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Development Of Student-Based Work Sheet Open Ended Problem In Fraction Materials Class III Elementary School

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ABSTRACT

The background of this research is that students do not think creatively in solving problems that exist in questions and teachers rarely give open questions to students. To develop students' thinking skills, the development of worksheets based on open ended problems is carried out. This study aims to develop Student Worksheets based on open ended problems in class III fraction material at SD Negeri 060849 Medan Barat with valid and practical criteria. This research is a type of research and development (Research and Development) with the ADDIE model. The location of this research was carried out at SD Negeri 060849 Medan Barat. The time of this research was carried out in March 2023 – April 2023. The population in this study were class III students at SD Negeri 060849 Medan Barat. The sample in this study amounted to 27 students. Data collection techniques in this study used a questionnaire. The results showed that the average result of the validation of material experts was 4,8, the average result of media experts was 4,9, and the average result of linguists was 4,9. Based on the results of the average validation from material experts, media experts, and linguists, an average of 4,8 is classified as a valid criterion. The percentage of teacher response questionnaires was 92% (very practical) and student response questionnaires were 85,2 % (very good). Thus, worksheets based on open ended problems in class III fraction material meet valid and practical criteria for use in learning.

Keywords: Development of Student Worksheets, Based on Open Ended Problems

Introduction

Mathematics has an important role in everyday life. In addition, mathematics is an important basic science in the development of science and technology. Mathematics is a branch of science that has an important role in the development of science and technology, both as a tool in the applications of other fields of science and in the development of mathematics itself (Siagian, 2016). Therefore, everyone must know mathematics and understand the role and benefits of mathematics in the future. One of the causes of failure in learning mathematics is that students do not understand mathematical concepts or students misunderstand mathematical concepts. The lack of development of teaching materials and media in the field is the reason students are lazy to study. The low thinking ability of students is due to the fact that so far mathematics learning has only emphasized memorizing material and formulas rather than understanding concepts. Students only look for one correct answer so that the thinking process is less trained in solving problems on questions. In textbooks used by students, the questions have only one correct or convergent answer. So that in a learning atmosphere, teachers do not provide opportunities for students to apply their own ideas by choosing and using several strategies, methods and techniques that can make students active and think in the learning process (Apertha et al., 2018). Mathematics is one of the subjects that has been taught from Elementary School to Higher Education. But in reality, mathematics is considered a difficult subject because many students do not understand the importance of mathematics in life, so many students do not like it and students become less interested in learning mathematics resulting in less than optimal learning outcomes. The activities of

human life cannot be separated from the role and application of mathematical concepts. Mathematics functions to develop the ability to count, measure, derive and use mathematical formulas needed in everyday life (Sahrudin, 2014) . At present, with the enactment of the 2013 curriculum, it is hoped that it will be able to form students who are active and creative in the cognitive or scientific realm in an ongoing learning (Kemendikbud, 2014). This is in accordance with the contents of Permendikbud Number 21 of 2016, namely the purpose of education in Indonesia is to develop the abilities and potential of students so that they have knowledgeable, creative and independent personalities.

What is happening now is that it is difficult for teachers and students to develop creative thinking skills in mathematics. Teachers usually don't give creative thinking exercises to students because they don't see how students carry out the process and every exercise given only focuses on results. At the same time, students themselves are unfamiliar with exercises or questions that require creative thinking to answer. One reason is that teachers do not apply appropriate teaching methods to improve creative thinking skills. Based on the results of observations made by researchers in Class III SD Negeri 060849 Medan Barat there are problems, namely teachers rarely give open questions to students, teachers only use the lecture method in explaining material, students lack creative thinking in solving problems that exist in questions because students are required to solve the problem with one correct answer. Seeing the existing problems, it is necessary to make changes in teaching and learning activities, especially in learning mathematics. One of the mathematics lessons that can develop students' thinking skills is learning mathematics based on open ended problems. Open ended problem is an approach in the learning process that offers a lesson in which the process starts with giving problems related to the concepts to be discussed (Wirasti, 2021) . Learning with open ended problems will make learning activities more student oriented. Open ended problems provide opportunities for students to analyze and develop their ideas to solve a problem in various ways so as to improve students' thinking skills.

