DEVELOPING LEARNING MEDIA BASED ADOBE FLASH CS.3 WITH CONTEXTUAL ON POLYHEDRON SUBJECT MATTER FOR STUDENT IN CLASS VIII OF SMP/MTs

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ABSTRACT

Mathematics learning media in the learning process can help students understand mathematics, but in fact, learning media availability is still limited. This study aims to develop learning media using Adobe Flash CS.3 with a contextual approach on subject matter Polyhedron for students of SMP/MTs VIII grade that eligible to use in the mathematics learning process. This study included research and development using the ADDIE method that consists of five stages: analysis, design, development, implementation, and evaluation. Subjects were subject matter experts, media experts, and students of Muhammadiyah Junior High School (SMP Muhammadiyah) 4 Yogyakarta and State Junior High School (SMP Negeri) 1 Gamping. Data were analyzed using qualitative analysis were converted into a cumulative grade Likert scale—data collection techniques, such as interviews, questionnaires, and observations. The product media developed has been assessed and validated by three experts, math learning materials, and three math learning media experts. The results of the expert assessment of the material obtained a score of 68 on average with a very good category. The results of expert media assessment obtained an average score of 105 with a very good category. The students 'responses to the technical quality assessed in the small-scale trials obtained an average score of 47.05 with both categories. The students' response to the technical quality assessed in the classroom usage test scored an average of 50.3 with either category. When viewed from the material experts and the media experts into the category, the feasibility level of the learning media of mathematics is very good, whereas when viewed from the student response on small-scale testing and trial class usage into the category of good. So that learning media developed feasible to use in learning mathematics.

Keywords: Adobe Flash CS.3, ADDIE, Polyhedron.

INTRODUCTION

Education is one of the most important things for a nation because a nation's progress reflects the quality of education. Education's function is to increase human resources and instill good attitudes and morals towards the nation's successors. According to Law No. 2 of 1989 concerning the National Education System Article 1 paragraph 1, the meaning education is a conscious effort to prepare students through guidance, teaching and or training activities for their role in the future. Technological developments from time to time have experienced a very good increase. The increasing development of technology also affects the development of education. It appears that at this time, the learning process has used the results of technology. According to Suherman, Erman et al. (2003: 8) that learning is a process of functional communication between students and teachers and students and students in the context of changing attitudes and mindsets that will become a habit for students concerned.

The use of computers as a source of information has been widely used in several schools' learning process. The utilization of quality human resources supported by the use of leading technology can bring scientific advancement. Problems that are always faced by students today can be solved by a media that supports learning. According to Arsyad, Azhar (2014: 3), Understanding the media in the teaching and learning process tends to be interpreted as graphic, photographic, or electronic tools for capturing, processing, and rearranging visual or verbal information.

The form of learning media can be in the form of hardware (hardware) or software (software) that contains messages or information educators. At present, many schools use various kinds of

technology to increase learning effectiveness, one of which is the use of computers. However, not all schools utilize computer technology in learning mathematics. These problems arise because educators do not know the use of computers in learning. Not all educators are experts in making computer-aided learning media. Suherman, E et al. (2003: 57) argue that In mathematics learning students are accustomed to gaining an understanding through experience of the properties possessed and those not possessed from a group of objects (abstraction). By observing examples, it is expected that students can grasp the understanding of a concept. Furthermore, with abstraction, students are trained to make estimates, guesses, or tendencies based on experience or knowledge through specific examples (generalizations). To find out about mathematics learning in class VIII of Junior High School (SMP), observations and interviews were conducted in two different schools, namely SMP N 1 Gamping and SMP Muhammadiyah 4 Yogyakarta.

Based on the results of an interview with Mr. Alfandi, S.Pd., one of the mathematics teachers at SMP Muhammadiyah 4 Yogyakarta on December 14, 2016, said that although the learning process uses direct learning and LKS media on certain materials, the teacher feels students are becoming less active and still having difficulties in understanding material. So when explaining in the classroom, the teacher has difficulty with abstract material, for example, in building space. An interview was also conducted with Mr. Suharta, S. Pd., One of the mathematics teachers at SMP Negeri 1 Gamping on November 16, 2016, said that in learning, direct learning had been implemented, discussion and demonstration depend on the material to be delivered, but it is still dominant indirect learning which makes students less active in class. He also explained that learning media needs to be tried in explaining teaching materials that make students active, for example, in teaching materials to build space because of their abstract nature and difficult to understand by students. The same thing was also expressed by several students of Muhammadiyah 4 Yogyakarta Middle School by Feby that mathematics learning requires learning media that are interesting and easy to understand because mathematics is considered a difficult and abstract subject. Material that is considered difficult by students such as algebra and building space.

