DEVELOPMENT OF STUDENT ACTIVITY SHEET WITH CONTEXTUAL APPROACH ON LINEAR EQUATION SYSTEM MATERIAL OF TWO VARIABLES FOR CLASS VIII

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ABSTRACT

Some students regard mathematics as a subject matter. Independence, concentration, liveliness, and student self-confidence are still low. The use of existing teaching materials less facilitate students in the process of learning mathematics. This study aims to develop and test Student Worksheet's feasibility (LKS) with a contextual approach on the linear equation system material of two variables for class VIII in Junior High School (SMP). This research method uses Research and Development (R & D), covering the stage of preparation, implementation, testing, and revision. The data analysis technique used is the questionnaire instrument analysis. Research subjects are material experts, media experts, and students of grade VIII in SMP. The result of the research and development of LKS shows that the material expert's assessment obtained 96,6 score with a very good criterion, from media expert 75,6 with good criterion. Moreover, the result of student response to LKS is good, with a scoring average of 47,75. The result shows that LKS, with a contextual approach on the linear equation system material of two variables for class VIII in SMP, is feasible to be used as learning material in the learning process.

Keywords: Development of student activity sheet, Contextual approach, Linear equation system material of two variables

INTRODUCTION

Education is an initial condition for humans to be able to walk in this life. Since humans were created, education has become a part of life to adapt to the environment. The development of a nation is primarily determined by the quality of the nation's education. Therefore, organizing education must begin with the procurement of educators and educational facilities to improve education quality. Learning is an activity that will continue to happen to everyone. Learning means change efforts made by individuals, both related to the addition of knowledge. After learning to know this happens because of the process of the learning experience. Some subjects are given students' lessons for the learning process, and some subjects teach, namely teachers.

Contextual is only a learning strategy. In this contextual learning, the teacher is tasked with guiding and directing students to achieve a learning goal. The teacher links the material being taught with students' real-world situations. The teacher encourages students to make connections between the knowledge they have and their application in real life. By implementing contextual learning strategies, the teacher makes it easy for students to understand the subject matter. Students can understand the material with pleasure because learning does not only take place in the classroom.

In addition to an appropriate learning strategy, learning resources are also a significant factor in determining the learning process. Teaching material as supporting material for the learning process so that learning activities are more attractive. One of the teaching materials that are often used is Student Activity Sheets or can be abbreviated as student worksheets. Therefore, Student Worksheets can guide students when learning takes place. With the Student Worksheet, students can engage in active, independent learning activities. They can make it easier for students to understand the material being taught. In learning mathematics, Student Worksheets are used as guidelines to improve student learning activities in understanding mathematical concepts. With the Student Worksheet developed by the right learning strategy, understanding the concept will be achieved properly.

From the interview results with a mathematics teacher at Muhammadiyah 1 Minggir Sleman Junior High School on January 3, 2018, some students considered mathematics problematic. Students assume mathematics too many calculations and formulas, so they are lazy to try to solve the teacher's problems. When teaching and learning activities occur, many students ignore the teacher's explanation. They do not play an active role in the classroom. Students prefer to chat with classmates, and students' desire to present their learning outcomes in front of the class is still low. In addition to these problems, schools' lack of learning tools in facilitating their students is also a problem in learning to improve experience, activity, ability to construct knowledge, and students' ability to develop the knowledge they acquire.

Most students find it challenging to understand the material well because the number of books lent by the school library is minimal. There are no additional Student Worksheets or modules. Learning in the classroom is not effective and monotonous because it is only centered on the teacher and requires a relatively long time. This can cause a decrease in student concentration. The incomplete facilities provided by schools can lead to unsatisfactory learning outcomes.

Interviews were also conducted with the Mathematics Teacher at SMP Muhammadiyah 2 Minggir Sleman on January 4, 2018. Mathematics was the most challenging subject compared to other subjects. Because mathematics is very monotonous when learning takes place, students assume too many formulas in mathematics. Students also feel very bored because of the lack of teaching aids available at school. Student independence is still low because many students do not want to present their learning outcomes in front of the class.