In learning mathematics, teaching materials are needed in the form of LKPD (Student Worksheets) based on open ended problems. LKPD is one of the teaching materials in the form of material sheets which include a series of learning experiences that are systematically arranged with the aim of helping students learn well (Fuadi et al., 2021) .The purpose of using LKPD is to strengthen and support learning in achieving indicators and competencies that are in accordance with the curriculum. With the LKPD can help teachers achieve the learning objectives to be achieved. According to Juwita, et al., (2019) the hallmark of open ended problem learning is that it provides open questions (especially open ones) at the beginning of learning, and these questions have multiple answers. Learning to use an open ended problem approach begins with giving open cases to students. Learning activities are required to point and lead students to answer cases using many ways and perhaps also using many (correct) answers, as a result of which stimulates the intellectual abilities and experiences of students in the process of discovering something new. In addition to honing skills, this approach provides solutions, ways/methods of solving problems not just using one method. The open ended problem approach does not emphasize multiple answers, but in the process of solving cases using many ways or searching for solving cases in more than one way. Development of worksheets based on open ended problems can improve students' creative thinking. An open ended approach can develop students' ability to think creatively and creatively to bring up understanding of concepts, ideas, ideas & patterns and develop students' creativity. So after do observation researcher interested want to develop worksheets based on open ended problems, especially in learning mathematics in fractional material. So the researchers hope that by developing worksheets based on open ended problems it can improve students' creative thinking skills in solving problems using many ways , students are able to work together in groups to solve problems given by the teacher and students can understand the concept of fractions through an open ended problem approach. Therefore, researchers will conduct research with the title "Development of Student Worksheets Based on Open Ended Problems in Class III Fractional Materials at SD Negeri 060849 Medan Barat".

Research Methodology

The research method used is the development method or Research and Development (R & D). According to Sugiyono (2013: 407) Research and Development (R & D) as a research method used to produce certain products, and test the effectiveness of these products. The development model used in the development of this LKPD is the ADDIE model developed by Dick and Carey. This model consists of five stages, namely analysis, design, development, implementation, and evaluation. The location of this research was carried out at SD Negeri 060849, class III which is located on Jalan Karya II, Karang Berombak Village, West Medan District, Medan City, North Sumatra Province. The time of this research was carried out in March 2023 – April 2023. The population in this study were third grade students at SD Negeri 060849 Medan Barat. The sample in this study amounted to 27 students. In this study, researchers only limit it to the development stage. Which consists of the stages of analysis, design, and development. In the first stage, namely the analysis stage, namely the researcher carried out curriculum analysis, student needs analysis, and concept analysis. In the second stage, namely the design stage, in which the researcher prepares a reference book and then arranges the product design to be developed. In the third stage, the

researcher makes a product in the form of an LKPD, product assessment, and product revision. The research instrument used to collect data on the development of LKPD is in the form of a questionnaire. Which consists of validation questionnaires, teacher response questionnaires and student response questionnaires. The LKPD that has been developed is validated by material experts, media experts and linguists. Practical analysis of LKPD is done by distributing teacher response questionnaires and student response questionnaires. Test the validity of developing LKPD based on open ended problems on fractional material based on the scores of material experts, media experts, and linguists. Calculating the validity test can be calculated using the formula:

$$VR = \frac{\sum_{i=1}^{n} \overline{V}_i}{n}$$

Information:
VR = Average validity
$\overline{V}_i$ = Average score of each validator
n = Many validators
The formula calculates the average of all validators:

$$\overline{X} = \frac{\sum_{i=1}^{n} Vi}{n}$$

Information:
$\overline{X}$= Average total of all validators
Vi = Average validator i-th validation
n = Number of validators

Table 1. Validity Interpretation Criteria

No	Percentage	Criteria
1	1 – 1.5	Totally Invalid
2	1.6 – 2.5	Invalid
3	2.6 – 3.5	Invalid
4	3.6 – 4.0	Valid Enough
5	4.1 - 5	Valid

Source: Ihsan, H (2015)

The practicality of worksheets based on open ended problems in fractional material can be seen through the results of teacher and student response questionnaires. The data on the questionnaire instrument that has been filled in is then analyzed quantitatively by calculating the total score for all indicators which is then analyzed using a formula to determine its practical value.

$$P = \frac{f}{N} \times 100\%$$

Information :
P = Final grade
f = Acquired score
N = Maximum score

The level of practicality of research products is identical to the percentage score. The practicality category can be seen in the following table.

Table 2. Practical Interpretation Criteria

No	Percentage	Criteria
1	80% < x ≤ 100%	Very Practical
2	60% < x ≤ 80%	Practical
3	40% < x ≤ 60%	Pretty Practical
4	20% < x ≤ 40%	Less Practical
5	0% < x ≤ 20%	Impractical

Source: Riduwan in Annisa et al. (2020)

Student responses to the development of LKPD based on open ended problems in fractional material can be identified through student response questionnaires given to students. Student response questionnaires were analyzed

descriptively quantitatively in the form of percentages. Percentage is obtained based on the Guttman Scale.

