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The Jarimatika Method in Improving Multiplication Calculation Skills in Mathematics for Elementary School Students

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Abstract: This research aims to explain the effectiveness of the jarimatika method in improving the multiplication skills of second-grade students in mathematics at SDI Al Hadad Kedungjambe Singgahan Tuban. This study is classified as qualitative research. Data collection techniques include observation, interviews, and documentation. The research results show that the jarimatika method can improve student learning outcomes in multiplication material. The application of the Jarimatika method in the second grade at SDI Al Hadad Kedungjambe Singgahan Tuban shows that implementing the Jarimatika method significantly improves various aspects of mathematics learning. There is an increase in student active participation from 45% to 85%, multiplication accuracy rising from 50% to 90%, calculation speed with the average time to complete multiplication problems reduced from 10 minutes to 5 minutes, and student confidence rising from 40% to 80%. Additionally, the number of students achieving the Minimum Competency Criteria (KKM) significantly increased after applying this method. Inhibiting factors include students being noisy, often chatting, and lacking understanding. Supporting factors include the ease and practicality of using the jarimatika method and the teacher's ability to effectively manage and condition the class.
Keywords: Jarimatika method, Multiplication, Calculation skills

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A. Introduction

Mathematics is an important subject because it contributes to the development of various disciplines and solves everyday problems (Sumardjan, 2017). Multiplication operations are often applied in real life, such as calculating prices, measuring areas, or estimating time. A strong understanding of multiplication is the basis for mastering more complex mathematical concepts, so it is essential to master it early on (Velani & Retnawati, 2020).

Many students consider multiplication a tricky part of mathematics because of its hierarchical nature, where basic understanding is needed to proceed to more advanced material (Fausia et al., 2021). The mindset that mathematics is complex, accompanied by monotonous teaching methods such as lectures and memorization, leads to low student engagement, affecting learning outcomes (Behlol et al., 2018; Indiastuti, 2021).

To overcome this difficulty, the Jarimatika method is present as an innovative alternative. By utilizing fingers as a counting tool, Jarimatika reduces memory load and helps students master multiplication interactively and enjoyably, without external aids (Damayanti, Zumrotun, & Sutriyani, 2024). This approach increases student engagement and makes mathematics more interesting (Widyanengrum, Ningrum, Arifin, & Riswari, 2023).

At SDI Al Hadad Kedungjambe Singgahan, the Jarimatika method has only been implemented in the last two years in Class II. Previously, mathematics teaching was dominated by lectures and memorization, which made it difficult for students to understand multiplication in depth. The implementation of the Jarimatika method is expected to improve student understanding. Teachers assess students' understanding by appointing students to come to the front, and if there are students do not understand, additional guidance is given during recess or class time.

Research shows that the Jarimatika method positively impacts students' numeracy skills, especially in multiplication. Martianti found an increase in grade 4 students' understanding of natural number multiplication (Nalole & Sunati, 2021). Wafiroh & Qurotul A'yun (2023) She also reported that this method is effective in addition, subtraction, and division. Novitasari & Herwin (2023) combined Jarimatika with scaffolding and peer tutoring while Fakhiroh, Firmansyah, & Shulkhah (2024) Showed a significant increase in student learning outcomes after implementing this method.

This study uses an in-depth qualitative approach, which is different from previous studies, to examine the effectiveness of the Jarimatika method. The aim is to test whether this method can improve students' understanding of multiplication operations and support more effective mathematics learning in elementary schools. The results of this study are expected to contribute to the application of innovative teaching methods in overcoming difficulties in learning multiplication in elementary schools.

B. Method

This study employs a qualitative approach, specifically using a case study method. The focus is an in-depth examination of how the jarimatika method improves multiplication numeracy skills among second-grade students at SDI Al Hadad Kedungjambe Singgahan Tuban. This approach allows for a comprehensive understanding of the unique context and dynamics within the classroom. The data sources consist of both primary and secondary data. Primary data are directly obtained from mathematics teachers, second-grade homeroom teachers, and the students of SDI Al Hadad. Secondary data are collected from document studies that supplement and support the primary data, providing additional context and depth to the research (Nurudin, 2019). Data collection methods include observation, interviews, and documentation. To ensure data validity, the researcher uses methodological triangulation, which involves cross-checking data from different sources, using multiple methods, and conducting the research at various times (Sugiyono, 2017).

After confirming data validity, the researcher analyses the data through three steps: simplifying the data, presenting the data, and drawing conclusions or verification. Several indicators were used: (1) student engagement, through observing students' active participation during lessons; (2) accuracy of multiplication, by measuring students' ability to perform multiplication accurately before and after the implementation of the jarimatika method; (3) speed of calculation through assessing how quickly students can solve multiplication problems using the jarimatika method (4) student confidence, with evaluating changes in students' confidence levels when dealing with multiplication tasks and (5) achievement of minimum competency criteria (KKM), tracking the number of students who meet or exceed the KKM score of 75 before and after the introduction of the jarimatika method.

C. Result and Discussion

Result

Active Participation of 2nd Grade Students at SDI Al-Hadad

The jarimatika method must be paired with a strong understanding of basic multiplication concepts. For example, understanding that 2 × 6 equals 6 + 6 = 12 is more effective than viewing it as 2 + 2 + 2 + 2 + 2 + 2 = 12. Teachers can use repetitive addition songs, such as (song example), to aid in conceptual understanding.

