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Development of Interactive Multimedia-Based Learning Media by a Scientific Approach in Class V of Elementary School

Siti MarlinaTarihoran
Postgraduate Student of Basic Education
Universitas Negeri Medan
Medan, Indonesia
sitimarlina.lina@ymail.com

Daulat Saragi
Faculty of Language and Art
Universitas Negeri Medan
Medan, Indonesia

Hidayat
Faculty of Social Sciences
Universitas Negeri Medan
Medan, Indonesia

Abstract – This research is motivated by the lack of teachers using interactive multimedia technology in learning activities that have an impact on the low learning outcomes of students. This study aims to determine the feasibility of the learning media developed and its effectiveness on thematic learning outcomes with the theme of events in life. This type of study is a research and development using a 4-D model consisting of four stages, namely Define, Design, Develop and Disseminate. The subjects in this study were the 33 students in class V of Public Primary School-104258 of Deliserdang. In the process of designing and developing, validation is carried out by a team of 3 experts which includes: a design expert, a learning media expert, and a learning material expert. The results of validation by instructional media design experts showed a score of 86%, instructional media experts of 92%, and learning material experts of 90%. The results of the trial practicality of the media developed by the assessment by the teacher showed a score of 89% while the students' responses to interactive multimedia showed a score of 87%. Student learning outcomes using interactive multimedia indicate an average score of 87%. These results indicate that interactive multimedia-based learning media that have been developed are suitable for use in thematic learning activities, especially in fifth grade students with the theme of events in life.

Keywords – Learning Media, Scientific Approach

I. INTRODUCTION

Learning media is the right solution to be used to realize learning that is fun for students, because media can generate learning motivation for students. Besides generating motivation and interest in students, learning media can also help students improve understanding and make presentation of data become interesting [1]. Thus, there will be educational interaction between the teacher and students, so that there is a change in students in terms of understanding and skills or attitudes. Learning media is a means or tool of education that can be used as an intermediary in the learning process to enhance effectiveness and efficiency in order to pursue the teaching objectives [2]. Learning media also functions: a) as a tool in the learning process, b) as a component of the learning sub-system, c) as a guide to the message or material to be delivered and competencies that will be developed for students to have, d) as a game that evokes enthusiasm and motivation of students, e) improves learning outcomes and processes, f) reduces the occurrence of verbalism, g) overcoming the limitations of space, time, energy, and sensory power to facilitate students' understanding of competencies that must be mastered of the material that must be learned, which in turn is expected to improve learning outcomes [3].

In choosing and developing the learning media there are several criteria that must be considered that aim so that the media used or developed can be appropriate and in accordance with the objectives to be achieved. Criteria for selection of media are as follows: a) Suitability with objectives. b) Compliance with learning material. c) Conformity with learning characteristics or students. d) Conformity with the theory. e) Suitability with student learning styles. f) Conformity with environmental conditions, supporting facilities, and time [4].

Programs for creating creative and innovative computer-based learning media are now widely available. One media creation program is Macromedia Flash. Macromedia Flash is a computer program or software that has superior capabilities in displaying multimedia, a combination of graphics, text, animation, sound and video [5]. Macromedia Flash is a web animation graphics program produced by Macromedia corp, which is a software vendor engaged in web animation [6].

The use of learning media using computer technology should be an alternative for teachers to facilitate students in understanding the material and is expected to change the learning conditions from teacher-centered to student-centered [7].

The process of learning activities in the Curriculum of 2013 is required to use a scientific approach, where by using this approach students are expected to be able to recognize

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and understand various materials provided by the teacher through a scientific approach process which includes: observing, asking, reasoning, trying, and forming networks for all subjects [8]. Learning with a scientific approach is a learning process that is designed in such a way that students actively construct concepts through stages of observing, formulating problems, formulating hypotheses, collecting data by various techniques, analyzing data, drawing conclusions and communicating concepts found [9]. The scientific approach is intended to provide understanding to students so that they can recognize and understand various materials using a scientific approach, and also that information can come from anywhere, at any time, does not depend on unidirectional information from the teacher [10].

