

## DEVELOPMENT OF MATHEMATICS MATERIAL OF SET FOR GRADE 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 developing mathematics materials 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 Set for VII Student Based on Creativity. Data collection techniques in this study are by using questionnaires. The results showed that the average material scores 80,33 were excellent; the average media scores 85,33 with the excellent category and the average student response rating of 73,33 with the excellent category. Based on these calculations' results, the mathematical material in the form of modules developed feasible to use in learning mathematics.

**Keywords:** Mathematics Module, creativity, Material the set

### INTRODUCTION

The development of science and technology is proliferating, causing new problems to emerge that must be handled creatively and innovatively. This is also in line with the increasingly developing world of education and raises new problems in education. Mathematics is one of the subjects in the School, especially schools in SMP Muhammadiyah 2 Bantul and SMP Muhammadiyah 1 Pundong. In teaching mathematics, teachers more often teach with the lecture method, so students only listen to what is taught by educators and look at books that have been determined. Students must also read the material taught and ask the teacher about material that is not yet understood. One of the materials in the mathematics learning curriculum is the set. The setting material can be well mastered by students, knowledge and understanding of the concept is needed first. Creativity-based teaching and learning are some of the innovations to help students build the concept of sets. Not that does not mean teaching materials can develop student characters at all. It is just that teaching materials are not optimally used to develop student characters.

This research is based on creativity in problem-solving. To sort out, 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 be improved by suitable learning model like problem posing learning model.

Teaching and learning activities in Mathematics at SMP Muhammadiyah 2 Bantul and SMP Muhammadiyah 1 Pundong have some shortcomings. The research results in mathematics learning conducted by Astuti, Dwi., Khasanah, Uswatun., Fitriyani, and Harina. (2016) in-class VII obtained information that teaching materials used in schools are by the curriculum's content standards. The material presented is by the competencies listed in the curriculum document. However, the implementation still needs to be developed independently to be more in line with Islamic students' character, namely creativity

and the school environment's condition.

Based on the description above, many teaching materials are by the content standards used in learning mathematics in class. However, these teaching materials are still unable to facilitate the development of student character. The development of teaching materials by students' character and environmental conditions to build students' Islamic character is a creativity-based teaching material. This is by the opinion of Widodo and Jasmadi (2008) that the development of teaching materials must follow one of the rules, namely, the developed teaching materials must be by the needs and characteristics of students. Characteristics of students can be reviewed on one side of the characters that exist in themselves. Specifically, restricted research will be reviewed by the Islamic character of creativity. From the description, it can be known that one of the characters that need to be developed is creative. Creative in learning mathematics is seen more in thinking or, in this case, 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). The development of the ability to think creatively indeed needs to be done because it is one of the abilities desired by the world of work (Career Center Maine Department of Labor USA, 2004). Based on theory and phenomenon, the editorial of the title of this research is Development of Mathematics Teaching Materials for Class VII Material Collection Based on Creativity.

The problem in this study can be formulated as follows: 1) How is the product of teaching materials for mathematics subject in the VII grade set based on creativity? 2) How is the feasibility of teaching materials for mathematics subjects in class VII based on creativity that has been developed?

The purpose of developing teaching materials in the form of modules is as follows: 1) Develop modules on set material for odd semester VII junior high school students based on creativity. 2) Knowing the good quality of modules on the set material for odd grade VII junior high school students developed based on creativity. 3) Knowing student mathematics learning outcomes after studying the set material modules based on creativity.