Therefore, a worksheet is needed with a contextual approach that can activate students in the learning process, namely linking learning with the initial knowledge that has been possessed, linking learning with students' environmental situations, and motivating students by providing mathematical activities or mathematical tasks to daily life day. Also, this worksheet can help students to find a concept or construct their knowledge. It can apply the concepts that have been learned into daily life through a learning activity, especially in the two-variable linear equation system.

Johnson and rising in his book say that mathematics is a thinking pattern, organizing patterns, and logical proof. Mathematics is a language that uses terms that are defined carefully, clearly, and accurately, its repetition with symbols about ideas rather than about sound. (Suherman, Erman, 2013: 16-17). According to the Ministry of National Education (2008: 6), All forms of material will assist teachers/instructors in carrying out teaching and learning activities. Teaching material allows students to learn a competency or basic competency coherently and systematically. Student Activity Sheet is teaching material that has been packaged in such a way that students are expected to be able to study the teaching material independently. (Prastowo, Andi, 2015: 204).

Contextual is a learning strategy that emphasizes the process of full student involvement to find the material being learned and relate it to real-life situations so that it encourages students to apply it in their lives. (Sanjaya, Vienna, 2013: 255). Some components that underlie contextual learning and guided by the teacher in packaging learning in the classroom are (Saefudin and Berdiati, 2015: 24-29): 1) Constructivism. 2) Inquiry. 2) Questioning. 3) Community Learning. 4) Modeling. 5) Reflection. 6) Authentic Assessment.

This study aims to: 1) develop Student Activity Sheets with a contextual approach to the material system of two-variable linear equations for class VIII in junior high school. 2) determine the feasibility of Student Activity Sheets with a contextual approach to the material system of two-variable linear equations for class VIII in junior high school.

METHODS

This study uses R&D methods with steps, according to Sugiyono (2014: 407). The steps for using the R&D method are shown in Figure 1 below:

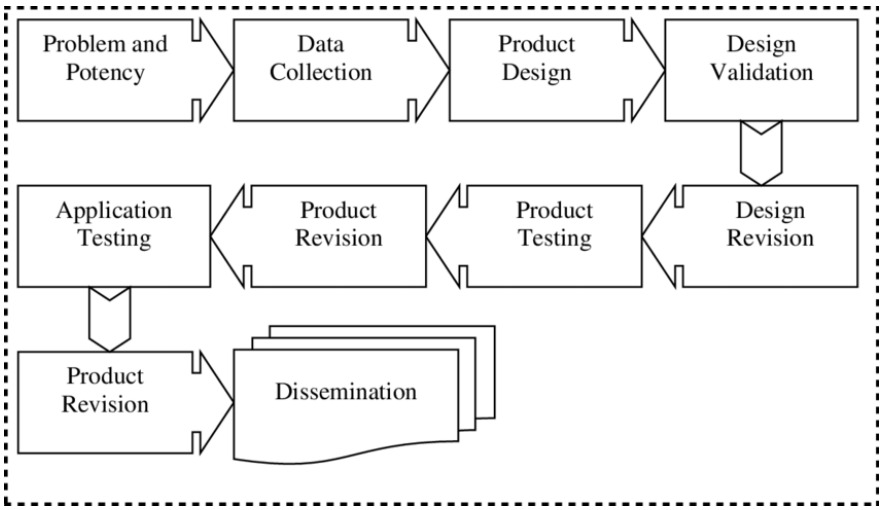

Figure 1. Steps for using the Research and Development (R&D) Method

The steps for using the R&D method are explained as follows:

