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Development of Interactively Mobile Interactive Learning Based Database with Product Development Using Framework7 for Vocational High School Students

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***Abstract*—Learning media is one component of learning that has an important role in the learning process. Good learning media can improve student's learning motivation. One of the good learning media is interactive learning media. Learning media makes students more active in the learning process because it not only presents the material but also provides feedback to students. This study aims to develop interactive learning media based mobile database and measure the level of effectiveness of the use of interactive learning media based on the mobile data base. This research uses the research method with ADDIE model which includes five stages: analysis, design, development or production, implementation or delivery, and evaluation. This study shows that: 1) interactive learning media based mobile database using framework7 feasible and has been by the standards. The material contained in it is the concept of a database, database structure, DDL, DML, DCL, and basic SQL; and 2) interactive learning media based mobile database using framework7 proved effective in improving student's learning outcomes in vocational high schools.**

Keywords—interactive learning media; database mobile; ADDIE model

I. INTRODUCTION

The database is one of compulsory subjects in SMK majoring in Software Engineering (RPL). Learning on these subjects includes theory and practice. Before doing the lab, students are required to understand the method first, so it takes a learning medium that can help students in understanding the material. Learning media is an intermediary used to convey learning messages to students. In the learning process, teaching media is one component of learning that has an important role. Media has a vital role in bridging the delivery of material in the learning process [1]. The use of good learning media can foster student learning motivation, can accelerate and improve the process and student learning outcomes [2]. A good learning media is a media that can provide feedback to students; one example is interactive learning media. Interactive learning media does not make student's passive listeners but makes students willing to learn independently, provide an active response, and participate in giving feedback in the learning process that took place.

Interactive learning media has been widely developed in previous studies, among them is research entitled Development of Interactive Media of Simple Arithmetic Learning for Elementary School Children. The study produced a learning media product that has an extension .swf. To be able to open the learning media, the user must install Adobe Flash Player software first. The use of learning media is still less practical and flexible because it requires other software to open, and limited to specific devices only [1]. The next research is the research entitled Interactive Media Design Procedures for Prayer for Early Childhood. The study produced a product packaged in a CD that can only be operated on a computer/laptop. The use of learning media is still less practical and flexible because it can only be used on specific devices only (computer/laptop). Besides the learning media in the form of CD has now been abandoned by the community because of the rapid development of digital technology.

Based on the above description, then came an idea to develop an interactive mobile database-based learning media. The form of this learning media in the form of an application that can be installed on various mobile devices and can be accessed anywhere and anytime [3]. The advantages of this learning media are interactive, practical, and flexible. Interactive is meant to be able to provide feedback to the user, while practical that can be accessed without using other software to open it, and flexible that can be opened on various mobile devices such as mobile phones and tablets. Currently, the use of interactive learning media is still far from perfect. In fact, the medium of learning allows the interaction between media and users who can build two-way communication. Interactive learning media that should be able to provide options that can optimize the desire of more users than other media, it becomes an obstacle to users who are less able to keep up with the world of technology. Also, there is still less synergy absorption of multimedia components such as text, images, sound, video, and animation due to lack of knowledge in utilizing the media [4]. Some systems are very relevant and

useful in developing applications, one of which is framework 7. Framework 7 which is a free and open source HTML mobile framework used to build Android & iOS mobile apps and web apps. Framework 7 presents User Interface (UI) that looks native like some other HTML frameworks such as React Native, Ionic, Famous, Native Script, and others.

II. METHOD

The research model used is the ADDIE model developed by Dick and Carry (1996). Stages of activity of the model include analysis, design, development or production, implementation or delivery, and evaluation of the product.

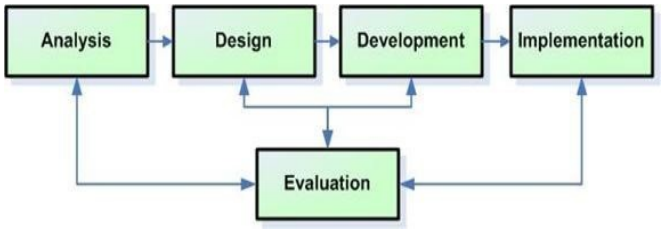

Fig. 1. ADDIE Development Model

Activities undertaken in the analysis phase include defining the product based on the background and the formulation of the existing problem. The results of this stage are used to design the interactive Database learning media product, which is then realized in the product development stage using framework7. Products that have passed the development stage continue to the next step of the implementation phase. At the product implementation stage applied to the end user (user). As for the evaluation phase can be done on the sidelines of each step or after the implementation phase. Instruments used in this research is a questionnaire or questionnaire instrument. This instrument is a list of questions in writing that must be answered or filled by the respondent.