Table 3. Guttman Scale Criteria

Answer	Information
5	Very good
4	Good
3	Enough
2	Not enough
1	Very less

Source: Sugiyono (2015)

Questionnaire results data were analyzed by :

$$\text{Percentage} = \frac{\text{Total Skor Sum (X)}}{\text{Max amount (Xi)}} \text{x } 100\%$$

Table 4. Interpretation Criteria

Evaluation	Interpretation Criteria
0 % - 20%	Very Not Good
21% - 40%	Not good
41% - 60%	Pretty good
61% - 80%	Good
81% - 100%	Very good

The practicality criteria used are according to the table above. Based on these percentage criteria, the media is said to be practical if the average percentage of student activity is ≥ 60%.

Results and Discussion

This research was conducted at SD Negeri 060849 Medan Barat. Before the research was carried out, the researcher made initial observations to examine the existing problems. Based on the results of observations made by researchers, problems were found, namely the LKPD used by the teacher was general and less innovative, and students lacked creative thinking in solving problems that existed in the questions. So that the research title taken is the development of teaching materials. It is hoped that this development will encourage students to think creatively because this research is a research worksheet development based on open ended problems in class III fraction material. After finding the existing problems, the researcher then conducted a literature study on similar research that had been carried out. Then the researcher collects reference books that will be used as a reference in developing LKPD. The researcher made a LKPD design that would be developed according to the characteristics of class III students. The LKPD that has been developed is then validated by material experts, media experts and linguists using a validation questionnaire instrument. The validation results obtained are then calculated using predetermined data analysis techniques to see the level of validity. As for the results of the validation that has been carried out, then revisions are carried out in the form of input or suggestions given by experts. After the product revision was carried out, the researcher conducted a trial of the LKPD which was distributed in class III to find out the validity and practicality of developing the LKPD that was carried out. By testing the LKPD that has been developed, the researcher distributes questionnaires in the form of teacher response questionnaires and student response questionnaires to see how far the practicality of the LKPD developed in learning is. The results of the questionnaire are then calculated using the data analysis techniques that have been carried out. By calculating the results of the questionnaire that has been distributed, it can be seen the level of practicality of LKPD. So by looking at the results of the validation and the results of the questionnaires distributed, it can be seen the level of validity and practicality of worksheets based on open ended problems in learning. Research and Development (R&D) research , which uses the ADDIE model which only reaches the development stage which has been described in chapter III. The product of this research is a valid and practical fractional worksheet based on open ended problems. In the development process to obtain valid and practical LKPD, a Learning Implementation Plan (RPP), Student Worksheets (LKPD) and the research instruments used were prepared. The development process for obtaining valid LKPD through LKPD validation activities and for obtaining practical LKPD through teacher and student response questionnaires. The stages of developing LKPD are carried out through the stages of analysis, design, development. In the first stage, namely the analysis stage, namely the researcher carried out curriculum analysis, student needs analysis, and

concept analysis. In the second stage, namely the design stage, in which the researcher prepares a reference book and then arranges the product design to be developed. In the third stage, the researcher makes a product in the form of an LKPD, product assessment, and product revision.

LKPD that has been developed beforehand is validated by material experts, media experts and language experts. LKPD validators consist of 3 FKIP lecturers at Muhammadiyah University of North Sumatra. The validation results by several experts were then averaged and the results matched according to predetermined categories. The purpose of this validation is to test the feasibility of the LKPD that has been developed so that it can be applied in learning and to obtain input, suggestions, opinions and evaluation of LKPD. Based on the results of the material expert validation questionnaire, it gives a total score of 72 and an average of 4,8. Based on the results of the media expert validation questionnaire, it gave a total score of 49 and an average of 4,9. Based on the results of the validation questionnaire, the linguists gave a total score of 49 and an average of 4,9. The results of LKPD validation by several experts can be seen in the following table:

Table 5. Average Results of Validation by Experts

Evaluation	Validators 1	Validators 2	Validators 3
Total score	72	49	49
Average Per-Validator	4,8	4,9	4,9
Validator Average		4,8	
Category		**Valid**	

From the table above, the 1st validator obtained a total score of 72 with an average of 4,8, the 2nd validator obtained a total score of 49 with an average of 4,9 and the 3rd validator obtained a total score of 49 with an average -average 4,9. From the average per-validator gain, it can be obtained that the average value of the three validators is 4,8 with valid results with the decision of the developed LKPD is feasible to try out. The data obtained from the teacher's response questionnaire obtained a total score of 69 and a maximum score of 75 with a practicality percentage of 92%. Judging from the teacher response questionnaire results table, this shows that the LKPD that has been developed is in the very practical category. The score obtained through the student response questionnaire was 1151 with a total of 27 students with a percentage of student response questionnaire scores of 85,2%, this shows that the LKPD that has been developed is stated to be very good. This study aims to develop Student Worksheets based on open ended problems in class III fraction material at SD Negeri 060849 Medan Barat with valid and practical criteria. This research is a research and development (R & D) that produces a product. In this study the product produced was LKPD based on open ended problems in class III fraction material. This LKPD contains material and sample questions accompanied by supporting pictures with the aim of making it easier for students to understand the material, as well as practice questions made based on the open ended problem method which students are expected to be able to think creatively in solving the questions contained on LKPD.

