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Implementation of Jarimatika Method to Improve Multiplication Calculation Ability in Grade III Elementary School Students

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Abstract: This study aims to describe the use of the jarimatika method to improve multiplication calculation skills in grade III students at SD Negeri 2 Surabaya Utara in the 2023/2024 Academic Year. This research approach is a classroom action research with four stages, namely planning, implementation, observation, and reflection. Data collection techniques in this study used observation, tests and documentation. The data obtained from the research results were then analyzed using data analysis consisting of three stages, namely (1) data reduction, (2) data presentation, (3) drawing conclusions. Based on the initial conditions, the first data obtained were only 11 students (60.4%) whose scores were able to reach the KKTP while 14 students (39.6%) whose scores were below the KKTP. After conducting the research, the results obtained showed that in cycle I there were 19 students (72.48) who were able to achieve the KKTP score and 6 (27.52%) students whose scores were below the KKTP. Meanwhile, in cycle II, there were 2 students (19.28) who were below the KKTP and 23 (80.72%) students who were able to achieve the KKTP score. This shows that learning activities using the jarimatika method can improve student learning outcomes in multiplication material..

Keywords: Jarimatika, PTK, Arithmetic Ability, Multiplication.

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Introduction

Education is the key to success for a nation that wants to progress. Law Number 20 of 2003 concerning the National Education System states that education aims to develop the potential of students to become human beings who believe and are devoted to God Almighty, have noble morals, are knowledgeable, creative, independent, democratic and responsible.

The education process is actualized in the form of learning activities in schools consisting of various subjects, one of which is mathematics. Mathematics is one of the important subjects for children. Mathematics subjects have been introduced since children entered Elementary School (SD). Mathematics is one of the subjects taught in schools with the most frequency of lesson hours compared to other subjects. Mathematics lessons are basic skills that must be mastered by children before studying other subjects. According to (Susanti, 2020) the aim of teaching mathematics in elementary education is to emphasize the arrangement of reasoning and the formation of student attitudes that can be transferred through mathematical activities.

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General competencies or abilities of learning mathematics in elementary school include "performing arithmetic operations of addition, subtraction, multiplication, division along with mixed arithmetic operations including those involving fractions." Arithmetic is a basic part of mathematics that cannot be separated from daily life, both at elementary school and college levels. (Jovita et al., 2024). One of the arithmetic skills that must be mastered by elementary school students is basic multiplication, namely multiplication 0-10 (Hayati et al., 2023), so that many teachers in elementary schools require their students to memorize basic multiplication to help and make it easier for them to count, especially in the field of multiplication (Dewi et al., 2023; Sihombing et al., 2023). This is because basic multiplication is always used up to higher schools. Children who have not mastered basic multiplication in the lower grades will be one of the obstacles in the next class when studying the same material, because mathematics is always continuous. Based on the results of observations conducted by researchers at SD Negeri 2 North Surabaya, especially in class III, students' mathematics learning outcomes in basic multiplication arithmetic material are still low. Namely, most of the students' scores are below the KKM with a KKM score of 70. This is because when the teacher explains the teaching material, students pay less attention to the explanation given by the teacher, even some of the students talk and play with their deskmates and the use of learning methods used by the teacher, especially the material on multiplication arithmetic operations, still uses memorization techniques, and the lack of media or teaching aids used to support learning, this can be seen based on the results of the pre-test given by the researcher by giving questions in the form of essay tests, out of 25 students, 11 of whom were male and 14 female out of 25 students only 11 students got scores above the Minimum Completion Criteria (KKM) and 14 children got scores below the KKM, where the highest score was 85 and the lowest score was 30 while the learning outcome score obtained classically was 44%. Based on this, it can be seen that the mathematics learning outcomes in the basic multiplication addition material achieved by grade III students of SD Negeri 2 Surabaya Utara are still low and the main cause of students' learning outcomes in the basic multiplication material is not good, in addition to external and internal factors of the child is due to the memorization method factor carried out by the teacher which makes children tend to feel burdened and become lazy with mathematics lessons. Referring to this problem, to improve mathematics learning outcomes in basic multiplication material at SD Negeri 2 Surabaya Utara, the researcher emphasizes the use of the jarimatika method which uses 10 fingers as a tool for the basic multiplication calculation process which will make it easier for students to solve basic multiplication problems.