1) Potential and Problems. Potential and problems are steps taken to find the potential and problems that exist in the school. Potential problems are obtained from the classroom's learning process with teaching materials, namely Student Activity Sheets. Judging from students' needs in learning mathematics, teaching materials that are lacking facilitates students' learning mathematics. After getting the potential and problems, then analyze the needs that occur in schools about developing worksheets with a contextual approach to the material system of two-variable linear equations for class VIII in junior high school.
2) Data Collection. Data collection is the activity of researchers gathering various information that can be used as product planning material. In this step, the researcher collects information based on the potential possessed to solve the problem at hand. Information can be used as material for product planning to create the expected product. Data collection is done by looking for reference material and other supporting materials for manufacturing LKS products.
3) Product Design. Product design is designing products to be produced, namely Student Activity Sheets. Product design is realized in the form of initial products. The initial product is tentative (still subject to change), refined through validation steps to the product review and trial expert.
4) Design Validation. Design validation is a process of activities to assess whether a product's design is rationally effective or not. In this design validation stage, LKS products are assessed as feasible in the material and media aspects. The assessment of LKS products in the material aspect was validated by one mathematics education lecturer in two variables linear equation system and two mathematics teachers, while in the media aspect was assessed by one mathematics education lecturer in the media field. From the results of this design validation, the weaknesses and shortcomings of the product can be seen.
5) Design Revision. After the product design has been validated by material and media experts, the researcher then conducts revisions or improvements based on material and media experts' input or advice. After being repaired and declared good, the product can be tested on students.
6) Product Testing. The product LKS trial of the two-variable linear equation system material with a contextual approach was carried out in small classes at SMP Muhammadiyah 1 Minggir and SMP Muhammadiyah 2 Minggir Grade VIII 5 students each in each school. Students are asked to rate the worksheet by filling in the student response questionnaire provided by the researcher. Through this activity, researchers also gather information for product improvement.
7) Product Revision. After testing the product to 5 students, the next step is product revision. Product revision aims to overcome the weaknesses and deficiencies in LKS products tested in a small class. Product revision is based on input or suggestions obtained.

8) Usage Trial. Usage trials are trials conducted to assess the worksheet results, whether appropriate, to be used in the learning process. The trial run was conducted at SMP Muhammadiyah 1 Minggir with 26 students and SMP Muhammadiyah 2 Minggir , with 26 students. Students are asked to rate the worksheet by filling in the student response questionnaire provided by the researcher.
9) Product Revision. Product revision to get the final product ready for use. This product revision is useful for perfecting the product based on advice from experts and student response questionnaires. This revision aims to obtain the final LKS product with a contextual approach.
10) Mass Production. After the product has been revised, tested, and the product is declared practical and feasible, the resulting product can be mass-produced for mathematics learning. However, this study is only limited to step 9, namely the revision of the final product. This is due to several reasons, including the limited energy, time, and cost.

The subjects of the trials in this research development were: 1) Material Expert, namely a mathematics education lecturer, and a mathematics teacher at SMP Muhammadiyah 1 Minggir and SMP Muhammadiyah 2 Minggir, 2) Media experts, namely mathematics education lecturers and computer teachers of SMP Muhammadiyah 1 Minggir and SMP Muhammadiyah 2 Minggir. 3) Students of class VIII of SMP Muhammadiyah 1 Minggir and SMP Muhammadiyah 2 Minggir. In this study, there are two types of data: 1) Qualitative data obtained from interviews with mathematics teachers in class VIII and input or suggestions from material and media experts obtained from the validation results. 2) Quantitative data in the form of scores on the questionnaire assessment results of material experts, media experts, and the results of students' questionnaire responses to the products developed. The instruments used to collect data in this research development are interview and questionnaire guidelines. For the assessment carried out by material experts, media experts, and student responses, an instrument in the form of a questionnaire was used where the calculations were carried out using the criteria according to Table 1 below.

