THE DEVELOPMENT OF INTERACTIVE LEARNING MEDIA BASED ON MACROMEDIA FLASH 8 WITH CONTEXTUAL TEACHING AND LEARNING APPROACH ON PROPORTION SUBJECT

Eti Rahayuningsih[a], Suparman[b]

Program Studi Pendidikan Matematika Universitas Ahmad Dahlan

Jalan Ring Road Selatan, Tamanan, Banguntapan, Bantul Yogyakarta

[a]etira29@gmail.com, [b]suparmancict@yahoo.co.id

ABSTRACT

The use of media in learning mathematics helps students understand mathematics, but learning media is still not available. This development research aims to produce an interactive learning media mathematics with contextual teaching and learning approach in the proportion of junior high school (SMP) class VII semesters. The resulting media is tested on students' feasibility and responses based on the content and objectives, instructional quality aspects, technical quality aspects, and instructional design aspects. The ADDIE development model covers five subjects: analysis, design, development, implementation, and evaluation. The instruments used are (1) assessment questionnaire by material expert, (2) questionnaire by media expert, and (3) student assessment questionnaire. This study's subjects were students of SMP Muhammadiyah 5 Yogyakarta class VIIC and students of State Junior High School (SMP Negeri) 4 Patuk class VIIB. Learning media developed in the form of CD (Compact Disk) Interactive contains SK and KD material comparison. The material on the interactive CD comes with an exercise question and evaluation question. The media is also equipped with audio, images, and navigation quickly understood and used by students. The quality of interactive learning media is seen from material experts' assessment with an average score of 3.62 or very good. While the assessment of media experts with a score of 3.71 or in the category of Very Good. In comparison, assessing the assessment by students with an average score of 3.18 or in the category of Good. The results show that the interactive learning media of mathematics with contextual teaching and learning approach the subject of proportion SMP class VII odd semester is feasible to be used in the learning process and get a positive response from the students.

Keywords: Interactive Learning Media, Contextual Teaching and Learning Approach, Proportion.

INTRODUCTION

The teacher and the learning process are very determining factors on the learning outcomes achieved by students. A teacher should master various approaches or methods of learning and then practice them when teaching so that learning objectives can be adequately achieved. In learning mathematics, many learning approaches can be used, one of which is the contextual learning approach.

Contextual learning or Contextual Teaching and Learning (CTL) is a learning concept that helps teachers link material taught with students' real-world situations and encourage them to connect their knowledge with their application in their daily lives (Trianto, 2009: 107). To facilitate mathematics learning with a contextual learning approach, media can direct and link material with real-world situations. Interactive learning media has great potential to stimulate students to respond positively to the learning material delivered.

Media is one factor that supports the success of the learning process at school because it can help deliver information from the teacher to students or vice versa. Creative use of media can facilitate and improve learning efficiency so that learning objectives can be achieved (Arda et al .: 2015). According to Gagne in Sadiman, A et al. (2014: 6), Media are various types of components in the student environment that can stimulate them to learn. Suppose the media carries messages or information that has instructional purposes or contains teaching purposes. In that case, the media is called learning media.

The use of instructional media in the teaching and learning process can arouse new desires and interests, generate motivation and stimulation of learning activities, and even negatively influence students. The use of instructional media at the learning orientation stage will significantly assist the learning process's effectiveness and delivery of messages and content. In addition to arousing student motivation and interest, learning media can also help students improve understanding, present data, and condense information. (Hamalik, O in Arsyad, A: 2015). The development of instructional media enables creating learning multimedia that is more interactive and effective in learning. Interactive multimedia is a media equipped with a controller operated by the user to choose what they want for the next process (Daryanto: 2010). One of the software that can be used to create learning media is Macromedia Flash 8. Macromedia Flash 8 is a program aimed at designers and programmers who intend to design animations to make web pages and presentations for business purposes. The learning process to make interactive games and other more specific goals (Yudhiantoro, D: 2006).

Research and development of interactive learning media are carried out in line with technological developments. One of them is a study conducted by Andespi, Ceria (2016), using the ADDIE model (analysis, design, development, implementation, evaluation). It is known that the quality of interactive learning media is seen from the aspects of the content and purpose feasibility, instructional quality, and aspects of technical feasibility are included in either classification.

Ermitasari also conducted similar research (2016) entitled Development of Interactive multimedia-based Learning Media on Line and Corner Materials for Middle School Students with a Contextual Approach, the step of media development using the ADDIE analysis, design, development, implementation, evaluation) model is known that the quality Interactive multimedia-based learning media achieve Good quality. Student responses to the media Good, and the teacher's response Very Good. This shows that interactive multimedia-based learning media gets positive responses from teachers and students.