Basic multiplication arithmetic ability is a person's ability or capability to carry out one aspect of repeated addition arithmetic operations, more broadly (Muhajir, 2023), The ability to calculate multiplication can be interpreted as mastery of basic arithmetic which is part of a mathematical operation which includes addition, subtraction, multiplication and division (Alisnaini et al., 2023). Some indicators of multiplication calculation ability include the ability to memorize multiplication tables, the ability to understand the concept of multiplication as repeated addition, the ability to solve multiplication problems quickly and accurately, and the ability to apply the concept of multiplication in everyday life (Faujiah, 2022).

Jarimatika is a method of calculating mathematics using fingers as an aid (Hidayah & Islamiah, 2022). The use of the jarimatika method is in line with the use of teaching aids so that abstract mathematical concepts appear concrete (Damaiyanti et al., 2022). The jarimatika method is a way of counting that uses 10 fingers as an aid for the basic multiplication calculation process which will make it easier for students to solve basic multiplication problems.

Based on the description above, the researcher is interested in conducting a study entitled "Using the jarimatika method to improve multiplication calculation skills in grade III students at SD Negeri 2 Surabaya Utara in the 2023/2024 Academic Year.

Method

The type of research used in this study is Classroom Action Research (CAR). CAR is a research activity with the aim of improving the quality of learning in the target object of research so that its quality becomes better (Susilo et al., 2022). This research was conducted because there was a problem in classroom learning. So it can be seen that this classroom action research was carried out as an effort to improve learning in the classroom based on the results of reflection on learning. The design of this classroom action research follows the rules of the Kemmis and Tanggart classroom action research model which in this study uses two cycles, each cycle consisting of four main components, namely planning, implementation, observation, and reflection. These four stages can be presented in the following chart

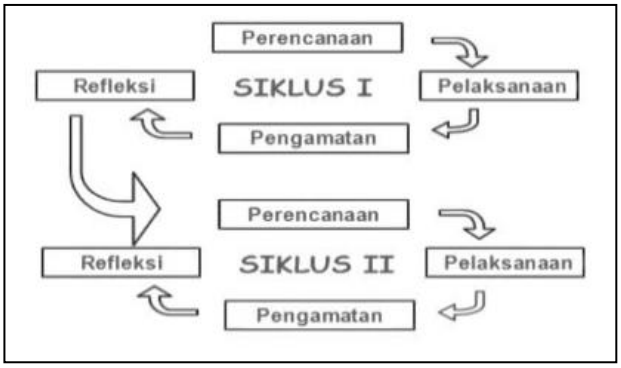

Figure 1. Research Cycle

The implementation time of this research activity was carried out for 3 months in the even semester of the 2023/2024 academic year starting from April to June 2024, from the pre-action stage to the implementation of the action. This research was located at SD Negeri 2 Surabaya Utara, Sakra Timur District, East Lombok Regency. The subjects of this study were all third grade students at SD Negeri 2 Surabaya Utara, totaling 25 students, including 11 boys and 14 girls.

The data sources in this study consist of two sources, namely primary data sources which include test results and observations, then secondary data obtained from learning devices used in learning before the action. The data validation used is internal validation, namely the degree of accuracy of the research design with the desired results. Starting from planning, implementation, observation, and reflection so as to obtain maximum results as expected. Data analysis consisting of three stages, namely (1) data reduction, (2) data presentation, (3) drawing conclusions to determine the level of completeness of student learning outcomes.

