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DEVELOPMENT OF STUDENT WORKSHEETS (LKPD) MULTIPLICATIONS TO OVERCOME OPERATIONAL DIFFICULTIES CALCULATE MULTIPLICATIONS STORY ROAD

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Abstract

The aim of this research is to describe the development stages of the multiplication student worksheet (LKPD) to overcome the difficulties of calculating multiplication operations and to find out whether the multiplication student worksheet (LKPD) can meet the criteria of validity, practicality, and effectiveness. This research uses a type of development research or Research and Development (R&D) and uses the ADDIE development model, which includes Analysis (analyzing), Design (designing), Development (developing), Implementation (applying), and Evaluation (evaluating). Data collection instruments used were material expert validation sheets, media validation sheets, student response questionnaires, and test sheets. The data collection techniques used by researchers in this research were interviews, validation sheets, learning outcomes tests, and student response questionnaires. In this research, the data obtained was analyzed qualitatively and quantitatively. Qualitative analysis is used to describe the product development process. Quantitative analysis is used to describe product quality assessments, response questionnaires, and learning outcomes tests. The results of data analysis are used to improve products. This research was conducted in MIS Madinatussalam. The population in this study were students in class III-6 MIS Madinatussalam, totaling 30 students. Meanwhile, sampling in this research used a total sampling technique or used the entire population as the research sample. Using purposive random sampling, the research subjects were grade III elementary schools. The results of the research showed that the average total validity value obtained from material experts was 92.8% and media experts were 86.6%, which means that the LKPD for the multiplication of stacked roads that was developed had met the valid criteria. The results of the analysis of the practicality of the LKPD learning media for multiplication of stacked paths show that the average total practicality value of student responses is 88.21%, which is in the value range (81% - 100%). In the trial test of learning outcomes on effectiveness, an average N-gain value of 0.44 was obtained and met the range $0.3 \leq$ n-gain ≤ 0.7.

Keywords LKPD, Multiplication, Stacked Paths.

INTRODUCTION

Education based on the 1945 Constitution has the ideal of educating the nation to increase devotion to God Almighty. The aim of national education in Law No. 20 of 2003 concerning the National Education System Chapter II Article 3 is stated as follows: "National Education aims to develop the potential of students to become human beings who believe and are devoted to God Almighty, have a noble character, are healthy, knowledgeable, capable, creative, independent, and a democratic and responsible citizen (Lubis et al., 2023).

In realizing these national education goals, learning is carried out in schools in various fields of study, including Mathematics. Mathematics is one of the basic educational sciences that students must master because it is a field of study that is useful and helps solve various problems in everyday life that require skills and abilities (Nasution & Hsb, 2022).

Mathematics is a universal science that underlies the development of modern technology, has an important role in various disciplines, and advances human thinking. In education, mathematics is one of the subjects that plays an important role in forming quality students (Saragih, 2015). Mathematics is one of the subjects taught from the elementary to upper secondary level, and it even continues up to the university level. This shows that mathematics plays an important role in efforts to improve the quality of human resources (Maysarah, 2018).

There are still many students who feel that mathematics is a theoretical subject that is difficult to learn. Difficulty in connecting ideas between speculations, especially when faced with rather complicated problems (Wandini et al., 2024). According to Bruner, mathematics learning is learning about mathematical concepts and structures contained in the material being studied and looking for relationships between mathematical concepts and structures in them (Siagian, 2017). Mathematics learning is learning that is given to all levels of education (Clarisa et al., 2021).

Mathematics learning at the beginning of elementary school is focused on mastering the concept of arithmetic operations, namely addition, subtraction, multiplication, and division (Risqi & Siregar, 2023). Mathematical arithmetic operations are taught sequentially, starting from addition and subtraction, then multiplication and division. After understanding the concept of addition and subtraction calculation operations, students must master the concept of multiplication calculation operations (Silvia et al., 2023). Multiplication is a mathematical operation of scaling one number by another number. In concept, multiplication is the same as addition. However, in multiplication, the addition is done repeatedly. For elementary school students, multiplication is one of the materials

that is considered difficult for some students to understand or learn. This can be seen from the large number of students who are at the high level of elementary school on the topic of multiplication, so they experience many difficulties in studying higher mathematics (Saputro & Nikmah, 2023).