Data collection techniques used in this study is to use a questionnaire method. Questionnaire or questionnaire is a data collection technique that is done by giving a set of questions or written statement to the respondent to be answered. The questionnaire or questionnaire used is a type of questionnaire or a final direct questionnaire in which the respondent only left a mark on one of the correct answers. This questionnaire uses the Likert model interval scale with values 1-4. The Likert model interval scale with a value of 4 (scale 4) represents a statement strongly agree, excellent, very feasible, very interesting, and very appropriate. Scale 3 represents a statement agree, good, feasible, attractive, easy, appropriate, and appropriate. Scale 2 represents a statement sufficient, good enough, quite decent, interesting enough, quite appropriate, and quite appropriate. While the scale 1 represents the statement disagree, not good, not worth, not interesting, not appropriate, and not appropriate. Data analysis techniques used in analyzing quantitative data in the form of assessment questionnaire scores for media experts and students is to calculate the percentage of answers with descriptive analysis formula. The sampling technique was done by using the non-random sampling technique. The selected samples consist of 2 groups/classes, and 1 class/control group of 29 students and one experimental class/group of 29 students.

III. RESULTS

The result of this development is an Interactive Database learning media that is packaged in the form of mobile applications and is intended for students of Vocational High School (SMK) majoring in Software Engineering (RPL). The material contained in it is the concept of a database, database structure, DDL, DML, DCL, and basic SQL. The design process of interactive learning media has gone through the stages based on the ADDIE development model. Stages that have been passed include the stages of analysis, design, development or production, implementation or delivery, and evaluation. Here is a display of interactive learning media products that have been successfully developed.

Fig. 2. The initial app view (Home)

On this page there are 5 options menu: (1) Media Instructions Menu, used to display media usage instructions, (2) Apperception Menu Material, used to show video about introduction of database, (3) Learning menu 1, used to show material about the database concept, (4) Learning Menu 2, used to show content about the database structure, and (5) Learning Menu 3, used to show content about SQL commands group. Also, in the top left corner, there is also a button which is used to show the navigation bar.

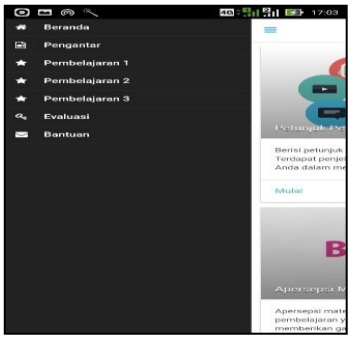

Fig. 3. Navigation Bar

Figure 3 is the view of the navigation bar (*navbar*), the *navbar* contains several menus used to go to specific pages

such as home page, introduction, material (learning 1, learning 2, and learning 3), evaluation, and assistance.

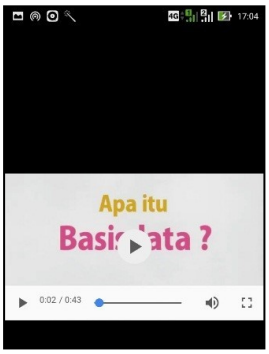

Fig. 4. Introduction page

Figure 4 is the view of the Introduction Page. The page contains a video about the introduction of the database the introductory page; we present a video explaining the concept of a relevant and complex database.The database which is a collection of data located in the information system presented clearly and directed.

Fig. 5. Material Pages

Figure 5 is the view of the material pages. The page contains the learning objectives to be achieved and the learning materials. Learning materials are displayed, presented attractively by using pictures and using words that are easily understood by the reader.

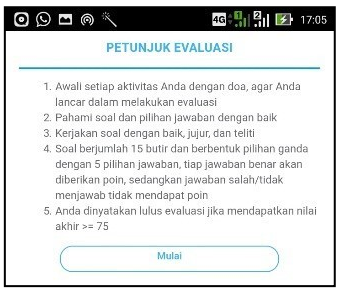

Fig. 6. Evaluation Guide Page

Figure 6 is an Evaluation Guide page. The page contains instructions for performing the evaluation process. On that page there is a button named Start used to start the evaluation (displaying the evaluation page).

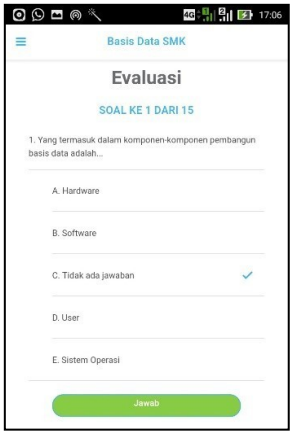

Fig. 7. Evaluation page

Figure 7 is the view of the Evaluation Page. The evaluation on this page is presented in the form of multiple choice questions consisting of 5 options. On the page there is a button named Answer used to check whether the selected answer is correct or incorrect.

Fig. 8. Evaluation Result Page

Figure 8 is the view of the evaluation result page. The page contains the correct number of answers, the number of incorrect answers, the final score and the graduation statement.

