

THE EFFECT OF JARIMATIKA METHOD USING PAPET MEDIA ON LEARNING OUTCOMES OF 4TH GRADE STUDENTS MULTIPLICATION

Alfina Shofiyana Damayanti^{1*}, Erna Zumrotun², Wulan Sutriyani³

^{1,2,3} Nahdlatul Ulama Islamic University Jepara, Indonesia

Email: ¹ 201330000698@unisnu.ac.id, ² erna@unisnu.ac.id, ³ sutriyani.wulan@unisnu.ac.id

ABSTRACT

One of the reasons why the multiplication learning outcomes of grade 4 students at SD Negeri 03 Kedungleper are low is because the students' understanding of the multiplication material is poor. This research aims to determine the relationship between the use of the Jarimatika method using papet media before and after, as well as how much influence this method has on the learning outcomes of grade 4 elementary school students. This research is quantitative research that uses an experimental approach with a one-group pretest-posttest design. The place where this research was conducted was SD Negeri 03 Kedungleper. The research population was grade 4 students, and the sample was 19 grade 4 students. Data collection techniques included observation, tests, and documentation techniques. From the results of the t test analysis, it can be seen that the use of the Jarimatika method with papet media has a significant influence on the multiplication learning outcomes of grade 4 students at SD Negeri 03 Kedungleper. The calculated t value of 8.732 is greater than the t table value of 1.734, indicating that there is a very significant influence. It has been proven to be an appropriate learning method to help students master multiplication material, as evidenced by student learning outcomes which have increased by 40%. Before this method was used, the average student pretest score was 49.79. After this method was implemented, the average posttest score increased to 80.42. This 40% increase means that students show significant improvement in mastering multiplication material after using the Jarimatika method with paper media, compared to the previous teaching method.

Keywords: Matic Fingers, Papet, Learning Outcomes

*** Corresponding Author Email:** 201330000698@unisnu.ac.id

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INTRODUCTION

Mathematics is a very important subject at elementary school level, and is taught since students enter first grade. Mathematics has benefits for everyday life such as financial calculations, personal needs, addition, multiplication and division operations (Setyawan & Putra, 2020). Mathematics is very important in elementary school because it helps students learn to count according to their abilities. Apart from that, mathematics also plays an important role in students' future lives (Shipa Faujiah & Nurafni, 2022). Mathematics in elementary school is very important because it has special characteristics that help develop various abilities of students. One

of them is the characteristic of numbers in multiplication operations. In the characteristics of numbers, students are taught about the concept of numbers up to 100, and how to calculate them, such as adding, subtracting, multiplying and dividing.

One of the lessons taught in 4th grade is multiplication of numbers. Multiplication is a way to add numbers repeatedly (Afriani et al., 2019). Multiplication is a repeated process of adding each term to the same number (Kurniawan, 2020). This is in line with opinion Nurmaulani et al (2022) that multiplication of numbers can be explained as repeated addition of a number, such as $a \times b = b + b + b + \dots$.

The results of observations carried out in class 4 of SD N 03 Kedungleper on Saturday, March 16 2024 found problems regarding students' ability to understand the concept of multiplication. Some students find it difficult to understand the concept of simple multiplication given by the teacher. There are not many variations in mathematics learning methods and media due to limited infrastructure. Therefore, teachers have not been able to utilize various types of media that are in line with the progress of the times. Using appropriate learning media is very important so that students understand the material better and teachers can develop better ways of teaching (Nurfadhillah et al., 2021).

One of the reasons why the multiplication learning outcomes of grade 4 students at SD Negeri 03 Kedungleper are low is because the students' understanding of the multiplication material is poor. Abdurrahman (Nabillah & Abadi, 2019) stated that one of the reasons why students find it difficult to understand the concept of multiplication is the teaching method used by teachers, such as the traditional method where students only listen without being much involved in the learning process in class. Apart from that, one of the reasons why students' mathematics learning outcomes are low is because they do not understand the concept of multiplication. Many students find multiplication more difficult and intimidating than other math subjects. Meanwhile, Suryabrata (Oktaviani et al., 2020), internal and external factors are among the causes of low learning outcomes. Internal factors include physical and psychological conditions. These physical conditions include students' health that can affect their ability to learn well. Meanwhile, psychological factors include students' motivation, interests and talents which also influence their achievement at school. On the other hand, there are external factors including social and non-social factors. The student environment is an example of social factors, while the conditions of the learning environment and available facilities are examples of non-social factors.