Given the importance of mathematics, it is essential that it be taught from an early age, starting in elementary school, to establish a strong foundation for higher education. To support the improvement of education quality, mathematics must be effectively taught and mastered in elementary schools. However, students often face difficulties in learning mathematics. These learning difficulties are characterized by students' failure to achieve specific learning objectives, inability to complete assignments, difficulty in understanding the teacher's explanations, and a lack of motivation to complete tasks. Addressing these issues is crucial for ensuring that students can master mathematics and succeed in their academic endeavors (Suryani & Siregar, 2020). Learning difficulties is an effort to recognize the symptoms of learning difficulties. The role of teachers in overcoming the difficulties students face in learning mathematics is very large. Professional teachers are not only able to teach well, but they must also be able to motivate and create interesting learning conditions for their students (Retnanto, 2021).

The implementation of the 2013 Curriculum must be supported by various learning tools that actively develop students. One of the teaching materials used in the 2013 curriculum is student worksheets (LKPD). LKPD is a special learning medium for students in the form of a guide containing instructions for actively carrying out activities to achieve the desired basic competencies (Sitompul et al., 2023). Student Worksheets (LKPD) can function as a tool to develop cognitive aspects and other aspects of learning (Hasanah & Kamalia Siregar, 2023).

Based on interviews and simple analysis of the student learning process, it was found that current student learning is still not in accordance with the wishes of the applicable curriculum, so students are still unable to actively develop students with curriculum changes requiring teachers to be able to carry out learning according to the applicable curriculum. Therefore, there is a need for learning tools that actively develop students.

Student worksheets (LKPD) are a means to help and facilitate teaching and learning activities so that effective interaction is formed between students and educators, which can increase students' learning activities and achievements (Muslimah & Syarief, 2020). Lkpd is a sheet containing questions and activities that can help improve students' abilities in the learning process (Silvia et al., 2023).

Based on observations of elementary school teachers at Mis Madinatussalam, it was found that the commonly used teaching materials are textbooks and LKPD. However, the current LKPD lacks comprehensive material, with practice questions typically sourced from textbooks. To address this, researchers aim to develop an attractive LKPD tailored to the characteristics of lower-grade students to enhance their motivation and support their learning of mathematics. The success of teaching relies on teachers who possess the necessary skills and can effectively facilitate learning activities. One critical mathematical skill for elementary students is performing arithmetic operations, especially multiplication. Researchers observed that third-grade students at Mis Madinatussalam struggle with sequential multiplication, particularly with larger numbers, such as 23 x 15. Students often fail to follow the correct order and steps in multiplication, as evidenced by incorrect calculations like 2 x 1 = 2. This indicates a need for improved instructional materials to help students master multiplication operations accurately.

In accordance with the steps, this can be seen from the high and low student learning outcomes in the multiplication operation material. From the results of the written test, 30 class III students out of 12 had reached the criteria for minimum completion (KKM), namely 70, and 18 students were still taking the KKM. This means that as many as 60% of students do not understand the multiplication of multilevel paths. Based on the results of self-reflection in carrying out learning the multiplication arithmetic operation through the findings of low student learning outcomes, this is due to several problems encountered by teachers during learning, including teachers who rarely use appropriate learning media when teaching, the learning process carried out by teachers not interactive and not interesting so children don't focus and learning tends to be boring.

Researchers also analyzed learning materials in teacher books and student books on theme 1 of the 2013 curriculum about multiplication. The results obtained are multiplication questions in the form of story problems and are limited to multiplying 1-3 digit numbers with 1 digit numbers. These story questions are good to give to students because they relate to everyday life problems. However, in teacher books and student books, there is no specific guidance on how to calculate multiplication easily and precisely except by using the multiplication method. So, it can be seen that there are still students who have difficulty operating multiplication, which is caused by students not understanding the flow or procedure in multiplication multiplication. Based on the test results of 18 students, on average, they were wrong in carrying out multiplication according to the steps, but students would immediately write down the final answer without any process. There were also

students who were still unable to insert the numbers being multiplied, so they were confused about what would be added next. If students cannot master the multiplication calculation operation, it is feared that this will cause additional problems for the students. One example is students having difficulty following the next lesson. This certainly should not be taken lightly, especially for teachers and parents of class III students.