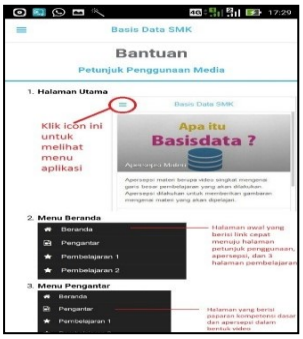

Fig. 9. Help page

Figure 9 is a view of the Help Pages. The page contains instructions for using the app. On the help page, includes information related to the application and what explains the functionality of the application. Also, on the help page menu presented information related to the usual difficulties.

TABLE I. T-TEST FOR EQUALITY OF MEANS

t-test for Equality of Means		
Sig. (2-tailed)	Mean Difference	Std. Error Difference
0,00	5.244	1.944
0,00	5.244	1.944

In Table, I, the results of the student's result are presented. In the final capability, test data is obtained from the value of the final ability. The value is a value after using interactive learning media. The final capability value test data is used to determine the hypothesis test of pre-test data to be analyzed. Summary of the above results shows that Tcount is 2.66 with sig. 0.00 and it can be concluded that there is a significant difference between the value of the initial test of the experimental class and the control class test.

IV. DISCUSSION

Interactive learning media developed is packaged in the form of mobile applications built using the framework 7. This application can run on various mobile devices such as android and ios that can be accessed wherever and whenever. The developed product is the application of interactive learning media Database. The application of interactive learning media is made using framework 7, so it can run on various mobile devices like Android, Blackberry, Fennec (Mozilla), WebOS from HP (Palm), iOS (iPhone, iPod Touch and iPad), and Opera Mobile. Interactive learning media product. This database specifically intended for students of SMK majoring in Software Engineering (RPL) class XI and class XII. But did not rule out this product is also accessed by teachers, institutions, and the wider community as a reference in learning. Ease of using the application on the learning process will be able to increase interest and motivation of students in learning. Student learning process can be directed to the material that must be mastered [2]. Each material has a different level of difficulty. It makes students must have a variety of learning media, especially online application-based learning. Interactive learning media is proven to improve student learning outcomes drastically. This is evidenced by the value of learning outcomes that change is getting better [5]. Interactive learning media can stimulate student's mindset toward comprehensive constructivism. Students can easily understand any material presented when presented with an interesting and complete.

By its purpose, the distinctive feature of this instructional media application is its emphasis on the interactive and the mobile. The content of this instructional media product using multimedia elements such as text, images, audio, and video that are expected to increase the attractiveness and motivation of students to learn. Also, this learning medium is also designed to provide feedback to the user (interactive). In this application, there is some main menu that is an introduction, material, evaluation, and assistance. The introductory menu contains videos about the introduction of the database, the material menu contains the learning objectives and learning materials, the evaluation menu contains evaluation questions, and the help menu contains instructions for using the application. These menus are the results of the analysis of the needs of students in the process of understanding a material [6]. Also, the use of interactive media-based online application proved able to revive student's interest in learning well significantly. Several studies have revealed that the brain of a person will be better able to understand a thing quickly when presented in detail and conceptualized. It became the first step in developing the mindset of students in solving the problem [1].

Based on the results of trials that have been done, obtained the results of interactive learning media applications that have been developed feasible to use. This is already in line with the initial goal of being interactive by presenting feedback to users, and can already be run on various mobile devices (Android and iOS). Also, the material presented in this learning media is also by the syllabus of Vocational School Database Subject (SMK) majoring in Software Engineering (RPL). The feasibility of a learning medium can be judged by the content and appearance presented. The content should cover all aspects of each indicator on the material [2]. It can be seen from every explanation on the material presented. In the display section, includes legibility, language customs, and the level of beauty of the design (theme). The brain will quickly respond to everything that is considered attractive and contains elements of new things [7].

The results of the calculation of data by t-test can be found that the differences are significant in the control class and the experimental class. In the experimental class/group, the average value of the ultimate experimental ability of 82,80 was obtained. While the average class of control is 76.44. The results of these values indicate that the result of the effectiveness test of H_0 is rejected. From this, it can be concluded that there is a significant difference between the experimental end-ability of the experimental class and the control. From the above explanation, it can be understood that the learning outcomes of students of excellence classes using interactive learning media differ significantly with the control class that does not use interactive learning media of online application.

V. CONCLUSION

Development of an interactive learning media Using mobile database produces a product in the form of a mobile application built using framework 7. The advantages of this product are: images and a video introduction database in it, as well as providing convenience to the user with the format of apk (application). With its apk (app) format, this product can be installed on various mobile devices like android and ios without the need for an internet connection. When this product is installed, then the user can access information (material) about the database anywhere and anytime. Also, the use of interactive learning media proven to improve student learning outcomes effectively.

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