The performance indicator to be achieved in this classroom action research is to improve the multiplication calculation ability of grade III students of SD Negeri 2 North Surabaya, after using the jarimatika learning method. The measure of success in implementing this classroom action research is if students who achieve the Classroom Completion Assessment (PKK) which is 65 is 80% of all students. If the results are not satisfactory, cycle II will be carried out and so on. The cycle will stop if the student's results have met or are above the PKK.

Result and Discussion

This Classroom Action Research (CAR) was conducted in two cycles with the research subjects being grade III students at SD Negeri 2 North Surabaya, Sakra Timur District, East Lombok Regency in the 2023/2024 Academic Year. The number of students in the class was 25 people with 14 female students and 11 male students. In this study, data on student learning activities were obtained through observation, while data on student learning outcomes were obtained through evaluation test results at the end of each cycle.

The initial condition of students at SDN 2 North Surabaya based on the results of observations conducted by researchers on grade III students with a total of 25 students, 11 boys and 14 girls. Based on the results of observations, it shows that students still use memorization techniques and repeated addition in multiplication operations, so that learning is less than optimal and less varied and there is a lack of media or teaching aids that support learning activities.

Then the observation was continued by conducting a pre-test observation by giving questions to test students' abilities as many as 20 questions on mathematics subjects with multiplication material to obtain initial data on the description of students' abilities in solving problems related to multiplication material. The results obtained by researchers from this observation were data in the form of student scores that were still low, from a total of 25 students, students achieved the KKM from the predetermined KKM standard, namely 70. Even the value of the students' multiplication test results obtained in class was only 44%. This proves how lacking the learning outcomes obtained by students in learning mathematics material about basic multiplication.

In addition to less than optimal learning outcomes, student learning activities are still passive. This is caused by several factors, namely (1) lack of student attention to teacher explanations (2) students' impressions of mathematics learning which tend to be boring (3) students are less able to use memorization methods, it seems difficult and boring. The following shows the results of the pre-action test in table 1 Recapitulation of Student Pre-action Test Results below.

Table 1. Recapitulation of cycle 1 test results

Kriteria	Total
Completed	11
Not Completed	14
Highest Score	85
Lowest Score	30
Average	59,6
Completion	44%

Based on the table above, it can be seen that the average value of students is still below the KKM (70) with an average value of 59.6 out of 25 students. The number of students who completed was 11 students or 44% and the number of students who had not completed was 14 students or 56%. Students' ability to calculate basic multiplication in pre-cycle conditions is

still low. Karena itu diperlukan melaksanakan siklus berikutnya dengan menerapkan

In cycle I consists of two meetings. The first meeting is conducted to deliver the material by applying the jarimatika method. The second meeting is used for evaluation given in the form of an essay with a total of 20 questions with a value weight of 5 points for each question.

After conducting the learning outcome test in Cycle I, the researcher obtained data on student activity and learning outcomes. For student activity data, the researcher conducted observations once in one cycle. The data on student activity and learning outcomes can be seen in table.2 Recapitulation of Observation Results for Student Learning Activities in Cycle I below:

Table 2. Recapitulation of Observation Results of Students' Learning Activities in Cycle I

Total Score	Average Value	Description
597	23,88	Less active

Based on the results of observations of student learning activities during the learning process in cycle I, it is still low because the researcher has not been able to create a conducive classroom atmosphere, causing the results of student observations in cycle I to be less than optimal, so that data is obtained that student activity is in the less active category with an average value of 23.88.

Cognitive learning outcomes are the results obtained through written tests at the second meeting in cycle I. Cognitive learning outcomes are obtained from the scores of students who have taken the cycle I evaluation test. Learning outcomes on multiplication material using the jarimatika method in student mathematics learning can be seen in table 3 below;

Table 3. Recapitulation of cycle 2 test results

Criteria	Total
Completed	18
Not Completed	7
Highest Score	90
Lowest Score	60
Average	75,8
Completion	72%

Based on the table above, the results of cycle I show that the average value increased to 75.8%, the number of students who achieved learning completion was 18 students or 72%, the number of students who had not achieved learning completion was 7 students or 28%. This learning achievement increased very rapidly compared to before using the jarimatika method. However, this result is not in accordance with the success criteria set, which is 80%.