There are three types of learning outcomes, namely knowledge (cognitive), attitudes (affective), and skills (psychomotor). The focus of this study was cognitive outcomes. Learning outcomes according to Susanto (Zumrotun et al., 2020) refer to students' abilities after participating in the teaching and learning process. During the learning process, a person tries to change his behavior to be more consistent. Teachers usually set learning goals in instructional or learning activities. If students successfully achieve learning or instructional goals, it means they have succeeded in learning. Meanwhile, Anni et al (Harminah, 2020) stated that changes in behavior made by students after the learning process are called learning outcomes. This means that learning outcomes are what a person obtains from the learning process, including changes in knowledge, attitudes and behavior. This ability is obtained through learning activities carried out by students.

The method chosen for the learning process has a major influence on the learning outcomes achieved. Syaiful Bahri Djamarah and Aswan Zain (Mulyono, 2022), Learning methods are an important part of the learning process. This method can function as an extrinsic tool where the teacher acts as a motivator for students. When teachers become motivators, they provide external encouragement that can arouse students' enthusiasm for learning. Therefore, educators must have appropriate learning methods. Meanwhile, Hasby Ashdiqi (Akmalia, 2022) stated that learning methods are a variety of methods used to achieve learning goals.

Based on this problem, researchers try to conduct research using innovative and creative learning methods where students are directly involved and participate in the learning process. Teachers can use the Jarimatics method to teach (Sutriyani & Widyatmoko, 2020) . There are several reasons why the Jarimatics method was chosen . It is hoped that this method can encourage students to be more active in their learning process and understand the concept of multiplication well by using physical involvement, such as counting with their fingers. This helps students to master multiplication quickly without depending on a calculator.

This method was previously researched by Indiatuti (2021) with the title "The Influence of the Multiplication Jarimatika Method in Mathematics Lessons on MIN 1 Madiun Learning Outcomes". This research shows that the use of the Jarimatika method has succeeded in improving students' learning outcomes and also their motivation in the learning process . There is also research by Nurjuliani et al (2022) entitled "The Effect of the Multiplication Jarimatika Method using Papet Media on Mathematics Learning Outcomes for Class III Students at SD Negeri 1 Kanan Menang" research shows that the use of the Jarimatika method really helps reduce students' learning burden in mathematics, especially when learn multiplication. This method is adapted to the development of elementary school students in order to achieve the best results. Paper media (finger puppets) are an interesting and fun tool for this method, because students can play with finger puppets and use their fingers to learn .

The Jarimatika method can help grade 4 students understand the concept of multiplication better . Jarimatika is a mathematical method that uses the fingers to perform various mathematical operations such as multiplication, division, addition and subtraction. This method not only helps in learning mathematics, but also strengthens cognitive abilities such as concentration, memory, and logical analysis. Involving the brain and hands in calculations, finger math allows children to perform calculations more quickly and efficiently (Siregar et al., 2024) . Meanwhile, Ayurachmawati et al (2021) "Jarimatics is an easy and fun method of teaching counting for elementary school children." This method makes counting easier and faster, especially in multiplication. Apart from that, students will also enjoy moving their fingers when doing multiplication, so that learning doesn't feel boring and monotonous.

The researcher used paper media (finger puppets) in accordance with the Jarimatika method. These finger puppets are smaller than hand puppets and are used as learning aids . Madyawati (Purnawati & Mustika, 2021) states that finger puppets are small characters that are attached to the fingers and used when telling stories or counting. Gunarti, et al (Nurjuliani et al., 2022) states that paper media, also called finger puppets, are small puppets that can be inserted into fingers the size of adult fingers and used to convey material.