The ability of educators in developing learning media is one of the determining factors for students' success in achieving the expected competencies. With the use of media in the learning process can generate new desires and interests, generate motivation and stimulation of learning activities and even bring psychological influence on students [11]. In other words, the use of media in learning will greatly help the effectiveness of the learning process and the delivery of messages and the contents of the lesson.

II. METHOD

This study is a type of research and development using a 4-D model consisting of four stages, namely Define, Design, Develop and Disseminate. The subjects in this study were the 33 students in class V of Public Primary School-104258 of Deliserdang. Data collection instruments are using questionnaires and observations.

III. RESULT AND DISCUSSION

Description of the Definition Stage (Define)

The analysis that has been done produces observation data which is then used as the basis for formulating interactive multimedia-based learning media that have been developed. The analysis phase in this study includes: Curriculum Analysis, analysis of media needs, material analysis and formulation of learning objectives.

Description of the Results of the Development Stage (Develop)

At the development stage, validation of draft 1 is submitted to experts and then field trials are carried out. The results of media validation from each validator can be seen in table 1.

Validator	Hasil Validasi I	Hasil Validasi II	Rata-Rata Total	Kriteria
Ahli Desain Media	55%	86%	89%	Sangat Valid
Ahli Media	60%	92%		
Ahli Materi	60%	90%		

TABLE 1. Validation results by a team of experts

For more details, validation results can be seen in the following diagram:

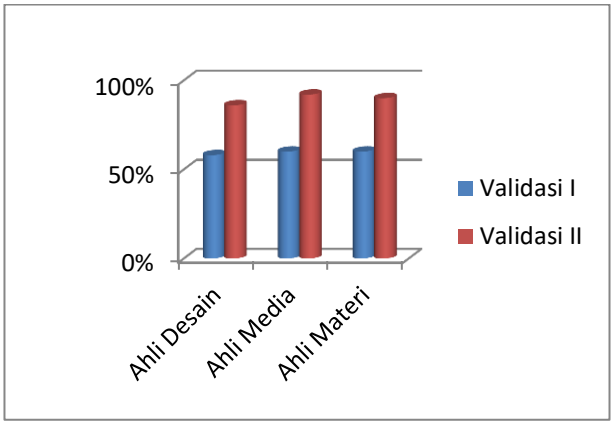

Fig 1. Diagram of Expert Validation Results

The results of media validation carried out by the validator in Validation II are clearly shown in Figure 1 above. The average score given by the media design expert validator is 86%. The average score given by the learning media expert validator is 92%. The average score given by the material expert validator is 90%. The total average score of the learning media which was validated by the three validators was 89%.

This student response questionnaire was conducted to determine the extent of interest, feelings of pleasure and satisfaction of students, as well as the ease they experienced in understanding the components of learning media that had been developed.

For more details, the results of student responses can be seen in figure 2.below.

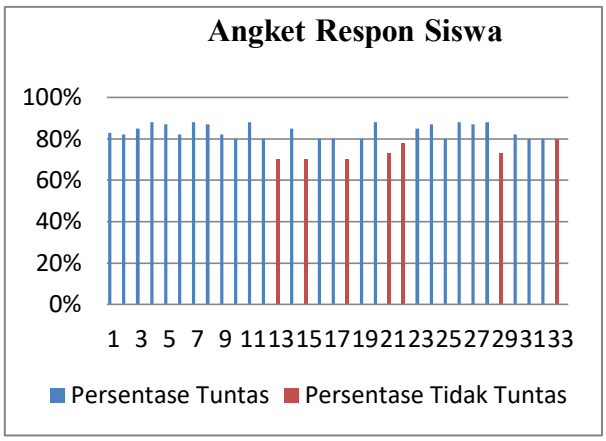

Fig 2. Diagram of Student Response Results

Based on the results of the student response analysis in diagram 4.8 it appears that the percentage of assessment given to the average of all students is 83%. Of the total 33 students, there were 7 or 21% who stated that the media had not been practical and as many as 26 or 79% said the media was practical.

Analysis of data on the effectiveness of learning media used in students in the post-test of trial I is presented in table 2 below.