Table 1. Criteria for Ideal Rating Categories

No	Score	Criteria
1.	$X_k > \bar{X}_i + 1{,}80SB_i$	Very good
2.	$\bar{X}_i + 0{,}60SB_i < X_k \leq \bar{X}_i + 1{,}80SB_i$	Good
3.	$\bar{X}_i - 0{,}60SB_i < X_k \leq \bar{X}_i + 0{,}60SB_i$	Enough
4.	$\bar{X}_i - 1{,}80SB_i < X_k \leq \bar{X}_i - 0{,}60SB_i$	Less
5.	$X_k \leq \bar{X}_i - 1{,}80SB_i$	Very less

(Sukarjo, 2006:53)

Information:

X_k: Actual/empirical score

$\overline{X_i}$: ideal average

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

SB_i: ideal standard deviation

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

The analysis results of the data obtained are used to know the quality of the products produced. Product Student Activity Sheets with a contextual approach to the material system of two-variable linear equations for eighth-grade students in junior high schools are deemed fit for use in the learning process if the worksheets' overall quality is in the minimum good category.

RESULTS AND DISCUSSION

The initial stage in the product making of this contextual approach is to prepare Software to make it easy to manufacture. In this case, the researchers used Microsoft Word 2013 to type the worksheet contents and used Corel Draw X6 to cover, and then all files were converted to pdf format. The goal is that in printing, the contents of the file will not change or be damaged. The results of the application of the product design can be described in general as follows:

1) Display front cover LKS

   Appearance The worksheet's front cover contains the product compiler, the contextual approach, curriculum, pictures supporting the SPLDV material, class, and the worksheet user's identity. Display front cover LKS with this contextual approach can be seen in the following figure 2.

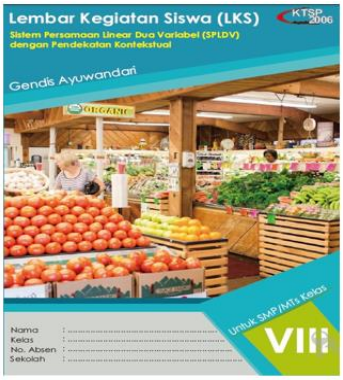

Figure 2. Display the front cover

2) Display LKS Identity

   The purpose of making LKS identity is to facilitate the search for information about the administration of LKS. LKS identity consists of:

   a) Identity Page
   b) Preface
   c) Table of Contents
   d) Background of Writing
   e) Description
   f) Prerequisite Materials
   g) SK, KD, and KD Achievement Indicators
   h) Instructions for using LKS
   i) Learning Objectives
   j) Concept Map

3) Contents section

   a) Title of Material
   b) Problems
   c) Let's Construct Knowledge
   d) Let us find
   e) Come on Ask
   f) Let's Model
   g) Come on Discussion
   h) Let us reflect
   i) Let us practice

4) Closing Display. This concluding view consists of a bibliography, summary, glossary, notes, and answers.

5) Display of LKS back cover. The back cover display of the worksheet contains information about the compiler. The back cover display of the worksheet with this contextual approach can be seen in Figure 3.

Figure 3. Display of back cover

The product trial was conducted at SMP Muhammadiyah 1 Minggir class VIII on January 8, 2018. It was carried out at SMP Muhammadiyah 2 Minggir on January 9, 2018, each school consisting of 5 students. Trial use of this large class researchers conducted a trial in class VIII SMP Muhammadiyah 1 Minggir on January 15, 2018, with some respondents 26 students, and a trial of the use of large classes in class VIII SMP Muhammadiyah 2 Minggir on January 11 with the number of respondents 26 students.

The results of the calculation of the material expert assessment questionnaire can be seen in Table 2.

Table 2. Results of the calculation of the Expert Material assessment questionnaire

No.	Assessment	Score
1.	Drs.Uus Kusdinar, M.Pd.	100
2.	Atik Widasih Basuki, S.Pd.	93
3.	Dra. Harni Wuryaningsih	97
	Amount	290
	Mean	96.6
	Qualitative Data Criteria (positive statement)	Very Good

The product quality assessment results show that the product produced in the form of worksheets using a contextual approach to the material system of two-variable linear equations for class VIII in SMP is assessed from the material aspects included in the criteria very well.

The results of the calculation of the media expert assessment questionnaire can be seen in table 3.