Researchers conducted observations in two schools, namely SMP Muhammadiyah 5 Yogyakarta and SMP Negeri 4 Patuk, especially VII Class SMP students. Based on researchers' interviews with VII grade mathematics subject teachers, the two schools use the Education Unit Level Curriculum (KTSP). Midterm and midterm tests and daily tests are still below the Minimum Completeness Criteria (MCC). MCC for mathematics lessons is 75. In addition to mathematics material that is difficult to understand, most of the mathematics material is still abstract. Sometimes, the teacher's way of presenting learning material is less attractive to students in terms of the model and the media used. The media used by the teacher are still simple, the teacher only refers to printed books, and it is not yet available learning media in the form of interactive Compact Disk (CD). Teachers still teach using the lecture method, and students tend to accept only what is conveyed by the teacher passively. There are no other innovations, such as using PowerPoint or using interactive CDs. This is considered less than optimal because it has not attracted students' attention to what is conveyed by the teacher when the learning process occurs.

Based on the description above, researchers are interested in developing interactive learning media to learn. Media developed in the form of interactive CD (Compact Disk) with a contextual learning approach to the subject of comparison. The material in this learning media is limited to comparison, including the meaning of comparison, scaled drawings, comparison of values, and values comparison. Learning media contains intro, introduction, content, and closing. It is equipped with sample questions, practice questions, and evaluation questions, along with the answer key.

Based on the background and problem constraints described above, the problem can be formulated: (1) How is interactive learning media based on Macromedia flash 8 with a contextual learning approach on the subject matter of comparison for seventh-grade junior high school? (2) What is the feasibility level of the developed mathematics learning media? (3) How do students respond to the mathematics learning media developed?

This study's objectives are: (1) To produce interactive mathematics learning media design based on Macromedia Flash 8 with a contextual learning approach on the subject matter of quality

comparison. (2) Determine the feasibility of the developed mathematics learning media. (3) Knowing students' responses to the developed mathematics learning media.

METHODS

This study uses the ADDIE system development model (Analysis, Design, Development, Implementation, and Evaluation). The product developed in this study was an interactive learning CD on the subject matter of comparison with a contextual approach for seventh-grade junior high school. The following are the stages of the media development procedure, namely:

1. Analysis. At this stage, the activities carried out are analyzing the needs of the media to be developed. Activities that can be carried out include analyzing student needs, analyzing school conditions and conditions, curriculum analysis.
2. Design. This stage is the stage for planning interactive learning media based on Macromedia Flash 8 that was developed. The results of this stage are storyboards and flowcharts. The design of this instructional media model is still conceptual and will underlie the next development process.
3. Development. At this stage, the conceptual framework is realized in a product that is ready to be implemented. Activities carried out at this stage are the creation of interactive learning media based on Macromedia Flash.
4. Implementation. Learning media that have been developed and validated are then tested on students. After being tested, students then fill out a questionnaire to determine students' quality and response to the media developed.
5. Evaluation. At this stage, an evaluation of learning media uses after testing it on the subject under study. Activities carried out are processing data obtained from product validation results by experts and field trials by students.

In this development, the test subjects are validation test subjects consisting of material experts (mathematics education lecturers and mathematics teachers), media experts (mathematics education lecturers and ICT teachers), and test subjects. The types of data in this study are of two types, namely quantitative data and qualitative data. The research instruments and data collection techniques used were questionnaire sheets. The data analysis technique used in this study is quantitative data analysis. Data obtained through a questionnaire by material experts, media experts, and students are collected, then calculate the average using the formula:

$$\bar{X} = \frac{\sum_{i=0}^{n} x}{N}$$

Information:

$\bar{X}$ = Average acquisition score

$\sum x$ = Number of scores obtained

N = Number of items

Then changed to qualitative criteria referring to the standard five-scale score guidelines (Widoyoko, Eko P. 2009: 238) as in Table 1.

Table 1. Guidelines for changing the standard score on a scale of five

Formula	Category
$X > \bar{X}_i + 1{,}8\,SB_i$	Very Good
$(\bar{X}_i + 0{,}6\,SB_i) < X \leq (\bar{X}_i + 1{,}8\,SB_i)$	Good
$(\bar{X}_i - 0{,}6\,SB_i) < X \leq (\bar{X}_i + 0{,}6\,SB_i)$	Enough
$(\bar{X}_i - 1{,}8\,SB_i) < X \leq (\bar{X}_i - 0{,}6\,SB_i)$	Less
$X \leq (\bar{X}_i - 1{,}8\,SB_i)$	Very Less

Information:

$\bar{X}$ = Average acquisition score

$\bar{x}_i$ (Mean ideal) = $\frac{1}{2}$ (ideal maximum score + ideal minimum score)

SB_i (Ideal standard deviation) $= \frac{1}{6}$ (Ideal Maximum Score - Ideal Minimum Score)

Furthermore, the conversion of actual scores into qualitative categories for intervals 1 to 4 is presented in the following Table 2.

