

DEVELOPMENT OF STUDENT SHEET ACTIVITIES USING THE OPEN-ENDED APPROACHES FOR CLASS VII SMP / MTs ON QUADRANGLE TWO-DIMENSIONAL SHAPES MATERIAL

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ABSTRACT

Learning is a human process to achieve a wide range of competencies, skills, and attitudes. The availability of mathematics teaching materials at SMP Negeri 1 Tempel and MTs Negeri 2 Sleman still lacks, especially the teaching materials that use The Open-Ended approach. The student worksheet based on The Open-Ended approach is one of the teaching materials alternatives that can be used to facilitate teachers and empower students. This research aims to develop and test the feasibility of the student worksheet using The Open-Ended approach for grade VII SMP / MTs students in the second semester on the Quadrangle two-dimensional shapes material. The research was done through a procedural development model. The stages in developing student worksheets using The Open-Ended approach were preliminary research, data collection, product development, product validation, and product trial. The subjects of research and development were materials experts, media experts, and students. In this research, material experts and media experts were expert lecturers and grade VII junior high school mathematics teachers. Data collection techniques used were interviews and questionnaires. The type of data used was qualitative data, which was then converted into quantitative data. Data analysis using a qualitative descriptive analysis technique was used to describe the development of student worksheets. The descriptive statistic was to analyze the questionnaire of the feasibility test of material experts, media experts, and the student response to the worksheet. The result of the research and development succeeded in making student worksheets using The Open-Ended approach for grade VII SMP / MTs student on the Quadrangle materials. The assessment of the material experts, media experts, and student responses to the student worksheet using The Open-Ended approach is 84.21% with very reasonable criteria. These results indicate that the student worksheet using The Open-Ended approach for grade VII SMP / MTs student on the Quadrangle two-dimensional shapes material is very feasible in the learning process

Keywords: Student Worksheet, The Open-Ended Approach, Quadrangle Two-dimensional Shape

INTRODUCTION

According to Law Number 20 of 2003 concerning the National Education System chapter 1, article 1, paragraph 20, that learning is the process of interaction of students with educators and learning resources in a learning environment. Based on this law, educators need appropriate learning resources to carry out learning. Learning resources according to the Association for Educational Communication and Technology (AECT, 1997) in the guidance of the development of teaching materials at the Ministry of National Education (2008: 5), Learning resources are all things or resources that can be utilized by teachers, both separately and in an integrated manner for the benefit of learning to increase the effectiveness and efficiency of learning objectives.

Learning resources will be more useful for students (students) if the learning resources are designed in such a way that they contain information used by students to make changes in behavior. Part of the learning resource is teaching materials, and teaching materials can be printed teaching materials. Printed teaching materials are written text teaching materials that are so well structured. A variety of printed teaching materials include handouts, books, modules, student activity sheets, brochures, leaflets, wall charts, photos, or drawings. Understanding teaching materials, according to Majid, Abdul (2013:

173), teaching materials are all forms of material used to help teachers or instructors in carrying out teaching and learning activities.

As a teacher should be able to develop teaching materials used in learning by student needs. One alternative teaching material used in the learning process is the Student Activity Sheet (SAS). Student Activity Sheet (SAS) has the same meaning as Student Activity Sheet, because in the Big Indonesian Dictionary (2008: 31): Activity also means activity. According to the Ministry of National Education (2008: 23), worksheets are sheets containing tasks that students must complete. The SAS will contain at least the title, basic competency to be achieved, completion time, equipment or materials needed to complete the task, brief information, work steps, work to be done, and reports.

Also, a teacher should choose and use approach strategies, methods, and techniques in learning. Learning using a scientific approach will make students have the ability to think scientifically, critically, creatively, and independently. This ability is very suitable for mathematics learning. Abstract mathematical concepts sometimes make students have difficulty understanding it, so students must think creatively and critically in solving these mathematical problems. Also, the learning process using a scientific approach requires students to find concepts that will be studied independently. Students can use teaching materials that can help them find concepts to be learned.