Based on the background that has been presented, it is concluded that LKPD is needed to help students understand the concept of the multiplication operation of multiplication of stacked paths. Therefore, the formulation of the problem of this research is what are the results of the development of the multiplication student worksheet (Lkpd) to overcome the difficulties of the operation of calculating the multiplication of multiplication paths, whether the development of the student worksheet (Lkpd) of multiplication to overcome the difficulties of the operation of calculating the multiplication of multiplication of multiplication paths can fulfill valid, practical and effective criteria.

Previous research related to the development of LKPD has been carried out, among others, by (Ririn et al., 2023), with the title "Development of LKPD Hots with a Nuance of Independent Learning on Multiplication and Division of Fractions Material for Class VI Elementary Schools," other research by (Eko et al., 2022), with entitled "Development of LKPD Based on Jathilan Arts, Elementary Number Multiplication Material," and other research by (Merrotsy, 2023), with the title Improving Learning Outcomes of Multiplication Counting Operations in Orders Using Napier Board Media in Mathematics Learning for Class III Students at Dapuan Elementary School, Surabaya.

In research (Ririn et al., 2023), the development of the Multiplication LKPD is aimed at class VI of SD Negeri 08 South Pontianak. The results of data analysis obtained from the validator during the validation and revision process regarding the use of this LKPD, as well as responses and feedback from students regarding the development of the LKPD, show that LKPD can be used to support the learning process seen from the validity during the development process in validation and revision resulting in a level of validity of LKPD products from the material learning aspect of 3.83 in the very valid category, the language aspect of 3.84 in the valid category, the technical aspect or a display of 3.9 with a very valid category and an aspect of conformity with the nuances of independent learning of 3.8 with very valid criteria. Students' responses to the HOTS LKPD media showed a nuance of learning independence overall on the small-scale test, resulting in an average of

79.42% in the good category. This shows that students gave a good response, while overall, on a large scale, they obtained average results. An average of 89.23% in the very good category. This shows that students responded very well to the development of student worksheets.

Meanwhile, research (Eko & Nisa, 2022), developing LKPD on multiplication material in class II of SD Negeri 3 Taskombang Manisrenggo, Klaten is an alternative for teachers to improve the learning and teaching process in class. Based on the results of research and discussion, it can be concluded that the development of LKPD in the multiplication material at SD Negeri 3 Taskombang Manisrenggo is suitable for use in learning activities. This is based on media expert validation results of 86.40% and material expert validation results of 84.60%.

Adek and Harisman's research (2023:116-124) on the development of live worksheet-based E-LKPD with a contextual approach to solving mathematical problems for class VII SMP/MTs students found that the arrangement of data presentation material was arranged into five meetings. Next, based on the distribution of the material, an E-LKPD was prepared and divided into five meetings. In the end, there are practice questions that students can work on to measure their abilities after studying the material, and the ELKPD contains problem-solving practice questions, which are prepared based on a contextual approach consisting of 7 components. This development is used effectively and increases students' success in answering questions given by the teacher.

Research conducted by (Merrotsy, 2023) stated that based on the results of the distribution of multi-level road multiplication test questions to all third-grade students at Dapuan Elementary School, Surabaya, the level of multi-level road multiplication material was still relatively low. This is proven by the average test results for all class III students at SD Dapuan Surabaya of 60%. Based on the research above, the researcher developed a multiplication worksheet for class III elementary schools.

The difference between this research and other previous research is the focus on problem-solving to overcome operational difficulties and calculate multiplication-tiered paths through the development of LKPD. The aim of this research is to develop a multiplication worksheet for students to overcome the difficulties of multiplication operations and to produce an LKPD that meets the criteria of being valid, practical, and effective. For this reason, the researcher tried to conduct research entitled "Development of multiplication worksheet to overcome the difficulties of multiplication calculation operations for multi-layered roads in Class III MIS Madinatussalam."

METHOD

This research uses a type of development research or R&D (research and development). According to (Sugiyono, 2019), the R&D research method is a research method used to produce a particular product and test whether the product is effective in use. This research uses the ADDIE research design (Analysis, Design, Development, Implementation, and Evaluation). These five stages are a guide for researchers in creating LKPD media, assisted by subject matter experts, media experts, and third-grade students.

