

**THE DEVELOPMENT OF MATHEMATICS MODULE IN LINEAR EQUATION SYSTEM
TWO VARIABLES MATERIAL WITH CONTEXTUAL APPROACH FOR GRADE VIII
STUDENTS SMP / MTs**

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ABSTRACT

Limited learning resources is a problem that affects the achievement of learning goals. The school does not have a mathematics learning module with a contextual approach. This research aims to create modules as mathematics teaching materials and know the quality of the module in terms of the feasibility of content, presentation, and conformity with the contextual approach's characteristics and principles and know the students' responses to the mathematics module. The type of research is development research. This research model used is research and development that developed, including identifying potential and problem, collecting the information, designing a product, design validation, design revision, experiment, product revision, and product test. This research's subjects are teachers of mathematics, ICT teachers, and students. The object is The Development of Mathematics Module in Linear Equation System Two Variables Material with Contextual Approach for Grade VIII Students SMP/ MTs. The type of data used is qualitative data, which is then converted into quantitative data. The data collecting technique used is the form of interviews and questionnaires. The instrument tests are performed by material experts, media experts, and students. The data analysis used is descriptive analysis, and questionnaire analysis. Based on the research results obtained from material experts' assessment, an average score is 129.33 included in the very good category, the assessment of media experts an average score is 136.33 included in the very good category. Student responses to the module indicate that an average score is 133.86 included in the very good category. Based on the assessment of research from material experts, media experts, and students' responses to the development of mathematics modules in line are equation system two variables material with a contextual approach for grade VIII students, SMP/MTs is feasible the learning process.

Keywords: Mathematics Module, Contextual Approach, Two-Variable Linear Equation System

INTRODUCTION

Education is very instrumental in creating quality human beings and potential in the broadest sense. Through education, there will be a process of maturing the human self, so that in the decision-making process of a problem faced is always accompanied by great responsibility. A teacher has a very important role in the learning process. One form, a teacher must think and act, be creative and innovative in developing teaching materials. Thus, teachers are expected to develop teaching materials as learning resources. Teaching material is an arrangement of materials that have been collected and come from various learning sources that are made systematically (Prastowo: 2011). In other words, teaching materials are a set of materials that are arranged systematically to create an atmosphere that allows students to learn.

Researchers conducted observations in two schools, namely State Junior High School 4 Pathuk (SMP Negeri 4 Pathuk), conducted on March 28, 2018, and Muhammadiyah Junior High School 2 Gamping (SMP Muhammadiyah 2 Gamping), which was conducted on March 31, 2017. Based on the results of researchers' interviews with mathematics teachers in class VIII, namely in both schools, they still use the Education Unit Level Curriculum. In mathematics learning, teachers use worksheets and textbooks published by the government as teaching material. Schools have not used modules with a contextual approach. There are no teachers who have developed modules with a contextual approach. To deal with student learning difficulties and for the sake of learning mathematics, teachers need

additional teaching materials such as mathematics modules. However, the teacher has not yet developed teaching materials in modules because developing the mathematics modules requires more time and energy.

Based on this background, the following problems can be formulated: 1) Some students see mathematics as subjects that are difficult to understand. 2) The teacher does not yet have a module with a scientific approach to learning resources. 3) Learning resources are less attractive, so it takes teaching materials in the form of modules.

The objectives of this research are: 1) Develop a mathematics module for the Linear Two-Variable Equation System material with a Contextual approach for grade VIII SMP / MTs students. 2) To find out the feasibility of a mathematics module in the material of the Two-Variable Linear Equation System with a contextual approach for grade VIII SMP / MTs students.

METHODS

This research is research and development (Research and development / R&D). According to Sugiyono (2015: 407), Research and Development / R & D methods are used to produce specific products and test the effectiveness of certain products. From the above understanding, it can be concluded that development research is oriented to the development of a product. The product produced in this study is teaching material in the form of a mathematical module of the Linear Two-Variable Equation System (SPLDV) material with a contextual approach for grade VIII SMP / MTs students.

The development of mathematics teaching materials with a contextual approach to the material system of two-variable linear equations is carried out on the Research and Development / R&D development model with the following stages.

