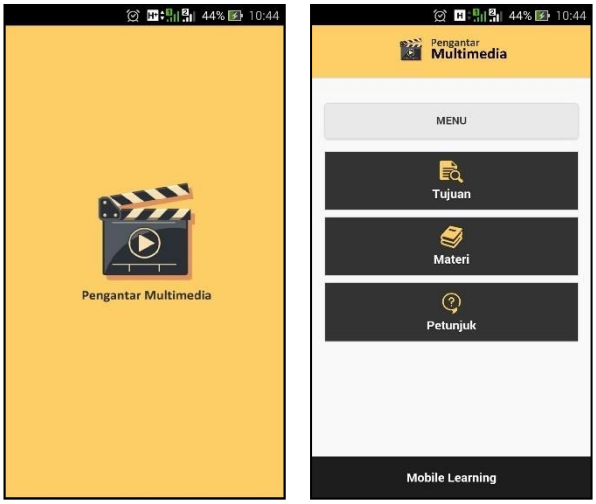

Fig. 2. Splash screen Display and Main Menu

Fig. 2 shows the start page of the teaching medium. This view contains menu options that can be done in the use of this media.

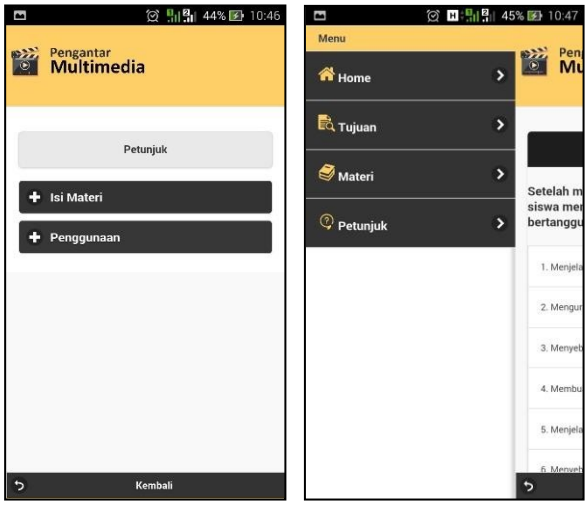

Fig. 3. Display of the usage instructions and Menu view on the panel

The appearance of the user manual contains an explanation of how to use the app and the features contained within the app. While the menu on the panel is used to facilitate access to other pages, Fig. 3.

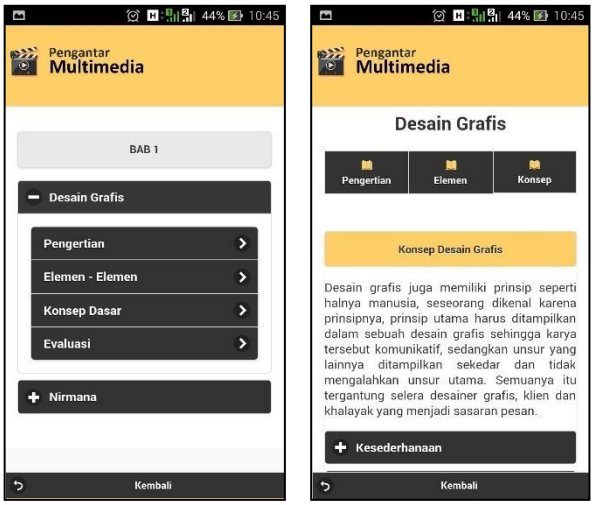

Fig. 4. Display of Material List and Material Display

The material list view contains the subject matter and submission of the Multimedia Introduction material. While the display material is the view of the selected material. Material translation is made each KD, so it is easier to learn, Fig. 4.