This study aims to develop Student Worksheets based on open ended problems in class III fraction material at SD Negeri 060849 Medan Barat with valid and practical criteria. This research is a research and development (R & D) that produces a product. In this study the product produced was LKPD based on open ended problems in class III fraction material. This LKPD contains material and sample questions accompanied by supporting pictures with the aim of making it easier for students to understand the material, as well as practice questions made based on the open ended problem method which students are expected to be able to think creatively in solving the questions contained on LKPD. The research procedure uses the ADDIE model developed by Dick and Carey which consists of five stages, namely analysis, design, development, implementation, and evaluation. But in this study, researchers only limited development to the development stage. The first stage is analysis, the activities carried out at this stage are curriculum analysis, analysis of student needs, and concept analysis. This analysis is carried out in order to obtain development products that suit the needs of students. At the design stage , the activities carried out are preparing references and compiling product designs including making LKPD cover designs, prefaces, instructions for using LKPD, table of contents, basic competencies, learning objectives, chapter subtitles, materials, practice questions, assessment, and bibliography. The LKPD design that was made aims to be in accordance with the 2013 curriculum on fractional material.

The next stage is the development stage, at this stage the researcher develops the product design that has been designed, then it is validated by several experts to determine the validity and practicality of the LKPD that has been developed. This validation was carried out by material experts, media experts, and linguists. At the validation stage, LKPD was assessed by material experts, media experts, and linguists using a teaching material assessment validation questionnaire. Meanwhile, to find out practicality, it was carried out by teachers and students by filling out the teacher's response questionnaire and the student's response questionnaire. After being validated by several

experts, the LKPD was then revised according to suggestions and input from material experts, media experts, and linguists. LKPD validation was carried out by three expert lecturers. The teacher's response questionnaire was filled out by the Class III Guardian and the student response questionnaire was filled out by Class III students, totaling 27 students. The validation results from material experts obtained a total score of 72 with an average of 4,8. The validation results from media experts obtained a total score of 49 with an average of 4,9. The validation results from linguists obtained a total score of 49 with an average of 4,9. Based on the results of the average validation from material experts, media experts, and linguists, an average of 4.8 is classified as "Valid". LKPD that has been developed and revised is implemented in class III SD Negeri 060849 Medan Barat with a total of 27 students. The results of the teacher's response questionnaire assessment obtained a total score of 69 with a practicality percentage of 92% included in the "Very Practical" category. The student response questionnaire obtained a total student score of 1151 with a percentage of 85,2 % included in the "Very Good" category. From the validation results of material experts, media experts, linguists, teacher response questionnaires, and student response questionnaires, it can be stated that the LKPD based on open ended problems that have been developed meet valid and practical criteria. Thus, this LKPD can be used to help students in the process of learning mathematics in class III fraction material at school.

Conclusion

Based on the results of the research and discussion that has been described, several conclusions are obtained as follows: This development research produced a product in the form of student worksheets based on open ended problems. Where in this study used the ADDIE development model which consisted of five stages, namely analysis, design, development, implementation, and evaluation. However, in this study the researchers only limited it to the development stage. In the first stage, namely the analysis stage, namely the researcher carried out curriculum analysis, student needs analysis, and concept analysis. In the second stage, namely the design stage, in which the researcher prepares a reference book and then arranges the product design to be developed. In the third stage, the researcher makes a product in the form of an LKPD, product assessment, and product revision. Based on the results of the development and discussion of the assessment of the validity level of LKPD assessed by material experts, media experts, and linguists, it can be seen that the average result of material expert validation is 4.8, the average result of media experts is 4.9, and the average result -the average linguist is 4.9. Based on the results of the average validation from material experts, media experts, and linguists, an average of 4.8 is classified as a valid criterion. Based on the results of the development and discussion of the practicality level of LKPD, assessed from the teacher response questionnaire and student response questionnaire, it can be seen that the results of the teacher response questionnaire were 92% (very practical) and the student response questionnaire was 85,2% (very good).

From the results of research conducted by material experts, media experts, linguists, teacher response questionnaires, and student response questionnaires, it was concluded that worksheets based on open ended problems in class III fraction material meet valid and practical criteria for use in learning. Based on the results of the development that has been carried out by researchers, the researchers suggest the following: For schools, it is hoped that worksheets based on open ended problems can support and assist teachers in carrying out the learning process in class. For educators, it is hoped that worksheets based on open ended problems can be used for mathematics lessons, especially fraction material so that it will make it easier for students to understand the material presented. For future researchers, it is hoped that further development of LKPD based on open ended problems can be carried out so that better and more interesting LKPDs are produced to improve students' thinking skills.

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