Table 2. Conversion of average score acquisition into qualitative categories

No	Score Interval	Category
1	$\bar{X} > 3,4$	Very Good
2	$2,8 < \bar{X} \le 3,4$	Good
3	$2,2 < \bar{X} \le 2,8$	Enough
4	$1,6 < \bar{X} \le 2,2$	Less
5	$\bar{X} \le 1,6$	Very Less

Information:

Ideal maximum score = 4

Ideal minimum score = 1

$\bar{X}$ = Average acquisition score

RESULTS AND DISCUSSION

This research was conducted by validating material experts and media experts. The calculation questionnaire assessment results by material experts and media experts can be seen in the following Table 3.

Table 3. Results of evaluation by material experts

No	Aspect	Average score	Category
1	Content quality and purpose	3,67	Very Good
2	Instructional quality	3,47	Very Good
3	Technical quality	3,67	Very Good
4	Learning design	3,67	Very Good
Overall average		3,62	Very Good

The table above shows that assessing the material from all aspects, including aspects of the contents and objectives, instructional quality, technical quality, and learning design obtained an average score of 3.62. The quality of interactive learning media based on the assessment of the material experts is Very Good.

Table 4. Results of Calculation of Questionnaire for Expert Material Evaluation

No.	Assessment	Score
1.	UAD Mathematics Education Lecturer	83
2.	Mathematics Teacher at SMP Muhammadiyah 5 Yogyakarta	69
3.	Mathematics Teacher at SMP Negeri 4 Patuk	87
	Mean	3,62
	Qualitative Criteria	Very Good

Table 4 shows that the mathematics interactive learning media is assessed in terms of the material included in the criteria very well.

Table 5. Results of evaluation by media experts

No	Aspect	Average score	Category
1.	Technical quality	3,71	Very Good
	Overall average	3,71	Very Good

Table 5 shows that the media's assessment of technical quality obtained a score of 3.71. This means that the quality of interactive learning media based on media experts' assessment is Very Good.

Table 6. Results of Questionnaire Calculation for Media Expert Rating

No.	Assessment	Score
1.	UAD Mathematics Education Lecturer	119
2.	Mathematics Teacher at SMP Muhammadiyah 5 Yogyakarta	112
3.	Mathematics Teacher at SMP Negeri 4 Patuk	114
	Mean	3,71
	Qualitative Criteria	Very Good

Table 6 indicate that the mathematics interactive learning media is assessed in terms of the media's criteria.

The school trial was held at SMP Muhammadiyah 5 Yogyakarta on Monday, June 12, 2017, at 4-5 hours. The trial's subject was 25 students in class VII C. While the trial at SMP Negeri 4 Patuk was held on Tuesday, June 13, 2017, at 5-6 hours. The subject of the trial was 22 students in class VII B. The results of calculating student response questionnaires can be seen in the following table:

Table 7. Evaluation Results of SMP Muhammadiyah 5 Yogyakarta Students

No	Aspect	Average score	Category
1	Quality of content and purpose	3,21	Good
2	Instructional quality	3,12	Good
3	Technical quality	3,24	Good
4	Learning design	3,18	Good
	Overall average	3,20	Good

Table 7 shows the average score of all aspects is 3.20 or included in the Good category. This shows that interactive learning media received positive responses from students of SMP Muhammadiyah 5 Yogyakarta.

Table 8. Evaluation Results of Students of SMP Negeri 4 Patuk

No	Aspect	Average score	Category
1	Quality of content and purpose	3,16	Good
2	Instructional quality	3,18	Good
3	Technical quality	3,43	Good
4	Learning design	2,84	Good
	Overall average	3,15	Good

Table 8 shows all aspects' average score is 3.15 or included in the Good category. This shows that interactive learning media received positive responses from students of SMP Negeri 4 Patuk.

Based on students' evaluation results from SMP Muhammadiyah 5 Yogyakarta and SMP Negeri 4 Patuk students, an average of 3.18 or included in the category of Good. This shows that interactive learning media received positive responses from students of SMP Muhammadiyah 5 Yogyakarta and SMP 4 Patuk. Students give an excellent response to learning media.

Table 9. Results of Calculation of Student Assessment Questionnaire

No	School	Mean	Qualitative Criteria
1	SMP Muhammadiyah 5 Yogyakarta	3,20	Good
2	SMP Negeri 4 Patuk	3,15	Good
	Overall average	3,18	Good

Table 9 shows an overall average of 3.18 is obtained. The interactive learning media in mathematics is stated in the excellent category.

CONCLUSION

The quality of mathematics interactive learning media with contextual learning approaches is measured based on media experts and material experts' assessments. Media experts' average score for media quality reaches 3.71, which falls into the Very Good category. Simultaneously, material experts' average score reaches 3.62, which falls into the Very Good category. Based on experts' assessment and advice, media that have been developed and revised, the media is suitable to be used and tested in the field. The average score of all aspects of the student assessment questionnaire data at SMP Muhammadiyah 5 Yogyakarta and SMP Negeri 4 Patuk was 3.18 or included in the Good category. This shows that interactive learning media in mathematics gets positive responses from students. Students give an excellent response to the quality of learning media developed.

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