Math Mobile Learning App As An Interactive Multimedia Learning Mathematics

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Abstract: The research aims to develop and produce interactive multimedia in a valid, practical, and effective mathematical learning. Therefore, the type of research used is development research with 4-D models that include four stages, namely Define, Design, Develop, and Disseminate. The instruments used in this study are (1) expert validation polls, (2) Student response polls, and (3) student evaluation tests. From 48 respondents who came from two schools obtained research results namely (1) material and media validation test results obtained an average score of 39 with valid categories; (2) The results of the media effectiveness test in small group trials gained a study of 100% in a very effective category, while the field trials were learned to learn by 84% with effective categories; (3) Media practicality results in small group trials were obtained an average score of 56.6 with very practical categories while large group tests gained an average score of 57.56 with very practical categories. These results show that Android-based learning media is very well developed and is in the national education application standards.

Index Terms: Math Mobile Learning, Learning Mathematics, Android,

1 INTRODUCTION

Some countries in Asia, especially Indonesia, today have the potential to be a very big force in the field of digitization [1], [2]. It is supported to progress the national application and adoption in the community and supported by the power of numbers 23.5 million households that have been connected to the ICT. The growing technology is now making learning not only fixed in the classroom, but learning can be performed whenever and wherever [3]. Nowadays, there are not very few people who already have smartphones that can also be used to learn [4]. The apps offered by Android are also available as needed.

But not all Android applications in the field of education have complete attributes, there are still some shortcomings, such as AutoMath Photo, MathWay, Math Experts, Math Helper Lite, MyScript, Math Tricks, 1300 Math Formula Mega Pack, and Much more. While the shortcomings owned by the application such as: (1) The app is still not able to read the problem handwritten and does not include theory or learning materials, (2) users are required to register and must pay if they want to look step by step in answering math problems, (3) This application is able to solve problems still limited, (4) This application is not too sophisticated to use [5], [6], [7].

Therefore, the need to develop interactive learning media that can help the learning process. Learning is a mobile learning application in the field of mathematics. The advantages of the Math Mobile Learning (MML) use that will be developed aims to facilitate students and teachers in the teaching and learning process, containing materials with engaging simulations and animations, examples of competent questions, exercises, no require a fee to acquire and operate it, and the learning process can be done anywhere and anytime. This development originated from the results of field observations in various educational institutions that (1) teachers still teach with the lecture, discussion, and assignment methods only, (2) 85% of students have an android mobile phone, then 80% do not use mobile for learning purposes, but to play. Android MML is very supportive of learning with various features that have been provided. All the features available are beneficial to help students understand the learning material, so the teacher does not need to explain repeatedly, and students can more easily understand the learning material through the media. In addition, students tend to prefer learning with the media than just with an explanation from the teacher, and students will find it more challenging to understand what is conveyed [8], [9]. The learning process using Android MML is expected to encourage students to study independently and deepen the material from anywhere and anytime. The evaluation of the learning can be done online so it does not cost such a learning system today. Not only easy for students, but also easier for the teacher to convey the material. The teacher will be returned to function as an educator who accompanies his students. Tampa must explain the material at length in front of the class [10]. Therefore, the purpose of research is to test the validity, practicality, and effectiveness of interactive multimedia learning.

2 METHODS

This research model is Research and Development (R&D). According to Sugiyono (2016) research and development is a research method used to produce a specific product, and to test the effectiveness of the product [11]. Meanwhile, according to Emzir et al (2014) Research and development is research that develops certain products to know specific needs with detailed specifications [12]. So development research is a method of producing a specific product or refining an existing product and testing the effectiveness of the product.

The types of products produced in this development are teaching materials in the form of media. The development model used in this study is 4-D (Define, Design, Develop, and Dissemination) developed by Thiagarajan, Semmel, and Semmel (1974). The final stage of the research is the dissemination of products which is one of the objectives of this research that the products produced can help students
improve their problem-solving abilities. The product trial was carried out through two stages: a small group of 5 students and a large group of 45 students. Furthermore, the data collection instruments were in the form of (1) expert team questionnaire sheets, (2) product trial questionnaire sheets, and (3) student learning outcome test sheets. Data analysis techniques were carried out to obtain quality and available learning tools that met the criteria of validity, practicality, and effectiveness.

3 RESULT

After analyzing the material, analyzing the respondents, analyzing the development objectives, and analyzing the product specifications, the initial design of the product is obtained consisting of several parts, namely:

a. The opening page, which includes welcome learning interactive media;

b. Student activities, in this student section there are learning objectives and indicators of learning outcomes;

c. Material simulation and sample problems consist of several questions related to the matter, namely geometry of triangles and rectangles;

d. The multiple-choice practice exercises are students' final exams accompanied by the final results obtained by students after students finish answering the questions.

e. Development team biography

Furthermore, expert validation stages, small group trials, and large group trials. The stages will be described as follows:

a. Expert Validation Stage

The initial design was validated first before trial by two experts, namely media experts and material experts. From the media field, validation results are obtained an average score of 35, which is a valid category. While the material field validation results are obtained an average score of 43, which is a very valid category. The improvement of media validation is in the training section by adding an image that can be used in the form of a problem story in a daily life or a realistic image, while the improvement of material validation is necessary. Added preliminary exercise questions at the end of the material.

b. Small Group Trial Stage

Before testing in the field directly, the product tested small group first by choosing five students to know the simplicity, the ministry, and the benefit of the product. From the results of this trial, the results of learning for students 100%, while the student response to the practicality of the product of 57.8, which means very practical.

c. Large Group Trial Stage

After testing a small group test, the product was successful, and the product subsequently tested its use on a large group trial. This large group trial was performed to 45 students. The procedure of implementation is as follows.

1) Explaining that the media is at the test stage and requires feedback to improve it;

2) Conduct learning by using developed media;

3) Provide evaluation test questions to test the effectiveness of product usage;

4) Share a poll and ask students to fill it out. The shared poll is to know the practicality level of the product that is being developed.

Based on the results of the evaluation, that as many as 84% of students are complete, this means that the products developed include effective categories. As for the average score of the student response poll of 57.56, which is categorized practically. The developed Math Mobile Learning (MML) meets valid, practical, and effective criteria. It proves that the importance of Android-based learning media is applied in class or outside the classroom in this technological era. Where learning methods should not be centered on teachers anymore, but students are required to be self-reliant. The teacher's job is to socialize learning media. It can also help students to more independently learn as well as to conduct repetitive experiments through the Android media. One of the positive impacts of this development is reducing the use of mobile phones for useless things [13], [14].

4 CONCLUSION

Learning using the right methods and media will produce positive impacts that are good for student learning outcomes, especially supported by the use of technology that is now increasingly developing. Teachers are required to update information and learning materials further while students are required to be independent in learning both at school and outside of school. The results showed that the average student gave a very practical response, and the students' learning completeness reached 84%, which means it was very effective. Furthermore, the team of authors giving suggestions in the future needs to consider the menus in the application should be designed as attractive as possible and also understandable to all users, as well as a wider range of material.

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REFERENCES