Researchers conducted interviews with one of the mathematics teachers at MTs N Manyaran and one of the teachers at SMP N 1 Manyaran regarding SAS's use in mathematics learning. At school, there are already several teaching materials. However, for SAS in SMP N 1 Manyaran and MTs N Manyaran, teachers have not yet made SAS. Students still find it difficult to understand social arithmetic material on teaching materials and the lack of sample problems on teaching materials available at school. The teacher hopes that if there is a SAS, it can make students active in discussions and learning not just centered on the teacher. So the teacher will be more helped when the learning process. SAS uses a scientific approach to the teacher's role only to guide students to understand the material to be studied so that learning becomes more effective and efficient because students will be directly involved in learning. Students not only work on problems, but students can also form mathematical concepts by solving the questions available in SAS.

From the description above, the researcher deems it necessary to conduct a study entitled Development of Student Activity Sheets (SAS) Mathematics in Social Arithmetic Using a Scientific Approach for Junior / MTs Students.

Based on the background of the problems outlined above, the following problems can be identified:

1. Students still have difficulty understanding social arithmetic material on teaching materials available at school.
2. Students feel the examples of questions on teaching materials available at school are still lacking.
3. Not yet available teaching materials that make students discuss each other and accommodate student discussion results.

Because of the limited time, cost, and ability of the researcher and so that there is no error in understanding the problem that the writer is thorough, the writer limits the problem so that the expected goals can be achieved. In this case, the limitation of the problem is the Development of SAS using a scientific approach to Social Arithmetic material class VII SMP / MTs. The development procedure is only up to trial products because they are not made up of mass products.

Based on the background of the problem and the limitations of the problem outlined above, the problem can be formulated, namely:

1. How to develop SAS mathematics social arithmetic material using a scientific approach for grade VII students of SMP / MTs?
2. How is the feasibility of SAS mathematics made in supporting mathematics learning social arithmetic material using a scientific approach for grade VII students of SMP / MTs?

Based on the background of the problem and the problem limitations that have been described above, the objectives to be achieved from this research are:

1. Develop SAS on social arithmetic material using a scientific approach for grade VII students of

SMP / MTs.

2. It knows the feasibility of SAS mathematics created in support of mathematics learning social arithmetic material using a scientific approach for grade VII students of SMP / MTs.

METHODS

This type of research is research and development. This study aims to produce teaching materials in the form of SAS on social arithmetic material using a scientific approach for junior high school students. According to Sugiyono (2013: 407), research and development methods are research methods used to produce specific products and test the effectiveness of these products. To be able to produce specific products used research that needs analysis and to test the effectiveness of these products to function on the broader community, research is needed to test these products. The development of Student Activity Sheets (SAS) refers to the steps developed by Research and Development (R&D) (Sugiyono, 2013: 407). The R&D steps in Sugiono (2013: 409) refer to how to produce SAS products and test their effectiveness. This research is focused on the Development of Student Activity Sheets (SAS) Mathematics in Social Arithmetic Material Using Scientific Approaches for Junior / MTs Students. The steps of research and development are shown in the following figure 1 (Sugiyono, 2013: 409).

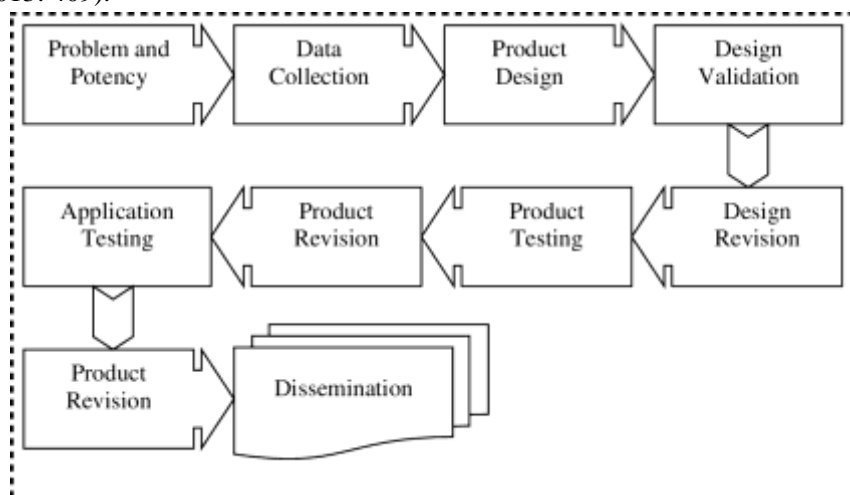


Figure 1. Steps for using the Research and Development Method (R&D method)

The data analysis technique used in this study uses a qualitative and quantitative descriptive analysis technique approach.