## METHODS

This research is a research and development R & D (Research and Development) with development steps, namely potentials and problems, data collection, product design, design validation, design revision, product testing, product revision, trial use, product revision, and mass production. . The R&D method is a research method used to produce certain products and test them (Sugiyono, 2016: 297). This research is a product-oriented, creativity-based mathematics module on the subjects assigned to grade VII students. The research subjects are:

1. Material Expert. The material experts in this study were a mathematics lecturer in algebra and two mathematics teachers in grade VII. The material expert will validate the module in terms of material which is categorized into four aspects: the appropriateness of the content, language, presentation, and creativity.
2. Media Expert. Media experts consist of one instructional media expert lecturer and two ICT subject teachers. Media experts will validate the module from a media point of view, categorized into five aspects: language, use of fonts, layout, layout, graphic illustration, and display design.
3. Students. The subjects in the creativity-based mathematics module trial on set material were grade VII students. Testing is carried out in small classes and large classes. In testing this product, students are asked to use an algebra module. After using the product, students are given a questionnaire to provide an assessment and positive feedback on the module. In small class trials, a sample of five students was taken. Meanwhile, in large class trials, it was conducted on 21 students.

Data collection techniques using questionnaires. 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 problem. Researchers explore the potential and problems by conducting observations and interviews with students of class VII. Astuti did this, Dwi., Khasanah, Uswatun., Fitriyani, Harina., (2016) at SMP Muhammadiyah 1 Pundong and SMP Muhammadiyah 2 Bambanglipuro. 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 potential problems, the researcher collected various information about class VII algebra based on creativity. In this activity, the researcher determined that the material's scope be presented in teaching materials in the form of modules.
3. Product desing. 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) Foreword
    - 3) table of contents
    - 4) Serving Module Content
    - 5) CC, BC, and Indicators
  - c. The contents section contains:
    - 1) Introduction
    - 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 revisi. 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
$(\bar{M} - 0,6 sb_i) < X \leq (\bar{M} + 0,6 sb_i)$	Pretty good
$(\bar{M} - 1,8 sb_i) < X \leq (\bar{M} - 0,6 sb_i)$	Less
$X \leq (\bar{M} - 1,8 sb_i)$	Very less

The mathematics module assessment was assessed by three material experts, namely Syariful Fahmi, M.Pd. Ahmad Dahlan University mathematics education lecturer, Mide Payama, a mathematics teacher at SMP Muhammadiyah 2, Bambanglipuro, and Tri Widiastuti, S.Pd. Mathematics teacher at SMP Muhammadiyah 1 Pundong. 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	Syariful Fahmi, M.Pd	86
2	Mide Payama, S.Pd.	77
3	Tri Widiastuti, S.Pd	78
Average		80,33
Criteria		Very good

Based on the table, it can be seen that the average score of material expert judgment is 80.33. 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 is Ahmad Dahlan University mathematics lecturer, Syariful Fahmi, M.Pd., Mide Payama, S.Pd. ICT teacher of SMP Muhammadiyah 2 Bambanglipuro and Pujimah, S. Sos. ICT teacher at SMP Muhammadiyah 1 Pundong. 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
Yunior	Syariful Fahmi, M.Pd.	93
2	Mide Payama, S.Pd.	85
3	Pujimah, S.Sos	78
Average		85,33
Criteria		Very good

Based on the table, it can be seen that the score of the results of the assessment of media experts is 85.33. These results indicate that the module developed in terms of media is included in the Very Good category.

Student responses to the product are known based on the questionnaire's results filled out during product 1 trial and product trial 2. 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 2 Bambanglipuro	76,4
2	SMP Muhammadiyah 1 Pundong	73,4

Average	74,9
Criteria	Very good

Based on the table, it can be seen that the average score of the results of the assessment by students on the trial of product 1 is 74.9. This shows that the module developed is seen from the response of students included in the excellent category.

The questionnaire calculation of student responses to the modules developed in the Product 2 trial can be seen in Table 5.

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

No	Assessment	Score
1	SMP Muhammadiyah 2 Bambanglipuro	74,64
2	SMP Muhammadiyah 1 Pundong	71,95
Average		73,3
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 73.3. 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 materials for Student Set VII grade students based on creativity with the R&D method.
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 that 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. The assessment of grade VII students of SMP Muhammadiyah 2 Bambanglipuro and SMP Muhammadiyah 1 Pundong on teaching materials shows that the mathematics teaching materials are based on creativity that has 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 73.3 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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