Based on the background that has been explained, the researcher will take the title "The Influence of the Jarimatika Method Using Papet Media on Mathematics Learning Results for Multiplication Material for Grade 4 Elementary School Students". This research aims to determine the relationship between the use of the Jarimatika method using papet media before and after, as well as how much influence this method has on the learning outcomes of grade 4 elementary school students.

METHOD

This research is quantitative research that uses an experimental approach with a *one-group pretest-posttest design*, because there was only one group to compare students' understanding between before and after treatment. The research population was grade 4 students, and the sample was 19 grade 4 students. The method used to select samples was *purposive sampling*. *Purposive sampling* was used because this research wanted to select a sample from all 4th grade students who could take part in the experiment with the design *one-group pretest-posttest* . Data techniques are collected through observation, tests, and documentation techniques. Research with a *one-*

group pretest-posttest design can be explained as follows: measurements before treatment (O1) are carried out before the treatment is given, while measurements after treatment (O2) are carried out after the treatment is given.

The difference between O1 and O2 is considered to be the result of the treatment or experiment carried out. To understand the objectives of this research more clearly, the research design was designed as follows:

1. All students will be given pre-test questions to assess their understanding in mathematics before learning using the mathematics method using paper media.
2. Learning using the Jarimatika method with paper media will be applied to students, with a focus on multiplication material.
3. After learning is complete, students will be given a test after the lesson to determine whether there is a difference in learning outcomes after the method is used.

If the average final test score (after treatment) increases significantly, this indicates that this learning approach was successful. However, if the final test score (after treatment) does not experience a significant change or if there is a significant decrease in the score, then learning success cannot be ensured.

Kunandar (Setyaningsih et al., 2020) categorizes student learning outcomes based on the following criteria:

Table 1. Criteria for assessing student learning outcomes

Value Percentage	Criteria
86-100	Very good
75-85	Good
56-74	Enough
<55	Not good

Researchers use a method to analyze data that consists of two steps. **First**, a prerequisite test is carried out to ensure whether the data is normally distributed. **Second**, after ensuring that the data has a normal distribution, the hypothesis is tested using the *Paired Sample T Test* using the SPSS application. This research aims to find out whether there is a difference in the achievement of student learning outcomes before and after using the Jarimatika method with the help of papet media. Carry out a simple linear regression analysis to find out whether the independent variable (X) has a significant effect on the dependent variable (Y).

RESULTS AND DISCUSSION

The results of observations carried out in class 4 of SD N 03 Kedungleper on Saturday, March 16 2024, showed that several students experienced difficulties at the initial stage in understanding the concept of simple multiplication. After implementing the Jarimatika method using papet media, there was a significant increase in students' understanding. Students show high enthusiasm during the learning process with this media. Some students who were previously slow in understanding multiplication were able to follow the material better with visual aids and manipulatives from finger puppets (paper).

Table 2. Normality Test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Pretest Learning Outcomes	.133	19	.200 *	.942	19	.281
Posttest Learning Outcomes	.197	19	.050	.908	19	.068

Based on the normality test, it can be concluded that the data that has been collected has a normal distribution. The significance value of the test is 0.068, which exceeds the significance limit value that has been set at 0.05. After obtaining data from the first step of testing, the researcher then entered the *pretest* and *posttest* scores in the next stage, namely the T test. The aim of this research was to find out whether there were differences in student learning outcomes before and after applying the Jarimatika method using papet media.

Table 3. Average Pretest-Posttest Score (Paired Samples Statistics)

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest Grade 4 MTK Scores	49.79	19	19,355	4,440
	Posttest Grade 4 MTK Scores	80.42	19	15,255	3,500

From this table, it can be concluded that the Jarimatika method with papet media shows clear differences in student learning outcomes . Evidence of this difference is the increase in students' scores after the exam (*posttest*) which was higher than the previous score (*pretest*), namely 80.42 compared to 49.79.