The purpose of the situation and environment analysis was to determine the necessary products to be developed and identify learning materials through curriculum analysis. At the Design stage, researchers began designing the LKPD product, focusing on content and appearance and preparing and validating the feasibility test instrument. The Development stage involved preparing the LKPD and conducting validation tests by media and material experts. During the Implementation stage, the LKPD was tested on students to gauge their responses. Finally, at the Evaluation stage, researchers assessed whether the product and each step of the activity met the specified requirements. The research was conducted at Mis Madinatussalam, involving a population of 30 students from class III-6, using a total sampling technique to include the entire population as the research sample.

The data collection techniques used by researchers in this research were interviews, validation sheets, learning outcomes tests, and student response questionnaires. (1) Interviews are conducted before research with subject teachers to obtain the information needed to develop an LKPD. The information needed is in the form of materials and curriculum used in the learning process at Mis Madinatussalam. (2) Validation sheets are intended for material experts, media experts, and education experts to test the validity of the product being developed. This validation sheet is the result of comments and suggestions on the LKPD that have been made to make the LKPD suitable for implementation in field trials. (3) Test the learning outcomes to determine the effectiveness of the multiplication LKPD in overcoming the difficulties of the multiplication calculation operation of the stacked roads that have been developed. (4) The student response questionnaire is used to determine the practicality of the LKPD multiplication of multiple paths from the responses/comments given by students on the questionnaire sheet.

In this research, the data obtained was analyzed qualitatively and quantitatively. Qualitative analysis is used to describe the product development process. Quantitative analysis is used to describe product quality assessments, response questionnaires, and learning outcomes tests. The results of data analysis are used to improve products.

Validation Sheet Data Analysis

Validation sheet data is calculated using the following formula:

$$\textbf{Nilai Validasi} = \frac{\textbf{jumlah skor jawaban validator}}{\textbf{jumlah butir}} \textbf{ x 100\%}$$

The average score value is interpreted based on the validity level categories presented in Table 1.

Table 1. Category of Validity Level of Multiplication LKPD

No	Category	Score
1.	Very Valid	81%- 100%
2.	Valid	61% - 80%
3.	Fairly Valid	41% - 60%
4.	Not valid	21% - 40%
5.	Invalid	0% - 20%

Practicality Data Analysis

The questionnaire given to students to measure the practicality of the multiplication LKPD to overcome the difficulty of the multiplication calculation operation of multiplication is calculated using the formula:

$$\textbf{Nilai Kepraktisan} = \frac{\textbf{jumlah skor angket siswa}}{\textbf{jumlah butir}} \textbf{x100 \%}$$

The average score is interpreted based on the practicality level categories presented in Table 2 as follows.

Table 2. Categories of Practicality Level of Multiplication LKP

No	Category	Score
1.	Very Practical	81% - 100%
2.	Practical	61% - 80%
3.	Quite Practical	41% - 60%
4.	Less Practical	21% - 40%
5.	Impractical	0% - 20%

Effectiveness Analysis

The effectiveness of the LKPD can be seen from the analysis of students' scores, which are known from the results of the pre-test and post-test using the formula:

$$N - Gain = \frac{skor\ post\ test - skor\ pre\ test}{skor\ ideal - skor\ pre\ tes}$$

The N-Gain (g) classification table below can be used to determine the effectiveness of LKPD:

Table 3. N-Gain Classification

No	Type of Scor	Option
1.	$g > 0{,}7$	High
2.	$0.3 \leq g \leq 0.7$	Medium
3.	$g < 0{,}3$	Low

The hypothesis in this research is:

H0: Multiplication LKPD is not effective in overcoming operational difficulties in calculating multiplication double-decker road

Ha: LKPD multiplication is not effective in overcoming operational difficulties. Calculating multiplication double-decker road.

FINDINGS AND DISCUSSION

Findings

The results of research into the development of multiplication LKPD to overcome the difficulties of arithmetic operations on multiplication materials in grades III-6 in mathematics subjects are 1) assessment of the content of the material by material experts, 2) Assessment of the LKPD design by media experts (LKPD), 3) Questionnaire students' responses to the use of LKPD to overcome difficulties in the multiplication calculation operation of stacked paths, 4) Test questions as a medium for evaluating the learning outcomes that students have obtained. Research on the use of Lkpd was carried out with the development of the ADDIE model as follows:

Figure 1. Front Cover of LKPD

Information:

Title of E-LKPD developed.