According to Ngalimun (2016), contextual learning is learning that begins with a presentation or oral question and answer (friendly, open, negotiating) related to the real world of student life, so that it will feel the benefits of the material presented, learning motivation emerges, the world of students' minds becomes concrete, and the atmosphere becomes conducive-comfortable and pleasant. A contextual approach is an approach that uses the contents of students' daily lives as a way to convey an understanding of the material to students in mathematics learning. Using a contextual approach, mathematics learning can be easier to understand because it uses everyday life that is often found by students as learning.

At this time, the use of technological developments that make it possible that is making useful and enjoyable learning multimedia. According to Mulyanta and Marlon (2009,1), Multimedia is a combination of computer and video so that in principle, multimedia is a combination of three basic elements, namely sound, images, and the text. One of the software used to create learning media today is Adobe Flash CS.3. Adobe Flash CS.3 software allows creating a learning medium that combines images, animation, text, video, or sound with mathematical material. Thus a mathematics learning can be exciting and easy to understand. Therefore, researchers are interested in developing a learning media based on Adobe Flash CS.3 with the title Development of Multimedia-Based Mathematics Learning Media Using Adobe Flash CS3 with a Contextual Approach on Polyhedron material for Class VIII Middle School Students. Based on the problems outlined above, the researchers wanted to find out how the development and feasibility of multimedia-based mathematics learning media using Adobe Flash CS3 with a contextual approach to the material Polyhedron for SMP / MTs class VIII students.

METHODS

This type of research used in this research is a research and development method (R & D) using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The model and design of ADDIE learning program development are based on its simplicity to quickly design and develop products (Personal, Benny, 2014: 30). The development procedure carried out in this study uses research

and development steps (Personal, Benny, 2014: 30). The steps of research and development are shown in Figure I below.

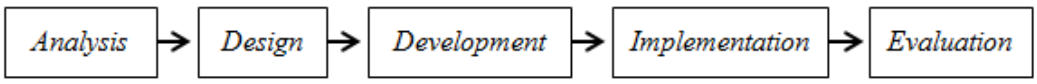

Figure I. ADDIE Model Steps

The following explains the stages of the ADDIE development model and design according to the chart above:

1. Steps to develop media
   a. Analysis
      The analysis is the first step in applying the ADDIE model to design and develop learning media. The stage in the analysis of learning media design is to analyze the needs of learning media, materials, and curriculum.
   b. Design (planning)
      The design or planning step is carried out after the researcher has conducted the initial research and information gathering. In the design step, a clarification of the learning program is designed to reach the learning objectives as expected.
   c. Development
      The development phase can involve making and modifying materials to achieve the learning objectives carried out. In addition to the process of translating the media design, validation is also carried out in the development phase by small scale test and trial experts.
   d. Implementation
      Pribadi, Benny (2014: 26-27) states that at this stage, the training program is carried out by a design that has been developed before. So at this stage, a large class trial was conducted at two schools involving one class of students. In other words, at this stage, the product is tested to determine the feasibility of the developed learning media.
   e. Evaluation
      The evaluation step is a process carried out to provide value to the developed media. The aim is to find out how the media's feasibility developed by the developed media is appropriate for use in the learning process. At this stage, the media are evaluated based on the results of the questionnaire material experts, media experts, and student responses.
2. Product Testing Steps
   a. Trial Design
      In order to get user feedback on the developed product, a product trial is conducted. In product trials in development, the research includes the following stages: (a) product validation, (b) Small Class Trials and Product Usage Trials
   b. Test Subject
      The test subjects in this learning media research are media experts, material experts, and students.
   c. Data Type
      Data obtained from each stage of development functions to provide input in revising the learning media that have been developed. The type of data in this research is qualitative data and quantitative data.
   d. Data Collection Instruments
      In this research development, data collection instruments such as interview guidelines and questionnaires were used to obtain the required data.

The data analysis technique used in this study is to analyze each item questionnaire, both material expert questionnaire, media expert, and student responses in the form of qualitative values will be converted into a quantitative value Likert scale (Riduwan and Sunarto: 2011).

