DEVELOPMENT OF MATHEMATICS MATERIAL OF NUMERICAL MATERIAL FOR VII STUDENT BASED ON CREATIVITY

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ABSTRACT

Module limitation is one of the problems that affect the achievement of learning. The existing teaching materials are still challenging to understand. Teaching materials that can help students learn actively and independently are modules. This study aims to develop, test the feasibility of teaching materials in the form of modules, and know the student's response to mathematics materials equations and linear inequality one variable based on creativity. This type of research is research development. The development procedure steps are potentials and problems, data collection, product design, design validation, product testing, product revision, and trial usage. Research subjects were material experts, media experts, and student response in SMP Muhammadiyah Boarding School (MBS) Pleret and Junior High School (SMP), Muhammadiyah Sanden. This research object is the subject matter of Mathematics Material of Numerical Material for VII Student Based on Creativity. Data collection techniques in this study are by using questionnaires. The results showed that the average material scores 77 were good, the average media scores 81.33 with the excellent category, and the average student response rating of 74.73 with the good category. Based on these calculations' results, the mathematical material in the form of modules developed possible use in learning mathematics.

Keywords: Mathematics Module, creativity, Material Numbers

INTRODUCTION

Education is a teaching material must follow one of the rules, namely teaching materials that are human resources that should receive more attention in efforts to improve the quality of education. Increasing educational efforts can mean improving the quality of human resources. Thus, it is necessary to renew in the field of education from time to time continuously. To educate the nation's life, improving the quality of education is one of the important things for development in all aspects of human life. In Indonesia, there are still some obstacles related to the quality of education. Namely, the number of teachers who have not been evenly distributed, limited access to education, and the teachers' quality are lacking. The importance of education for human life is an absolute necessity that must be fulfilled throughout life. Without education, a group of people cannot live in line with their aspirations (aspirations) to progress, prosper, and be happy according to their concept of life and creativity.

The teacher has an important role in the ongoing learning process. So that teacher is required to act and think creatively and innovatively in the use of teaching materials. Creative in learning mathematics is seen more in thinking or in this case, called creative thinking. This is in line with one of the focuses of mathematics learning. Through mathematics learning, students are expected to have the ability to think logically, analytically, systematically, critically, and creatively, and have the ability to cooperate (Depdiknas: 2004). According to Widodo and Jasmadi (2008), development must be developed according to students' needs and characteristics. Characteristics of students can be reviewed on one side of the characters that exist in themselves. This research is based on creativity in problem-solving. To assess creativity is to use problem-solving. According to siswono in Warli (2010: 3), explaining fluency in problem-solving refers to the diversity (various) answers to problems that students make correctly. Flexibility in problem mechanics refers to the ability to answer problems with some answers that cannot be done by individuals (students) at their stage of development or current level of knowledge. According to Pusfita and Fitriyani (2017), student's creativity can improved by suitable learning model like problem posing learning model.

This happened in SMP MBS Pleret and SMP Muhammadiyah Sanden based on the research results conducted by Astuti, Khasanah, and Fitriyani (2016) in class VII. During learning, students are not active and unable to ask diverse questions and ideas. Activities and abilities for students' creativity, especially thinking smoothly and flexibly, which is still relatively low, occur because, based on research in mathematics learning, the teacher only uses lecture, discussion, and practice exercises. Therefore, it is necessary to apply a useful learning model in these capabilities, namely a learning model based on creativity.

The problem in this study can be formulated as follows: 1) How is the product of teaching materials in the form of Mathematics Module Number Material for Class VII Students Based on Creativity?, 2) How is the feasibility of teaching material in the form of Mathematics Module Number Material for Class VII Students Based on Creativity?, 3) How do students respond to the feasibility of teaching materials in the form of Mathematics Module Number Material for Class VII Students Based on Creativity?

The purpose of developing teaching materials in the form of modules is as follows: 1) Development of number material mathematics modules for class VII students based on creativity. 2) To determine the level of feasibility of the number of material mathematics modules for class VII students based on creativity. 3) To determine students' responses to teaching materials' feasibility in numerical material mathematics modules for class VII students based on creativity.