The class level is class VII.

Images related to the material on the operation of calculating the multiplication of stacked paths.

Writer's name.

a. Display of LKPD Identity

After the front cover, on the next page, the LKPD identity is shown. The design is in line with the cover, which includes basic competencies, learning objectives, and LKPD instructions. The LKPD identity display can be seen in Figure 2.

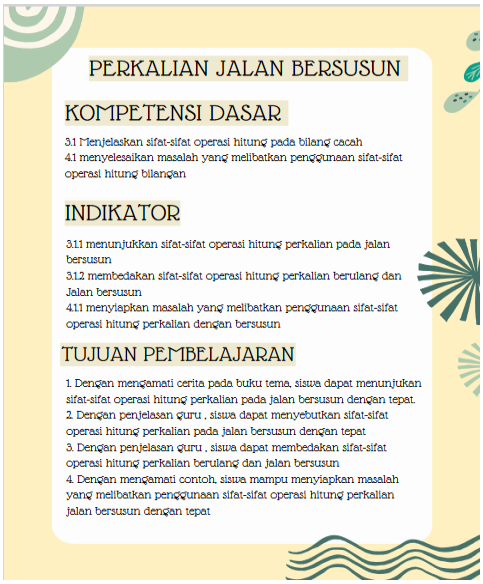

Figure 2. Displays of LKPD Identity

b. Instructions for Using LKPD

Instructions for use are on the same page as the LKPD identity. These instructions must be observed before using the LKPD. The background color used is light brown. Instructions for use are written in column form so that the writing looks neater and more grouped. In the instructions for using the LKPD, there is also a picture of the teacher getting something; this is so that the instructions for using the LKPD can be noticed by students. Instructions for use on the LKPD are in Figure 3.

Figure 3. LKPD Instructions

c. Learning Activities

Learning activities contain activity steps that are in accordance with the Contextual Approach model (inquiry authentic assessment, questioning, constructivism, learning community, modeling, reflection). In this activity, students are actively involved in solving problems in the LKPD. The role of educators is only to guide students in working according to mathematical problem-solving indicators. Learning activities begin with students' constructivism activities regarding problems. In this activity, students are introduced to the problem that needs to be solved. In the LKPD stage of constructivism, students are given problems in everyday life and analyze these problems. More details on students' constructivist activities regarding problems can be seen in Figure 4.

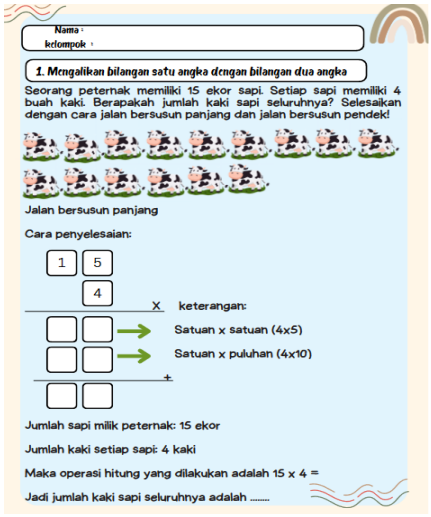

Figure 4. Learning Activities

1. Development Stage (Development)

At the development stage, the completed LKPD is designed and then validated by two expert validators to determine the feasibility of the LKPD that has been created. The feasibility of LKPD depends on the appropriateness of the material and media.

Material Feasibility

The feasibility of the LKPD material for the multiplication of stacked roads is known from the material's validation. The results of validation by material experts can be seen in table 4 below.

Table 4. Material Expert Validation Results

No	Aspect	Assessment Indicators	Score
1	Learning	Suitability of basic competencies (KD) with the material	4
		The material is presented systematically	4
		Accurate sentence structure and language that is easy to understand	3
2	Contents of the Material	The material is appropriate to the student's ability level	4
		Suitability of the material to the child's cognitive development/ability level	4
		The learning instructions are clear	4
		The material presented is clear and specific	3
Total Score			**26**

Media Eligibility

The feasibility of the LKPD media for the multiplication of multi-tiered roads is known from media expert validation. The validation results by media experts can be seen in table 5 below.