TABLE 2. Classification of student learning outcomes in posttest of trial I

No	Rentang Angka	Huruf	Frek	Persentase	Kriteria
1	3,85 – 4,00	A	0	88%	Tuntas
2	3,51 – 3,84	A-	5		
3	3,18 – 3,50	B+	16		
4	2,85 – 3,17	B	8		
5	2,51 – 2,84	B-	4	12%	Belum Tuntas
6	2,18 – 2,50	C+	0		
7	1,85 – 2,17	C	0		
8	1,51 – 1,84	C-	0		
9	1,18 – 1,50	D+	0		
10	1,00 – 1,17	D	0		
Jumlah			33		

Based on the results of the data analysis in Table 2, it can be seen that from the learning outcomes of the 33 students in the first trial, 29 or 88% were declared completed, while 4 students or 12% were stated not completed. For more details, see diagram 2 below.

Fig 3. Diagram of Completeness of Learning Outcomes of Students in Trial I

Data on the level of student learning outcomes in trial II can be classified in completed and not completed. For more details, it can be seen in table 3 below.

TABLE 3. Data on Completeness of Learning Outcomes in Trial II.

No	Rentang Angka	Huruf	Frk	Persentase	Kriteria
1	3,85 – 4,00	A	1	91%	Tuntas
2	3,51 – 3,84	A-	4		
3	3,18 – 3,50	B+	25		
4	2,85 – 3,17	B	0		
5	2,51 – 2,84	B-	3	9%	Belum Tuntas
6	2,18 – 2,50	C+	0		
7	1,85 – 2,17	C	0		
8	1,51 – 1,84	C-	0		
9	1,18 – 1,50	D+	0		
10	1,00 – 1,17	D	0		
Jumlah			33		

Based on the results of data analysis in table 4.20 it is obtained data on learning outcomes of 33 students in trial II as many as 30 students or 91% are completed, while 3 students or 9% are not completed. For more details, see diagram 3 below.

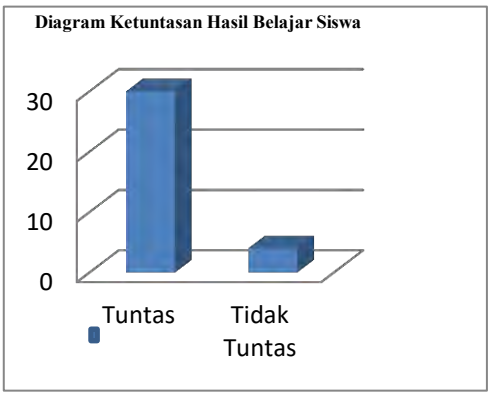

Fig 4. Diagram of Completeness of Learning Outcomes of Students in Trial II

IV. DISCUSSION

A. Feasibility of Learning Media

The feasibility of interactive multimedia-based thematic learning media refers to product quality. A product is said to be feasible to use if the product has three product quality criteria, namely validity, practicality and effectiveness [11].

B. Validity of Learning Media

The stage that must be passed before product testing in the field is to submit product validation to the expert team as a validator. The validator consists of a learning media design expert, a media expert, and an expert in learning material. The product is worth testing into the field if the expert team has validated the product with a valid category without revision.

C. Practicality of Learning Media

The second characteristic of high quality products is practical. The practicality of learning media was measured through student response questionnaires and teacher response questionnaires administered after using interactive multimedia-based learning media in the learning process.

D. Effectiveness of Learning Media

Learning media is categorized as effective if students can understand the subject matter, and student learning outcomes are as expected. It was obtained that the percentage of classical completeness (PCC) of students was 87%. This is obtained from the posttest of student learning outcomes after using interactive multimedia-based thematic learning media.

IV. CONCLUSION

Based on the results of the study, it can be concluded that the interactive multimedia-based learning media developed have met three criteria, namely valid, practical, and effective. Criteria of validity are seen from the assessment given by the expert team as validator in validating learning media. Practical criteria are seen from the results of the percentage analysis of student responses and teacher responses that have met practical criteria because of the percentage of all aspects of assessment for student responses and teacher responses. Effective criteria can be seen from the results of the posttest of students from which it was found that the percentage of classical completeness (PCC) of students is 87%, therefore it can be concluded that students of class V-A have completed their studies because their PCC ≥ 85%.

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