METHODS

This research is a research and development R&D (Research and Development) with development steps, namely potential and problems, data collection, product design, design validation, design revision, product testing, product revision, trial use, product revision, and production mass. R&D methods are research methods used to produce specific products and test them (Sugiyono, 2016: 297). This research is product-oriented, namely a creativity-based mathematical module on numbers for grade VII students.

Research subjects are:

1. Material Expert. The material expert in this study is a mathematics lecturer in numbers and two seventh grade mathematics teachers. Material experts will validate modules from the point of material categorized from four aspects: content eligibility, language, presentation, and creativity. Material experts will also provide positive inputs for the creation of quality modules.
2. Media Expert. Media experts consist of one lecturer who is an expert in instructional media and two ICT subject teachers. Media experts will validate modules from the point of media, categorized into five aspects: linguistic, use of fonts, layout, layout, graphic illustrations, and display design. Material experts are expected to provide suggestions to make the module more interesting, so students are motivated to learn it.
3. Students. The subjects in the creativity-based mathematics module trials on Numbers material were Grade VII students. Testing is done in small classes and large classes. In testing this product, students are asked to use the number module. After using the product, students are given a questionnaire to provide assessments and positive inputs to the module. In small class trials, a sample of 5 students was taken. While in large class trials, it was carried out on 21 students.

Data collection techniques using questionnaires (questionnaire). The questionnaire assessment technique was carried out by giving a product validation sheet containing a set of statements to the material expert lecturers and media experts, teachers, and students. Score calculation is done by looking for averages that refer to the guidelines for the ideal assessment criteria, according to Widoyoko (2012: 238). Eligibility in terms of scores obtained said to be feasible if included in the very good, good, or sufficient category.

RESULTS AND DISCUSSION

After research by the method of R&D (Research and Development) with development steps, namely:

1. Potential and problems. Researchers explore the potential and problems by conducting observations and interviews with students of class VII. This was done by Astuti, Dwi., Khasanah, Uswatun., Fitriyani, Harina., (2016) at SMP MBS Pleret, and Muhammadiyah Sanden Middle School. During learning, students are not active and unable to ask diverse questions and ideas. Activities and the ability to be creative, especially thinking students fluently, are still relatively low. Based on interviews with grade VII students, teachers only use the lecture method, discussion, and practice questions in mathematics learning.
2. Data collection. After studying and understanding the data obtained from the results of potential and problems, the researcher collected various information about the material of class VII, which is based on creativity. In this activity, the researchers determine the material's scope be presented in teaching materials in the form of modules.
3. Product design. The initial framework of the learning module is:
    a. The front cover and the back cover The front cover contains the mathematics module title, a picture that matches the material, and the target user, namely a seventh-grade junior high school student. While the back cover contains a photo, identity, and educational history of the author.
    b. The initial part includes:
        1) Module Compiler Page
        2) Preface
        3) Table of Contents
        4) Display Module Content
        5) CC, BC, and Indicators
    c. The contents section contains:
        1) Introduction
        2) 2) Concept Maps
        3) Material
        4) Sample Problems
        5) Exercise
    d. The closing part, loading:
        1) Competency Test
        2) Answer Key
        3) Bibliography
        4) Back Cover
4. Design validation. Design validation was carried out by two experts, consisting of two expert lecturers, namely one media expert and one material expert, by filling in the validated instruments.
5. Design revisionis. Design revisions were made on the results of input and comments from material experts and media experts.
6. Product trials. The first product trial is a small class trial by taking a sample of 5 students.
7. Product revision. Product revision is done from small class trial results to follow-up to students' input and comments to improve product quality.
8. Trial usage. The second class trial is a large class trial by taking a sample of 21 students.
9. Product revision. Product revision at this stage is carried out on the results of input and comments from student response questionnaires in large class trials
10. Mass production. To be able to mass-produce, researchers need to work closely with companies. Because the researchers did not have cooperation with printing companies, mass production was not carried out.

The results of the product evaluation by the validator are based on the ideal evaluation criteria, according to Widoyoko (2012: 238), presented in Table 1.