1. Potential and Problems, Problems arise when deviations occur between what is expected and what occurs in the field. In addition to being searched for yourself, potential problems in research and development can also be based on other people's research reports or up to date documentation of activity reports.
2. Gathering Information, various information can be collected to be used as material for product planning which is expected to solve the problem.
3. Product Design. In the world of education, the products produced are relevant to the needs and can improve the quality of education. In this study, researchers will develop mathematics teaching material products in the form of modules with a contextual approach.
4. Design Validation. According to Sugiyono (2015: 414), product validation can be done by presenting several experienced experts or experts to assess a newly designed product. Design validation can be done in a discussion forum. Prior to discussion, the researcher presented the research process until the design was found, along with its advantages.
5. Design Revision. After designing the product and validating it through discussions with experts and experts, it will be known where the error is. These errors are further reduced by improving the design.
6. Product Testing. Once validated and revised, new product designs can be tested immediately. Through this activity, information is also collected for product improvement.
7. Product Revisions. Through product testing, student information will help correct errors and improve product suitability for testing.
8. Trial Use. Product trials are carried out by providing products developed to class VIII SMP / MTs students to be used in the learning process.

The data analysis technique used in this study is a descriptive qualitative data analysis technique, which describes product development results in the form of modules with a contextual approach.

1. Descriptive Analysis Process
 - a. Collecting Data. In this step, the researcher separates essential data from unimportant or useless data and selects data consistent with the research objectives.

- b. Data reduction. Reduction activity is a step in research to focus, simplify, and transfer rough data to the field notes. The reduced data provides a clearer picture and makes it easier for researchers to carry out further data collection and look for it if necessary.
 - c. Showing data. In this step, the researcher arranges the data correctly and adequately. All data obtained in the form of assessment results and expert input and input from education practitioners are displayed descriptively. This aims to make it easier for readers to understand the flow of thought during the research process. Then the data will be organized, arranged in a relationship pattern to be easier to understand.
 - d. Data Verification and Interpretation. Verification activities in research aim to draw conclusions based on data obtained so that the data's meaning is exact.
2. Questionnaire Analysis Process
 Data obtained through a questionnaire by material experts, media experts, and student responses in qualitative scores will be changed to quantitative using a Likert scale.

Table 1. Likert scale

Answer Choice	Statement score
Very Agree (very good)	5
Agree (good)	4
Hesitation (enough)	3
Disagree (less suitable)	2
Strongly Disagree (not suitable)	1

Sugiyono (2015:135)

From the data collected, the average is calculated using the formula:

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n}$$

Information:

- \bar{x} = average score
- n = number of evaluators
- $\sum_{i=1}^n x_i$ = number of scores

Furthermore, the data obtained from the product assessment expert is converted to a qualitative value based on the ideal assessment criteria. Provisions for the ideal evaluation criteria are shown in Table 2 as follows.

Table 2. Criteria for Ideal Rating Categories

No	Formula	Classification
1	$X > \bar{x}_i + 1,8 \times sb_i$	Very good
2	$\bar{x}_i + 0,6 \times sb_i < X \leq \bar{x}_i + 1,8 \times sb_i$	Well
3	$\bar{x}_i - 0,6 \times sb_i < X \leq \bar{x}_i + 0,6 \times sb_i$	Enough
4	$\bar{x}_i - 1,8 \times sb_i < X \leq \bar{x}_i - 0,6 \times sb_i$	Less
5	$X \leq \bar{x}_i - 1,8 \times sb_i$	Very less

Widoyoko (2010: 238)

Based on these criteria, the feasibility value is modified as follows.

Table 3. Criteria for Ideal Rating Categories

No	Formula	Classification
1	$X > \bar{x}_i + 1,8 \times sb_i$	Very decent
2	$\bar{x}_i + 0,6 \times sb_i < X \leq \bar{x}_i + 1,8 \times sb_i$	Worthy
3	$\bar{x}_i - 0,6 \times sb_i < X \leq \bar{x}_i + 0,6 \times sb_i$	Decent enough
4	$\bar{x}_i - 1,8 \times sb_i < X \leq \bar{x}_i - 0,6 \times sb_i$	Inadequate
5	$X \leq \bar{x}_i - 1,8 \times sb_i$	Very unsuitable

Information:

\bar{x}_i = Average Ideal

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

sb_i = Ideal Standard Deviation

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

X = Empirical Score

Ideal maximum score = Number of criteria items \times highest score

Ideal minimum score = Number of items criteria \times lowest score

RESULTS AND DISCUSSION

Trial data in the Development of Mathematics Modules for the Material of Linear Equation Systems of Two Variables with Contextual Approaches for Grade VIII Middle School / MTs Students, namely gathering information, data collection, product design, design validation, design revision, product testing, product revision, product testing, user testing. Based on the data analysis technique used, the data obtained from three assessments, namely, media experts, material experts, and student responses are assessed.