Table 4. Paired Sample T-Test

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pretest Nilai MTK Kelas 4 - Posttest Nilai MTK Kelas 4	-30.632	15.291	3.508	-38.001	-23.262	-8.732	18	.000

The data table above shows that the calculated t value is 8.732, which is greater than the t table value of 1.734. This shows that the use of the Jarimatika method using paper media has a great influence on the multiplication learning outcomes of grade 4 students at SD Negeri 03 Kedungleper. The results of learning mathematical multiplication show a very low value, namely 0.000, with an α value of 0.05. Because the p-value is smaller than α , the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted based on the t statistical test.

Simple regression analysis is used to find out whether the independent variable (X) has a significant effect on the dependent variable (Y). The results of the linear regression trial show the following results:

Table 5. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1675.909	1	1675.909	11,338	.004 ^b
	Residual	2512.722	17	147,807		
	Total	4188.632	18			

a. Dependent Variable: Posttest

b. Predictors: (Constant), Pretest

The significance value of the data is 0.004, meaning less than 0.05, so it can be concluded that there is a relationship between the dependent variable and the independent variable . Or, the use of the Jarimatika method with paper media has influenced the multiplication learning outcomes of class IV students at SD Negeri 03 Kedungleper.

Based on previous research entitled " *The Effect of the Jarimatika Method on the Multiplication Learning Outcomes of Class III Students at SD Inpres Sikumana 3 Kupang* " by

(Bete et al., 2021) Research shows that the use of the Jarimatika method significantly improves student learning outcomes in understanding multiplication compared to the use of traditional methods. Apart from that, research (Nurjuliani et al., 2022) entitled " *The Effect of the Jarimatika Multiplication Method using Papet Media on the Mathematics Learning Outcomes of Class III Students at SD Negeri 1 Kanan Menang* " According to this research, the application of the Jarimatika method with Papet media improves multiplication learning outcomes. So, the researchers concluded that the application of the Jarimatika method using paper media had a big impact in increasing the achievement of learning outcomes multiplication for grade 4 students at SD Negeri 03 Kedungleper.

By using the *R-square* results, the *summary model* can show how much influence the use of the Jarimatika method and papet media has on the achievement of students' multiplication learning outcomes in class 4 at SD 03 Kedungleper.

Table 6. *Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.633 ^a	.400	.365	12,158

a. Predictors: (Constant), Pretest

There is a possibility that the achievement of multiplication learning outcomes for 4th grade elementary school students can be influenced by 40% by the use of the Jarimatika method with papet media, as shown by the *R-square* from the table above, which is 0.400 or 40%. This is in line with (Akmalia R., 2022) that student learning outcomes in multiplication operations have increased compared to learning mathematics without the mathematics method.



Figure 1. Process of Learning Activities

Based on the results above, it is known that using papet media in the multiplication math method is very influential in improving student learning outcomes. The results of the t test analysis showed that the t value was 8,732, while the t value in the table was 1,734. Since the calculated t value (8.732) is much larger than the t value in the table (1.734), So it can be concluded that the learning method using Jarimatika with the help of papet media significantly improves student learning outcomes. This evidence can be seen from the significant increase in student learning outcomes, shown by the data obtained from the *posttest* and *pretest* results of $80.42 > 49.79$, where the results on the *posttest* are greater than the *pretest* results. According to

Indiastuti T. (2021), the student's intelligence factor determines how quickly students absorb the material provided by the teacher, so that providing appropriate learning methods can support and make it easier for students to absorb the learning material.

This research also shows that the use of the Jarimatika method with paper media has a significant influence on students' achievement of learning outcomes in multiplication material. From the results of the *R-square value*, it is proven that the use of the Jarimatika method with the help of paper media significantly influences student learning outcomes. As can be seen from the *R-square value* which reached 0.400, the use of paper media for the Jarimatika method can explain 40% of the variation in student learning outcomes. This Jarimatika method is used in multiplication material in class 4 of SD Negeri 03 Kedungrejo, allowing students to master the material quickly.