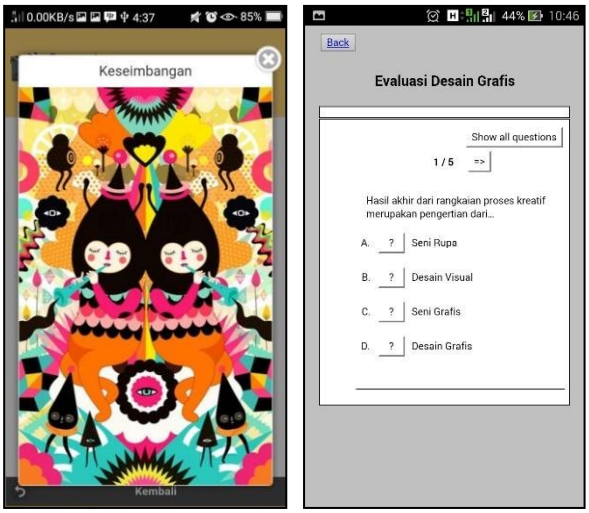

Fig. 5. Image View when zoomed and Display Evaluation

Fig. 5, display images when zooming shows images contained in the media teaching can be clarified by enlarging the image. Whereas, the evaluation view contains multiple choice questions about the material that has been displayed. This evaluation is made for each topic, so the questions provided are more specific. While the display of these instructions contains instructions for the use of this application. In this guide, there is an explanation with the picture so that it is easier to understand. The development of this teaching medium emphasizes the interface design with a simple impression user-friendly. Also, the page view is also made as simple as possible because it is expected that users more easily in use, Table I.

TABLE I. T-TEST FOR EQUALITY OF MEANS

t-test for Equality of Means				
t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
2.666	56	0,00	5.244	1.966
2.666	53.46	0,00	5.244	1.966

In the final ability test results obtained final ability score that is after receiving treatment by using mobile-based learning media. This final capability test data serves as a step to determine the hypothesis test by the data to be analyzed. In the above results indicate that the significance is worth 0.00 and it can be concluded that there is a significant difference between the test results of the initial capability of the experimental class and the control class.

IV. DISCUSSION

After the finished teaching media product is made, the product is tested to 20 samples of students of PTI and TI in Universitas Negeri Malang. This test aims to obtain feasibility information rather than product design, the effects of instructional strategies and communication in teaching media that have been produced. The data obtained in the test can be illustrated in the following diagram, Fig. 6.

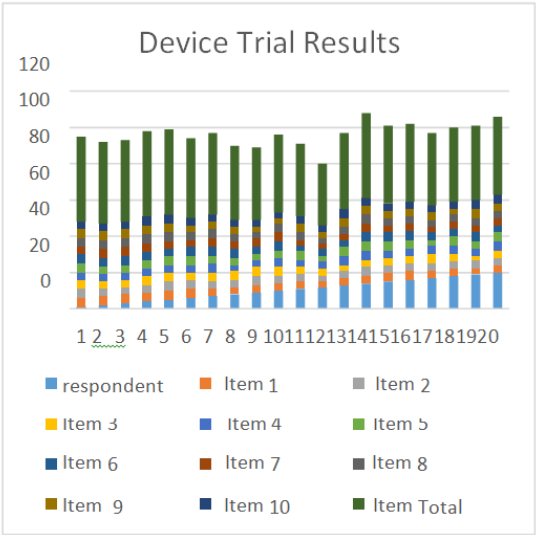

Fig. 6. Device Trial Results

Table II, the average score obtained is 4, 29 or equal 85, 9%. Based on criteria on a Likert scale this average score can be categorized well, so it can be said that this Multimedia Introduction medium is worth to use. With details that of the three aspects that are questioned to the students to find out their response, it turns out this media is already worthy of use. Seen from the table that the effect of learning strategies, 85% of respondents stated that this teaching medium is efficiently used in learning activities. Then regarding communication aspects such as ease of use, got an average score of about 88%. As for the media design based on the results of the assessment of student responses obtained 84% score.