1. Material experts, namely carry out module quality analysis in terms of material. Sunaryo, M.Pd is a mathematics lecturer at Ahmad Dahlan University, Yulis Herniarsi Rahayu, S.Pd is a mathematics teacher at SMP Negeri 4 Pathuk, and Rina Parwitasari, S.Pd is a mathematics teacher at SMP Muhammadiyah 2 Gamping. The results of the instrument from the material experts can be seen in the following table 4.

Table 4. Expert Questionnaire Calculation

No	Material Expert	Score	Qualitative Data Criteria
1	Drs. Sunaryo, M. Pd	134	Very good
2	Yulis Herniarsi Rahayu, S. Pd	127	Very good
3	Rina Parwitasari, S. Pd	127	Very good
	Average	129,33	Very good

From table 4, it can be seen that the average score of material expert judgment is 129.33. These results indicate that modules developed in terms of material are included in the Very Good category. Based on the three material experts' assessments, all aspects of the module have very good criteria. However, the presentation aspect gets the highest evaluation compared to other aspects, which is 88.33%.

2. Module quality analysis in terms of appearance was carried out by media experts, namely Syariful Fahmi, M.Pd is a mathematics lecturer at Ahmad Dahlan University, Supratman S.Pd is a teacher of Information and Communication Technology (ICT) at SMP Negeri 4 Pathuk, Kusyamto, S.Kom is

a technology teacher Information and Communication (ICT) SMP Muhammadiyah 2 Gamping. The results of the calculation of the module quality by media experts can be seen in Table 5 below.

Table 5. Calculation of Questionnaire for Media Experts

No	Material Expert	Score	Qualitative Data Criteria
1	Syariful Fahmi, M. Pd	145	Very good
2	Supratman, S. Pd	132	Very good
3	Kusyamoto, S. Kom	132	Very good
	Average	136.33.	Very good

From table 5, it can be seen that the average score of the assessment of media experts is 136.33. This shows that the module developed is included in the Very Good category. Based on the evaluation of the three media experts, all aspects of the module have very good criteria. However, the visual aspect gets very high ratings compared to other aspects, which are 91.67%.

- Module quality analysis in terms of student responses was carried out by students from SMP Negeri 4 Pathuk and SMP Muhammadiyah 2 Gamping. The calculation results of the quality of modules by student responses can be seen in the following table 6.

Table 6. Calculation of Student Response Questionnaire

No	Activity	Average Score	Category
1	Product Test of SMP Negeri 4 Pathuk and SMP Muhammadiyah 2 Gamping	135,8	Very Good
2	Product Test of SMP Negeri 4 Pathuk and SMP Muhammadiyah 2 Gamping	131,92	Very Good
	Average product trial score	133,86	Very Good

Table 6 shows that students' responses to the Very Good module are shown with an average score of 135.8 in the product trials and Very Good indicated by an average score of 131.92 in the product tests. From the two tests conducted, it can be concluded that the modules developed are included in the excellent category, with an average of 133.86.

CONCLUSION

Based on research on developing a mathematical module material system of two-variable linear equations with a contextual approach for grade VIII SMP / MTs students, the following conclusions are obtained:

- This research has developed a mathematical module of the material system of two-variable linear equations with a contextual approach for grade VIII SMP / MTs students using the research and development (R&D) development model.
- The feasibility of the mathematics module of the two-variable linear equation system with a contextual approach for grade VIII SMP / MTs students is demonstrated through the results of the material expert assessment with an average score of 129.33 included in the excellent category, media expert with an average score of 136, 33 included in the excellent category.
- Student responses when using the mathematics module material system of two-variable linear equations with a contextual approach with an average score of 133.86 with a very good category.

REFERENCES

- Prastowo, Andi. 2011. *Panduan Kreatif Membuat Bahan Ajar Inovatif, Menciptakan Metode Pembelajaran yang Menarik dan Menyenangkan*. Yogyakarta: Diva Press.
- Sugiyono. 2015. *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif dan R&D)*. Bandung: Alfabeta.
- Widoyoko, S. Eko Putro. 2010. *Evaluasi Program Pembelajaran Panduan Praktis Bagi Pendidik dan Calon Pendidik*. Yogyakarta: Pustaka Pelajar.