Table 1. Ideal Assessment Criteria

Score Range	Qualitative Criteria
$X > (\bar{M} + 1{,}8\, sb_i)$	Very good
$(\bar{M} + 0{,}6\, sb_i) < X \leq (\bar{M} + 1{,}8\, sb_i)$	Well
$(\bar{M} - 0{,}6\, sb_i) < X \leq (M_i + 0{,}6\, sb_i)$	Pretty good
$(\bar{M} - 1{,}8\, sb_i) < X \leq (M_i - 0{,}6\, sb_i)$	Less
$X \leq (\bar{M} - 1{,}8\, sb_i)$	Very less

Mathematical module assessment was assessed by three material experts, namely, Drs. H. Edi Prajitno, M.Pd. Ahmad Dahlan University mathematics education lecturer, Jaka Purwana, S.Pd. Mathematics teacher at Muhammadiyah Sanden Middle School, and Bustanika Luthfi H, S.Pd. SMP MBS Pleret math teacher. The assessment of the material experts' eligibility questionnaire calculation results can be seen in the following table 2.

Table 2. Results of Calculation of Expert Material Evaluation

No	Evaluator	Score
1	Drs. H. Edi Prajitno, M.Pd	77
2	Jaka Purwana, S.Pd.	80
3	Bustanika Luthfi H, S.Pd	82
Average		79,67
Criteria		Very good

Based on the table it can be seen that the average score of material expert judgment is 79.67. These results indicate that the modules developed in terms of material are included in the excellent category.

Media experts assess the feasibility of the product in terms of media. The media expert in question was Ahmad Dahlan University mathematics lecturer, Syariful Fahmi, M.Pd., Dian Martani, S.Pd. ICT teachers at SMP Muhammadiyah Sanden and Laras Setiawan, S.Pd. SMP MBS Pleret ICT teacher. The assessment of the results of the eligibility questionnaire calculations by media experts can be seen in the following table 3.

Table 3. Results of Calculation of Media Expert Rating

No	Evaluator	Score
1	Syariful Fahmi, M.Pd	91
2	Dian Martani, S.Pd.	86
3	Laras Setiawan, S.Pd	84
Average		87
Criteria		Very good

Based on the table, it can be seen that the score of the results of the assessment of the media experts is 87. The results indicate that the module developed in terms of media is included in the Very Good category.

The questionnaire calculation of student responses to the module developed in the product 1 trial can be seen in Table 4.

Table 4. Results of Calculation of Student Responses on Product Test 1

No	Assessment	Score
1	SMP Muhammadiyah Sanden	73
2	SMP Muhammadiyah Boarding School	73
Average		73
Criteria		Very good

Based on the table, the average score of students' assessment results in the product 1 trial is 73. This shows that the module developed is seen from the response of students included in the excellent category.

The student questionnaire response calculation results for the module developed in product trial two can be seen in Table 5 below.

Table 5. Results of Calculation of Student Responses in Product Trial 2

No	Assessment	Score
1	SMP Muhammadiyah Sanden	71,89
2	SMP Muhammadiyah Boarding School	71,33
Average		71,61
Criteria		Very good

Based on the table, it can be seen that the average score of the results of assessments by students in large class product trials is 71.61. This shows that the module developed is seen from the response of students included in the excellent category.

CONCLUSION

Based on the results of this research and development, it can be concluded that:

1. This research has developed mathematics teaching material Numbers for students of class VII based on creativity with the development method of Research and Development (R&D).
2. Based on the assessment of the material expert and the media expert on teaching materials in the form of modules, it can be concluded that the mathematics teaching material based on creativity, which has been developed, is said to be suitable for use in learning. The assessment of teaching materials in the form of modules by material experts obtained an average score of 80.33 with very good criteria. Media experts obtained an average score of 85.33 with very good criteria.
3. Based on the assessment of the responses of Grade VII students from SMP Muhammadiyah Sanden and SMP MBS Pleret towards teaching materials, it can be concluded that the mathematics teaching materials for Numbers based on creativity that have been developed are categorized as good for use in the learning process. The assessment of teaching materials in the form of modules by students has obtained an average score of 74.73 with a very good category. So, the teaching material in the form of this module is suitable for use in learning mathematics.

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