Table 5. Media Expert Validation Results

Assessment Indicators	Assessment items	Score
Size of Learning Media	1. Suitability of size to use of learning media	4
	2. Suitability of size to the material/content of teaching materials	3
Cover Design for Learning Media	3. The appearance of the layout elements on the cover is unified and consistent	4
	4. The paper used is appropriate	3
	5. Good image quality	3
	6. The colors of the layout elements are harmonious and clarify the function	4
	7. The letters used are attractive and easy to read	3
	8. Don't use too many font combinations	3
	9. Illustration of the LKPD cover for the content/material of the teaching material and reveal the character of the object	3
Learning Media Design	10. Layout consistency	3
	11. The separation between paragraphs is clear	4
	12. Elements of harmonious layout	4
	13. Spacing between text and illustrations is appropriate	4
	14. Appropriate placement of titles, subtitles, illustrations	3
	15. The use of letter variations is not too excessive	4
Score		**52**

Media validation produced a total score of 52 with a score percentage of 86.6%, and this places the classification in a very valid category with an interval of 81% - 100%. Media revisions are carried out using images that are appropriate to the material, as well as color design, font type, and font size, which need to be improved so that they can be read clearly.

Table 6. Overall Validity Test Results

No	Validator Type	Validation Score (%)	Criteria
1.	Materials Expert	92.8 %	Very Valid
2.	Media Expert	86.6 %	Very Valid
Average		**89.7%**	**Very Valid**

Based on the calculations in Table 6, it was found that the validity test results of the LKPD developed were 89.7%, which was in the very valid category, so it could be said that this LKPD was suitable to be tested on students.

2. Implementation Stage (Implementation)

At this stage, the LKPD, which has been developed and is suitable for use, is then tested in mathematics learning material on multiplication of multi-level paths for grade III elementary school. The practicality of the LKPD for the multiplication of stacked roads can be assessed based on the student response questionnaire scores, as well as the effectiveness of the LKPD based on the results of *the pre-test* and *post-test*; the test used is the description test.

3. Evaluation Stage (Evaluation)

Currently, we are at the evaluation stage, the LKPD on the operation of calculating multiplication of multiplication, which has been validated and then tested to see the level of effectiveness and practicality so that it can be applied in the mathematics learning of multiplication material. After using the trial, there are no specific suggestions, input, or criticism from users that can be used as revisions to improve the product.

The practicality of LKPD Multiplication of Layered Roads

During the lesson, the students seemed very enthusiastic about working on the LKPD to calculate the multiplication of stacked roads. Because the LKPD contains pictures and questions that provoke students' curiosity about the LKPD on the multiplication material of multilevel paths. Students seemed very enthusiastic about filling in the questions on the LKPD.

Practicality is measured using an assessment instrument in the form of a response questionnaire for learners. Giving questionnaires to students was used to determine the level of practicality in the LKPD trial on the multiplication calculation operation of the stacked roads that had been developed. The results of the data obtained can be seen in table 7.

Table 7. Results of Student Response Questionnaire Analysis

No	Practicality Criteria	Category assessment results
1	Student Response Questionnaire	88.21% Very Practical

Based on table 7. The results of the overall student response questionnaire assessment obtained an average percentage of 88.21% in the "Very Practical" category. Effectiveness of the LKPD Operation to Calculate Multiplication of Stacked Roads *pre-test* and *post-test* scores are seen in table 8 below.

Table 8. Recapitulation of *Pre-test* and *Post-test Scores*

No	Subject	Obtained Average Value	
		***Pre-Test* Score**	***Post-Test* Score**
1.	18 Third-grade Students	62.16	78.83
2.	Average N— *Gain* (g)	0, 44	
Average N-Gain (g) percent		**44%**	

Based on table 8. The number of students who took *the pre-test* and *post-test* was 30 students. The highest *pre*-test score obtained by students was 85, and the lowest score was 40. There were also 12 students who had achieved completion and 18 students who had not reached the Minimum Completion Criteria (KKM). However, overall, the average score obtained from *the pre-test* was 62.16. Meanwhile, the highest *post-test* score obtained by students was 100, and the lowest score was 40. There were also 24 students who had achieved completion, and six students had not reached the Minimum Completion Criteria (KKM). However, overall, the average score obtained from *the post-test* was 78.83. This shows that there is an improvement after the use of LKPD in the operation of calculating the multiplication of multi-layered roads in learning. By referring to *the pre-test* and *post-test values*, the n-gain value is 0.44 and meets the range of 0.3, ≤n-gain ≤0, 7 in the medium category with quite effective criteria.