Table 3. The results of the calculation of the Media Expert assessment questionnaire

No.	Assessment	Score
1.	Drs.H. Sunaryo, M.Pd.	74
2.	Herlambang R, S.Farm	80
3.	Irwan Susanto, S.kom	73
	Amount	227
	Mean	75.6
	Qualitative Data Criteria (positive statement)	Very Good

The product quality assessment results show that the product produced in the form of worksheets using a contextual approach to the material system of two-variable linear equations for class VIII in junior high school is assessed from the media's aspect included in the criteria very well.

The results of the calculation of the student response assessment questionnaire can be seen in table 4

Table 4. The results of the calculation of the Student Response assessment questionnaire

School	Mean
Product Trial at SMP Muhammadiyah 1 Minggir and SMP Muhammadiyah 2 Minggir	44.5
Trial usage in SMP Muhammadiyah 1 Minggir and SMP Muhammadiyah 2 Minggir	51
Average student response score	47.75
Qualitative Data Criteria (positive statement)	Good

Based on the results of the calculation of student response questionnaire obtained from the two trials, shows that the product developed in the form of worksheets using a contextual approach to the material system of two-variable linear equations for class VIII in junior high is assessed from the aspect of the media included in good criteria.

After assessing the material and media aspects and student responses are known, they can then find out the feasibility of the worksheet that has been developed. The results of the calculation of the assessment questionnaire and student questionnaire responses to the worksheet can be seen in table 5.

Table 5. Results of Calculation of Assessment Questionnaire and Student Response Questionnaire

No.	Assessment Aspects	Average score	Quantitative Data Criteria
1	Material Expert	96.6	Very Good
2	Material Expert	75.6	Very Good
3	Student Response	47.75	Good

Based on the calculation results of the assessment questionnaire and student questionnaire responses, it shows that the product developed in the form of worksheets using a contextual approach to the material system of two-variable linear equations for class VIII in junior high is included in good criteria and is suitable for use in the learning process in class.

CONCLUSION

Based on the research results of the development of Student Activity Sheets with a contextual approach to the material system of two-variable linear equations for eighth-grade students in junior high school, the following conclusions are obtained:

1. Relating to developing Student Activity Sheets with a contextual approach to the two-variable linear system material for class VIII in junior high school.
   a. Research of this development is carried out based on the potential and problems that have been collected. Problems found include the majority of students considering mathematics as a complicated subject, student learning independence is still low, student learning concentration is still low, student learning activeness is still low, student confidence is still low, and school facilities are inadequate.
   b. Gathering reference books related to the material system of two-variable linear equations, guidelines for developing teaching materials LKS, and contextual approaches can help overcome learning mathematics problems.
   c. Product design is done after enough information has been obtained. At this stage, the researcher takes the following steps:
      1) Determine Competency Standards, Basic Competencies, and Achievement Indicators to be presented in the worksheet.
      2) Design and arrange LKS
      3) Develop research instruments that include material expert questionnaires, media questionnaires, and student response questionnaires. Before the research instruments are used, the three questionnaires are validated by the validator first.

d. The products arranged in the form of initial products are validated by material experts and media experts, namely by filling out material experts and media experts' questionnaire.
e. Revisions were made to improve the product based on input or suggestions provided by the validator.

2. Relating to Student Activity Sheets' feasibility with a contextual approach to the material system of two-variable linear equations for grade VIII students in junior high school.
   a. The product trials were conducted in two schools, namely SMP Muhammadiyah 1 Minggir and SMP Muhammadiyah 2 Minggir , each taken by five students of class VIII, by filling out a student response questionnaire to the product trial. Furthermore, the trial use consisted of 26 students from SMP Muhammadiyah 1 Minggir and 26 students from SMP Muhammadiyah 2 Minggir .
   b. The feasibility of the Student Activity Sheet product with a contextual approach to the material system of two-variable linear equations for eighth-grade students in the developed SMP is included in the excellent category based on the results of the calculation of the average combined score of material experts by 96.6 and the excellent category of media experts by 75.6. The good category of the average student response score is 47.75. The worksheet with a contextual approach for class VIII students in junior high school is appropriate for the learning process.

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