Table 1. Rules for Scoring Using a Likert Scale

Information	Score
SS (Strongly Agree)	5
S (Agree)	4
C (enough)	3
TS (Disagree)	2
STS (Strongly Disagree)	1

From the data collected, we calculate the average using the formula:

$$\overline{X_i} = \frac{\sum_{i=1}^{n} X_i}{n}$$

Information:

$\overline{X_i}$: Average score

$\sum_{i=1}^{n} X_i$: Total score

n: Number of assessors

Furthermore, the data obtained from both media experts, material experts, and students are converted into qualitative values based on ideal evaluation criteria. Provisions for the ideal evaluation criteria are shown in Table 2 below:

Table 2. Criteria for Ideal Rating Categories

No	Score	Criteria
1.	$X_k > \overline{X_i} + 1{,}80SB_i$	Very good
2.	$\overline{X_i} + 0{,}60SB_i < X_k \leq \overline{X_i} + 1{,}80SB_i$	Good
3.	$\overline{X_i} - 0{,}60SB_i < X_k \leq \overline{X_i} + 0{,}60SB_i$	Enough
4.	$\overline{X_i} - 1{,}80SB_i < X_k \leq \overline{X_i} - 0{,}60SB_i$	Less
5.	$X_k \leq \overline{X_i} - 1{,}80SB_i$	Very less

(Sukarjo, 2006:53)

Information:

X_k : Actual / empirical score

$\overline{X_i}$: Ideal average

$\overline{X}_i = \frac{1}{2} \times$ (ideal maximum score + ideal minimum score)

SB_i : ideal standard deviation

$SB_i = \frac{1}{6} \times$(ideal maximum score - ideal minimum score)

RESULTS AND DISCUSSION

This research was conducted using the validation of material experts and media experts. Research in schools was carried out in small class trials with a sample of 10 students at SMP Muhammadiyah 4 Yogyakarta and SMP Negeri 1 Gamping. On September 13, 2017, the small class trial was guided directly by researchers at SMP Muhammadiyah 4 Yogyakarta and on September 7, 2017, at SMP Negeri 1 Gamping. The use of class trial was carried out on a sample of 20 students at SMP Muhammadiyah 4 Yogyakarta and 20 students at SMP Negeri 1 Gamping. The use of class trial was carried out on September 19, 2017, guided directly by researchers at SMP Muhammadiyah 4 Yogyakarta. On September 14, 2017,

the trial at SMP Negeri 1 Gamping. The results of calculating the student response questionnaire can be seen in the following table:

Table 3. The Results of Calculating Student Response to Small Class Trials

No	Activity	Mean	Quantitative Data Criteria
1.	SMP Muh 4 Yogyakarta	48,6	Good
2.	SMP Negeri 1 Gamping	45,5	Good
	Mean	47,05	Good

Table 4. Results of Calculation of Questionnaire Response of Students in Tryout Class Usage

No	Activity	Mean	Quantitative Data Criteria
1.	SMP Muh 4 Yogyakarta	50,1	Good
2.	SMP Negeri 1 Gamping	50,5	Good
	Mean	50,3	Good

The results above indicate that the students' responses to the mathematics learning media using Adobe Flash CS.3 that have been produced are included in the excellent category and suitable for learning.

The questionnaire results on the eligibility of material experts and media experts can be seen in the following table.

Table 5. Results of the Eligibility Questionnaire Calculation by Material Expert

No.	Assessment	Score	Quantitative Data Criteria
1.	Drs. H. Edi Prajitno, M. Pd.	69	Very Good
2.	Suharta, S. Pd.	77	Very Good
3.	Drs. AMK.	58	Good

Table 6. Results of Feasibility Questionnaire Calculation by Media Experts

No.	Assessment	Score	Quantitative Data Criteria
1.	Anggit Prabowo, M. Pd.	96	Good
2.	Ircham, S., ST.	100	Good
3.	Riyadi, S.Pd.	Very Good	Sangat Baik
Mean		105	Very Good

The results above show that mathematics learning media using Adobe Flash CS.3 is assessed in terms of material. The media are included in the excellent category and are suitable for use in learning. The results of the questionnaire calculations from material experts, media experts, and student responses can be seen in the following table.

Table 7. Results of Calculation of Feasibility of Learning Media Using Adobe Flash CS.3

No	Aspect	Average Score	Category
1.	Material	68	Very good
2.	Media	105	Very good
3.	Student Response Trial Small Class	47,05	Well
4.	Student Response Trial Usage Class	50,3	Well

Based on the data above, it can be concluded that the mathematics learning media using Adobe Flash CS.3 is fit to be used as a learning medium that helps students learn actively, independently, and is fun.

CONCLUSION

This research was carried out through several stages: data collection, product development, design validation, design revision, and product trials. The feasibility of mathematics learning media using Adobe Flash CS.3 on the material of Polyhedron for grade VIII SMP / MTs students which were

developed included in the feasible category based on the final calculation results obtained, namely 68 average scores from aspects of the material with excellent categories, 105 the average score of the aspects of the media with a very decent category, 47.05 the average score of the aspects of the response of students in small class trials with good categories and 50.3 average scores of aspects of the responses of students using class trials with good categories. Based on these data, it can be concluded that the mathematics learning media using Adobe Flash CS.3 is suitable for use by teachers to teach and students to learn independently in school.

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