Discussion

Based on a needs and curriculum analysis conducted through interviews with teachers and students at Mis Madinatussalam, it was observed that class III-6 had implemented the 2013 curriculum in the learning process. Researchers identified the core competencies (KI) and basic competencies (KD) necessary for developing an LKPD focused on multiplication to facilitate active student learning. Previous observations highlighted that the existing teaching materials in the form of LKPD primarily consisted of explanations and practice questions, lacking a layered concept of multiplication. Additionally, teachers, as facilitators, had not yet developed their own LKPD tailored to students' needs. This analysis revealed that several students had below-average grades, indicating the necessity for a more effective and targeted approach to teaching multiplication (Bosher & Smalkoski, 2002; Khatri, 2017; Ricard et al., 2023; Smith et al., 2022).

At the design stage, the results obtained were the references used in preparing this LKPD, namely the theme package book for SD/MI Class III. Next, the product design is prepared according to the material chosen by the researcher, namely the multiplication calculation operation of stacked roads. The designed student worksheet (Lkpd) consists of LKPD cover, KI & KD, learning objectives,

instructions for use, and questions. This LKPD was created using the Canva application. Apart from being easy to access, the Canva application also provides various features for image, design, animation, etc., making it easier for researchers to design LKPD.

At this stage, an analysis of needs, curriculum, concepts, and students is carried out to design LKPD that is in line with students' needs. The following describes the characteristics of the LKPD being developed:

The front cover contains the title and specifications of the LKPD. The front cover of the LKPD is designed to be as attractive as possible and depict the material in the LKPD. The design of the front cover of the LKPD is in Figure 1. Based on the results of the total material validation score, namely 29 with a percentage of 92.8%, including the very valid category with classification in the interval 81% - 100%, the results on the suitability of the material in the LKPD multiplication of layered roads are suitable for use with slight revisions. The revision of the material that has been carried out is to improve the illustrations and the writing in the steps to be written more clearly and in more detail so that students can understand them well. (Hujala et al., 2020; Liu et al., 2024; Wondim et al., 2024).

Based on the research findings of the multiplication LKPD to overcome students' learning difficulties, it shows that the LKPD regarding the operation of multiplication calculations meets the criteria of being valid, practical, and effective for use as teaching material for teachers and students. This is in line with Rubio-Zuazo & Castro, 2022), which employ stages of the scientific approach in teaching and learning activities to facilitate an easier, more systematic, and structured process. This structured approach ensures that learning activities are organized in a logical sequence, which helps students understand and internalize the material more effectively. As a result, students are more likely to engage deeply with the content, participate actively in classroom activities, and ultimately achieve better learning outcomes. The scientific approach in the LKPD not only aids in comprehension but also encourages critical thinking and problem-solving skills, making the entire educational experience more enriching and productive for students (Smeplass, 2023; Zhai & Wibowo, 2023).

Likewise, the results of research conducted by (Tamur et al., 2021) show that learning using a scientific approach plays an important role in improving problem-solving abilities because, with this approach, students will fully express their academic knowledge and skills both inside and outside the school environment. Solving existing problems makes students more active in conveying their

ideas. Not only that, but the role of LKPD using a scientific approach also makes students no longer feel difficulty when repeating understanding algebraic calculation operations material even though they are outside of learning and makes it easier for students to understand the material because of the systematic presentation of the material (Antunes & Hill, 2024; Harel, 2017).

The research on the development of the multiplication LKPD to address difficulties in arithmetic operations, specifically in multiplication for grades III-6 in mathematics, involved a thorough assessment of its validity, practicality, and effectiveness. The development followed the ADDIE model, encompassing the Analysis, Design, Development, Implementation, and Evaluation stages. Here, we will discuss the key findings and analyze the data presented. (Gavarkovs et al., 2019; Johnson-Barlow & Lehnen, 2021; Mullins, 2014).

The material experts assessed various aspects, including the alignment of the basic competencies (KD) with the material, systematic presentation, language clarity, and appropriateness for the student's cognitive level. The overall score from the material experts was 26 out of a possible maximum, indicating high validity. Specific scores, such as the systematic presentation of material and alignment with basic competencies, received perfect scores. (Jahanvand et al., 2023).