Learning media that has been by the needs of students can improve student learning motivation. Increased student motivation will directly impact on learning patterns and student's thinking patterns [1]. Also, the mobile learning media seem exciting and foster the spirit of students in increasing the intensity of learning [3]. Students will feel happy and easy to understand a material if the material is presented with impressive. Therefore, the use of mobile-based learning media plays an active role in encouraging students to study hard and understand a material [4].

In another study also revealed that in the present era, all student learning facilities and infrastructure already includes online media [2]. Online-based learning media, such as mobile-based, increase students' speed in analyzing a problem. On the other hand, students will feel the ease whenever they want to learn and understand the material. Learning media is a major component to stimulate brain reactions to be able to perform the process of revitalization of knowledge [1].

TABLE II. VALUE OF RESPONDENTS QUESTIONNAIRE

No	Aspect	Total Items	Average Score	Percentage
1	Effect strategy learning	3	4,3	85,3 %
2	Communication	3	4,4	88 %
3	Design Technical	4	4,2	84 %
Total		10	4,29	85,9 %

Based on data from Table II it is known that the medium of the introduction of multimedia-based mobile is considered valid and feasible to be used and applied in schools with a validation value of 85.9%. This value has excellent criteria, so it is possible to continue.

In the calculation of data through the t-test, the results of the difference values are significant in the control class and the experimental class. In the experimental class, the average grade of experimental grade end ability is 82.30. While the average in the control class of 74.66. The results of these values indicate that the result of the effectiveness test of H_0 is rejected. So it can be concluded that there is a significant difference between experimental and control class end-ability. From the above description, it can be understood that the learning outcomes of ex-ministry students using different car-based learning media are significant with control classes that do not use mobile-based learning media.

V. CONCLUSION

Research shows that: 1) mobile-based multimedia learning media proven to improve students' asynchronous learning in vocational high schools; 2) there are significant differences in learning outcomes between students using mobile-based multimedia learning media with students who do not use mobile-based multimedia learning media; and 3) mobile-based learning media proved to improve student learning outcomes.

REFERENCES

[1] [A. B. N. R. Putra, W. Irdianto, A. Mukhadis, and S. Suhartadi, "Pocket Book Learning: Learning Methods to Train Students Productive and Creative Using 'BRANO' as an Effective Learning Recorder," in *Proceedings of the International Mechanical Engineering and Engineering Education Conferences (IMEEEC-2016)*, 2016, vol. 30034, p. 30034.

[2] A. B. N. R. Putra, A. Mukhadis, and S. Suhartadi, "Miskonsepsi Transmisi Mobil dan Pemecahannya Menggunakan Pembelajaran Peta Pikiran pada Kompetensi Memelihara Transmisi Mobil Siswa SMK," *Teknol. dan Kejuru.*, vol. 38, no. 2, pp. 133–146, 2016.

[3] H. MayTruong, "Integrating learning styles and adaptive e-learning system: Current developments, problems and opportunities," *Elsevier Comput. Hum. Behav.*, vol. 55, no. B, pp. 1185–1193, 2016.

[4] V. Arkorful and N. Abaidoo, "The role of e-learning, advantages and disadvantages of its adoption in higher education," *Int. J. Instr. Technol. Distance Learn.*, vol. 12, no. 1, pp. 29–42, 2015.

[5] A. Mukhadis and U. Nurul, "Prototipe Pembelajaran Terintegrasi Model Shared Berbasis Gallery Project," *J. Pendidik. DAN PEMBELAJARAN*, vol. 21, no. 2, pp. 132–145, 2014.

[6] S. Mohammadyari and H. Singh, "Understanding the effect of e-learning on individual performance: The role of digital literacy," *Elsevier Comput. Educ.*, vol. 82, pp. 11–25, 2015.

[7] M. G. Violante and E. Vezzetti, "Virtual interactive e-learning application: An evaluation of the student satisfaction," *Comput. Appl. Eng. Educ.*, vol. 23, no. 1, pp. 72–91, 2015.