Apart from that, research from Nurjuliani et al (2022) also supports these results, where this research found that the Jarimatika method using paper media increased mathematics learning achievement in class III students at SD Negeri 1 Kanan Menang. This research states that the mathematics method helps students avoid excessive cognitive load when learning mathematics, especially multiplication. These results are also supported by research by Bete et al (2021), which shows that the Jarimatika method can significantly improve student learning outcomes in studying multiplication compared to traditional methods.

Meanwhile, Siregar et al (2024) stated that mathematics not only helps in learning mathematics but also strengthens cognitive abilities such as concentration, memory and logical analysis. This research is in accordance with the results of research conducted by Ayurachmawati et al (2021) which states that the finger method makes counting easier and faster, especially in multiplication, and makes learning more fun and less boring for students.

Students who initially had difficulty mastering multiplication material experienced rapid progress in absorbing and understanding the material using this method. As previously researched by Akmalia (2022), learning to use fingers to count makes students happy because they can use them at school or at home. This method is practical, allowing students to calculate anywhere easily. This increases students' comfort and confidence in studying mathematics.

Furthermore, learning mathematics in multiplication becomes more fun because students can use the fingers of their right or left hand to count, so they become more enthusiastic and actively participate in learning. Student learning outcomes have been significantly improved by using the Jarimatika method, and students have become more motivated to take part in learning activities. In fact, students who have difficulty understanding multiplication using the grammar method actively ask friends and teachers, creating a collaborative and supportive learning atmosphere.

Based on the learning process carried out by researchers, learning begins by presenting material as teaching material first. The concept of multiplication of numbers and story problems is introduced using the finger puppet method, then students work together in groups to practice and discuss multiplication problems. They were given direction through group discussions, and each group explained the results of their collaboration. These results are then analyzed and evaluated by other groups. The obstacle experienced during learning is that some students are slow in understanding the concept of multiplication using the Jarimatika method, which can be caused by differences in cognitive abilities and adaptation to new learning methods.

To overcome this difficulty, more attention and an individual approach in explaining the concept of mathematics to students who experience difficulties is an effective solution. The application of the Jarimatika method using paper media in class 4 learning went well, with students who were very enthusiastic about practicing this method through the questions given to their respective groups. Even after all the questions were done, they were still excited to be given additional questions.

The Jarimatika method using paper media has succeeded in eliminating boredom during the learning process, making students more enthusiastic and more active in class. Thus, the Jarimatika method with media can improve student learning outcomes and can make the learning process more interesting and support students' cognitive development. The implementation of the Jarimatika method applied at SD 03 Kedungleper can be used in other schools to help students learn multiplication better.

CONCLUSIONS AND SUGGESTIONS

Based on research conducted at SD Negeri 03 Kedungleper, it was found that grade 4 students at SD Negeri 03 Kedungleper showed a significant increase in their learning outcomes when using the Jarimatika method which used papet media rather than the lecture and rote method. By using an experimental research method with a one-group pretest-posttest design, the researcher tried to compare how students in class 4 at SD Negeri 03 Kedungleper learned using the lecture and memorization method compared to the Jarimatika method which used papet. From the results of the analysis carried out using the SPSS 22 application, it shows that the significance limit of 0.05 is greater than the significance value (p-value) of 0.000. The H_0 hypothesis is rejected while the H_a hypothesis is accepted. This shows that the values before and after treatment in the study were influenced by the treatment. Apart from that, the Jarimatika method using paper media is superior and has a big influence on student learning outcomes, with *posttest* scores being higher than *the pretest*. The *R-Square* value of 40% shows that this method has a significant impact on student learning outcomes.

The Jarimatika method using papet media is recommended to be applied in various schools because it has proven to be effective in helping students understand multiplication material better. This method is successful in eliminating boredom during the learning process, making students more enthusiastic and active in class, and increasing their participation. An individual approach in explaining the concept of mathematics to students who experience difficulties is also an effective solution to overcome learning obstacles. Thus, the use of the Jarimatika method with paper media can improve students' mathematics learning outcomes and make the learning process more interesting, supporting students' cognitive development. The successful implementation of this method at SD 03 Kedungleper can be used as an example for other schools.

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