Based on the results of cycle 1, it is known that the target of the study has not been met, namely learning completion of 80%. Therefore, a reflection was carried out for cycle 1 where the results were that there were still many students who were not active in the learning process. At this reflection stage, the researcher evaluated all the shortcomings that occurred in cycle I in order to make improvements in the next cycle. The obstacles experienced by students when learning mathematics found in cycle I include; there are students who play by themselves, there are students who are too active or dominate the learning process, there are students who disturb their friends during the learning process, and students' readiness in using the jarimatika method is still lacking. From the results of the reflection, improvements were made to continue the research for cycle 2.

This cycle II was prepared in accordance with the obstacles encountered in cycle I. Therefore, in this cycle II, the researcher took actions in the form of controlling the learning process so that teaching and learning activities could be delivered. The next step was to provide an evaluation test question sheet that had to be answered by students in the form of an essay with a total of 20 questions with a value weight of 5 points for each question in order to determine students' understanding of calculating multiplication in the cycle II material that had been prepared using the jarimatika method.

The activities carried out at the implementation stage of the action in cycle 2 are implementing teaching and learning activities in the classroom by implementing the learning plan that has been prepared. At this stage, the researcher carries out learning for 2 meetings, then at the first meeting the researcher discusses multiplication material using the jarimatika method.

The researcher tried as much as possible to package the material about multiplication using the jarimatika method to be simpler and easier to understand so that all students were very enthusiastic and excited in participating in the learning. Furthermore, in the second meeting, a learning evaluation was carried out by giving students 20 evaluation questions with the aim of finding out students' understanding of the material that had been explained.

After conducting the learning outcome test in cycle II, the researcher obtained data on student activity and learning outcomes. Observations were conducted once in one cycle, while data on student activity and learning outcomes can be seen in table 4 Recapitulation of Observation Results of Student Learning Activities in Cycle II below:

Table 4. Recapitulation of observation results for Learning Cycle 2

Total Score	Average	Description
776	31,04	Active

Based on the results of observations of student learning activities during the learning process in cycle II, there were quite significant changes in every aspect. This is due to the ability of students who already understand the multiplication material and the application of using finger arithmetic in calculating and students have created a conducive classroom atmosphere, the data obtained shows that student activity is in the active category with an average value of 31.04%, which means that there has been an increase in student learning activity from cycle I to cycle II, namely from a score of 23.88 to 31.04 from the less active category to active.

Table 5 Recapitulation of Results of Multiplication Ability Test Cycle 2

Criteria	Total
Complete	23
Not Complete	2
Highest Score	95
Lowest Score	60
Average	79,6
Completeness	92%

Based on table 5, the results of the test can be seen that 23 students completed the test with a percentage of 92%, while 2 students did not complete the test with a percentage of 8%. The average score of students was 79.6 while the classical completion was 92%, so it can be concluded that student learning outcomes increased from cycle I to cycle II. This shows that the use of the jarimatika method in mathematics subjects on basic multiplication material can improve the mathematics learning outcomes of grade III students of SD Negeri 2 Surabaya Utara in the 2023/2024 academic year, so researchers do not need to continue research activities to the next cycle.

Based on the results of observations in cycle I and cycle II, data on student learning activity results in cycles I and II increased, where the student activity value in cycle I was 23.88, while in cycle II it increased to 31.04 and was included in the category of good from before. Meanwhile, data on student cognitive learning outcomes in cycles I and II experienced a significant increase, where classical completeness data was obtained in cycle I of 72% with 18 students completing the course, then 7 students who did not complete it or 28%. While in cycle II there was an increase, namely by obtaining classical completeness data of 92% with 23 students completing the course and 2 students who had not completed it or 8% so that this study was said to be successful and increased significantly. Therefore, the researcher decided to stop this classroom action research until cycle II and not continue in the next cycle.