Process of Teaching Material Feasibility Test Instrument Analysis. Data obtained through the instrument feasibility test instrument of teaching materials by mathematicians, media experts, and students in the form of qualitative values will be changed to a quantitative value Likert scale modified from Sugiyono (2013: 135) and Sukarjo (2006: 52-53). After every aspect of SAS is assessed by mathematicians, media experts, and students of Grade 1 N Manyaran and MTs N Manyaran grade VII, the average score of each aspect is determined. Then it is converted into a qualitative value Student Activity Sheet by using the ideal assessment category criteria. After the data is analyzed, the feasibility of the SAS will be known.

RESULTS AND DISCUSSION

1. Potential and Problems

Before conducting research, researchers first conduct interviews. An interview with one of the mathematics teachers at SMP N 1 Manyaran and MTs N Manyaran can be seen in the appendix. Interviews were conducted with one of the Manyaran Middle School 1 teacher, Ms. Yulis Atmini, S.Pd, and the Many Many MTs teacher, Mr. Suprpto, S.Pd, to gather information about the

potentials and problems in the school that were explained in the background and identification of the problem, namely :

- a. Students still have difficulty understanding social arithmetic material on teaching materials available at school.
- b. Students feel the examples of questions on teaching materials available at school are still lacking.
- c. Not yet available teaching materials that make students discuss with each other and accommodate the results of student discussions.

In SAS mathematics, social arithmetic material using a scientific approach for SMP / MTs students meets the Competency Standards and Basic Competencies shown in table 1.

Table 1. Competency Standards and Basic Competencies

Competency standards	Basic competencies
Using algebraic forms, equations and linear inequalities of one variable, and comparisons in problem-solving	Use the concept of algebra in simple social arithmetic problems

2. Data collection

After studying and understanding the data that has been obtained from research results on potentials and problems, it is necessary to develop SAS mathematics social arithmetic material using a scientific approach for junior high school students. At this stage, the researcher conducted a reference study on social arithmetic material. In this stage, the researcher determines the scope of the material presented in the SAS based on discussions with the material expert lecturer and the teacher.

3. SAS product design

Before preparing the SAS mathematics social arithmetic material using a scientific approach for junior high school / MTs students, the initial SAS design was designed. The initial design of the SAS mathematics social arithmetic material using a scientific approach for SMP / MTs students includes:

- 1) Front and back cover pages
- 2) Introduction The introduction includes:
 - a. Preface
 - b. Study Instructions
 - c. Concept Maps
 - d. Competency Standards and Basic Competencies
 - e. Indicator
 - f. Map of SAS Requirements
 - g. Table of Contents
 - h. Section contents
 - i. Title of chapter
 - j. Title of sub-chapter
 - k. Example Problems
 - l. Let us observe
 - m. Let's Ask
 - n. Let us try
 - o. Let us reason
 - p. Conclusion Definition
 - q. Competency Test
 - r. Daily tests.
 - s. Bibliography

4. SAS Design Validation and Revision

SAS products that have been compiled are then subjected to product validation by material experts and media experts.

5. SAS Product Trial and Revision

CONCLUSION

The conclusions obtained from this research development are:

1. Development of Student Activity Sheet (SAS) Mathematics Social Arithmetic Material Using Scientific Approaches is done through the steps: (1) searching for product potentials and problems, (2) collecting product data, (3) designing products, (4) validating product design, (5) product design revisions.
2. The Eligibility of SAS Mathematics in Social Arithmetic Material Using Scientific Approaches for Junior / MTs Students.

The SAS assessment results by material experts and teachers obtained an average score of 92.67 so that SAS is included in the criteria very well. The results of the SAS assessment by media experts obtained an average of 98.5, so that the SAS was included in both criteria. The results of students' responses to SAS were very good with an average of 109.28 in the first try in 2 schools, namely SMP N 1 Manyaran and MTs N Manyaran, then increased to 109.84 in the second trial which was also the same in SMP N 1 Manyaran and MTs N Manyaran. The results of the average value of student competency tests are 61.61, and these results indicate that the SAS that was developed entered into sufficient criteria. Based on the above data, it can be concluded that the SAS mathematics social arithmetic material uses a scientific approach for SMP / MTs that is made suitable for use in the learning process.

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