Media experts evaluated the LKPD design by focusing on several critical aspects, including the layout, image quality, font readability, and overall design consistency. The media validation process yielded a total score of 52, with a percentage score of 86.6%, classifying the LKPD as very valid within the 81%-100% interval. Despite the high validation score, the experts recommended several improvements to further enhance the readability and effectiveness of the LKPD. These recommendations included selecting more appropriate images, refining the color design, and optimizing font choices to ensure that the text is clear and easy to read for all students (Delamarre et al., 2021; Merenda et al., 2024; Slattery et al., 2019).

Combining the validation scores from both material and media experts, the average validation score was found to be 89.7%, which places the LKPD in the "very valid" category. This high validation score indicates that the developed LKPD meets the rigorous standards set by both sets of experts, ensuring its appropriateness and effectiveness as an educational tool. The comprehensive evaluation process covered various aspects such as content alignment, systematic presentation, language clarity, layout design, image quality, and font readability. As a result, the LKPD is deemed highly suitable for use in educational settings, providing a reliable and well-

validated resource for teaching and learning. (Ali et al., 2024; Heo et al., 2024; Pan et al., 2021; Trabelsi et al., 2022).

The practicality of the LKPD was assessed through student response questionnaires, which revealed that students found the LKPD highly engaging. This engagement was particularly due to the inclusion of pictures and structured questions designed to stimulate curiosity. The results from the questionnaires showed an average practicality score of 88.21%, categorizing the LKPD as "Very Practical." This high level of practicality indicates that the LKPD is not only effective in capturing students' interest but also beneficial in enhancing their learning experiences. Consequently, students are likely to both enjoy and gain significant educational value from using the LKPD in their studies. (Ibrahim & Aljneibi, 2022; Jaouaf et al., 2024).

The effectiveness of the LKPD was measured by comparing the pre-test and post-test scores of students. The average pre-test score was 62.16, while the average post-test score increased to 78.83, indicating a significant positive impact of the LKPD on students' understanding and performance in multiplication tasks. Before using the LKPD, the highest pre-test score was 85, with the lowest being 40. After implementing the LKPD, the highest score achieved was 100, while the lowest score remained at 40. The number of students meeting the Minimum Completion Criteria (KKM) increased notably from 12 in the pre-test to 24 in the post-test. Additionally, the N-Gain score, which measures the effectiveness of educational interventions, was 0.44. This score falls within the medium category ($0.3 \leq$ N-Gain ≤ 0.7), signifying a moderate but meaningful improvement in students' learning outcomes. These results collectively demonstrate that the LKPD effectively enhances students' comprehension and proficiency in multiplication (Chen & Lin, 2021; Chiang et al., 2024; Evert & Stein, 2022).

The research demonstrates that the developed multiplication LKPD is a valid, practical, and effective tool for addressing learning difficulties in arithmetic operations among elementary school students. The validation process confirmed its appropriateness and quality, while the implementation phase showed that students responded positively and benefited from its use. (Iancu et al., 2024; Puthusserry & Delariarte, 2023; Wang et al., 2022). The pre-test and post-test comparisons provided clear evidence of its effectiveness, making it a valuable resource for educators in enhancing students' mathematical skills. Future research could focus on expanding the study to diverse cultural and economic contexts to validate these findings further and ensure the LKPD's broad applicability.

CONCLUSION

The research into the development of the multiplication LKPD (Lembar Kerja Peserta Didik) aimed at overcoming arithmetic operation difficulties among elementary school students has shown that it is a valid, practical, and effective educational tool. Following the ADDIE model, the LKPD received high validation scores from both material and media experts, with an overall average of 89.7%, classifying it as "very valid." Student response questionnaires indicated high engagement and practicality, with an average score of 88.21%. The effectiveness was further demonstrated through significant improvements in pre-test and post-test scores, with the average post-test score increasing from 62.16 to 78.83 and the N-Gain score of 0.44 indicating moderate improvement. These findings suggest that the LKPD effectively enhances students' mathematical skills and is well-suited for educational use. Future research should explore its applicability in diverse cultural and economic contexts to further validate its effectiveness.

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