Based on the research results that have been described, it can be said that the use of jarimatika has an effect on multiplication learning. Both in terms of increasing student activity and learning outcomes. The increase is seen in Figure 2 which shows an increase in the average student activity and Figure 3 which shows an increase in student learning completenes.

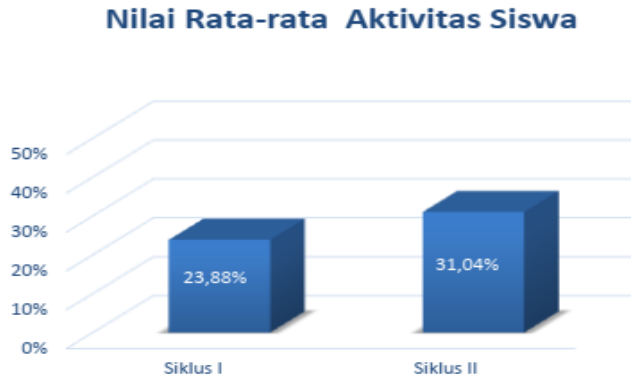

Figure 2. Increasing student activity

Based on Figure 2, it is clear that there is an increase in student learning activity where in cycle 1 it was 23.88% then increased to 31.04% or increased by 7.16%. The results of this study are in line with the results of the study (Suryaningrat et al., 2021) jarimatika is effective in increasing student learning motivation through innovative and fun finger methods. In addition, the jarimatika method helps students visualize multiplication operations so that it helps students understand the concept of multiplication better. One method that can be used is the jarimatika method because in this jarimatika method, children will be directly involved in learning by playing their fingers (Seplinda et al., 2022).

In addition to the increase in terms of activeness in learning, the increase is also apparent from the students' learning outcomes. The increase can be seen from Figure 3 which shows a graph of the increase from the pre-cycle stage, cycle 1 and cycle 2.

Figure 3. Percentage of classical completion.

Based on Figure 2, it can be seen that there was an increase from the pre-cycle of only 44%, increasing to 72% in cycle 1 and increasing to 92% in cycle 2. Where the cycle stopped in cycle 2 because it had reached the research indicator of 80%.

Based on the results of cycle I data, it can be concluded that the use of the jarimatika method can increase student activity and learning outcomes, but has not reached the desired target, therefore this research will be continued to the next stage, this is due to several factors, both internal and external factors.

Based on reflection on cycle 1, modifications were made in the hope of improving the quality of learning. Student learning outcomes where in cycle I the classical completion value was 72% and increased in cycle II to 92%. This shows that the use of the jarimatika method has been maximized in improving student activity and learning outcomes.

Student activity greatly influences student learning outcomes when student learning activities increase, then automatically student learning outcomes also increase. Learning outcomes are something that is obtained after learning. Learning outcomes have a very broad scope, can be seen from cognitive, affective and psychomotor aspects (Pradana, 2020). By looking at the data and discussion, therefore this study can be said to have succeeded in achieving the predetermined improvement indicators so that it can be concluded that the use of the jarimatika method can increase student learning activity and learning outcomes.

Conclusion

Based on the results of the research and discussion, it can be concluded that through the jarimatika method, it can improve the ability to calculate multiplication in grade III students at SD Negeri 2 North Surabaya. This can be seen from the ability to calculate multiplication in the pre-cycle of 25 students, it can be seen from the ability to calculate multiplication in the pre-cycle that was completed by 11 students or 44%, in cycle I that was completed by 18 students or 72%, while in cycle II that was completed by 23 students or 92%. Meanwhile, the results of students' cognitive learning in the learning process using the jarimatika method also have a positive impact and significantly improve student learning outcomes which are marked by an increase in the average value of students in each cycle, namely cycle I by 23.88 and increasing in cycle II to 31.04, the difference in increase that occurs from cycle I to cycle II is 7.16.

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