"Repetitive Addition"

"I want to learn, learn multiplication
Multiplication is repetitive addition
Remember what the teacher said about taking medicine
Come on, friends, let us learn together
Three times 1 equals how much?
It means there are 3 of 1
Come on, friends, let us all add up
Come on, friends, who know the answer 3."

The concept of jarimatika also supports students' understanding of completing multiplication tasks. For example, solving empty multiplication tables is easier using the jarimatika method. The jarimatika method is an effective method to assist students in understanding the concept of multiplication using their fingers, and it can make learning more enjoyable as students actively engage using their fingers. The steps in utilizing the jarimatika method emphasize that students need to have a strong understanding of the basic concepts of multiplication before they can apply it smoothly. Mathematics is initially introduced as a compulsory subject in elementary school. Students will likely form either a dislike or a fondness for the subject at this stage. Since elementary school serves as the first gateway in their mathematical journey, it is crucial to study this period closely (Anam et al., 2020). In line with Hasibuan's opinion, using the jarimatika method, students can learn efficiently and feel more enthusiastic without spending a long time scribbling on paper or using writing tools. The jarimatika method can train the left brain in quick and accurate calculation. There is an improvement in students'

mathematics learning outcomes in arithmetic operations when using the jarimatika as a learning medium (Hasibuan, 2022).

The research results show that after implementing the Jarimatika method in mathematics lessons, Grade II students' active participation at SDI Al Hadad increased significantly. Table 1 shows the active participation of 2nd-grade students at SDI Al Hadad before and after the Jarimatika method, with checkmarks (✓) indicating active students and crosses (✗) for inactive ones.

Before implementing this method, student engagement was only 45%, with many students remaining passive and not actively participating in class discussions. However, after applying the Jarimatika method, the level of active participation rose to 85%, with students becoming more involved in Q&A sessions and group discussions and enthusiastically and confidently solving multiplication problems.

Accuracy in Multiplication of 2nd Grade Students at SDI Al-Hadad

The research findings revealed a marked improvement in the accuracy of students' multiplication skills after the Jarimatika method was applied. Before the implementation, only 50% of the students could solve multiplication problems accurately, often making errors in basic calculations. After using the Jarimatika method, this percentage increased to 90%, with students demonstrating significantly fewer mistakes and a greater mastery of multiplication concepts.

The improvement is attributed to the method's structured approach to teaching multiplication, which enhanced students' understanding of number relationships and multiplication patterns, leading to more precise calculations and reduced error rates in their work. Table 2 shows the accuracy in the multiplication of 2nd-grade students at SDI Al-Hadad before and after the Jarimatika method, with checkmarks (✓) indicating accuracy in multiplication and crosses (✗) for inaccurate ones.

Speed in Calculation of 2nd Grade Students at SDI Al-Hadad

The study significantly improved students' calculations after implementing the Jarimatika method. Before its use, students' average time to solve multiplication problems was around 10 minutes. After applying the Jarimatika method, the average time has decreased to 5 minutes, demonstrating a 50% increase in calculation speed, with students solving problems more efficiently and confidently.

Student Confidence of 2nd Grade Students at SDI Al-Hadad

The evaluation revealed a substantial increase in students' confidence levels in handling multiplication tasks after introducing the Jarimatika method. Only 40% of the students initially expressed high confidence in solving multiplication problems. After implementing the method, this figure rose to 80%, with students reporting greater self-assurance and a positive attitude toward tackling multiplication tasks, as evidenced by their active participation and willingness to attempt more challenging problems.

Achievement of Minimum Competency Criteria (KKM) of 2nd Grade Students at SDI Al-Hadad

By using the jarimatika method, students can visualize multiplication operations concretely. They will develop better arithmetic skills and can quickly and accurately multiply numbers in their minds without needing to use scratch paper. Implementing this method has sparked enthusiasm among students who previously felt fear and drowsiness, and some even sought permission to leave during multiplication lessons in mathematics. Now, on average, students can practice the jarimatika method. Students' abilities vary; some have above-average abilities, while others have below-average abilities. The advantages of Jarimatika are: 1) It provides calculation steps; 2) Students can learn while playing; 3) The tools are free (Rosiyana & Umi Nurbaeti, 2023).

Figures 1 and 2 show the results before and after applying the Jarimatika method in learning mathematical multiplication, showing increased numeracy skills of class II students at SDI Al Hadad. Before the intervention, as many as 55% or 11 students had not yet achieved the KKM mathematics score 75. However, after applying the jarimatika method, the average mathematics score increased to 90, with 80% or 16 students achieving KKM and 20% or four students not achieving KKM with an average mathematics score of 90 more than the set KKM mathematics score (75). Therefore, it can be concluded that the jarimatika method has significantly improved students' numeracy skills.

Table 1. Active Participation Levels of 2nd Grade Students at SDI Al-Hadad Before and After the Jarimatika Method

No.	Student Name	Before Jarimatika Method	After Jarimatika Method
1.	Achmad Nathan Ardiansyah	✓	✓
2.	Achmad Nur Musthofa	✓	✓
3.	Aghninanisa Tsania	✓	✓
4.	Ahmad Ainun Najib	✓	✓
5.	Auliya Izatunnisa	✗	✓
6.	Diva Ayu Puspaningrum	✗	✓
7.	Eka Rifqi Elwafie	✗	✓
8.	Faris Dwi Kusuma	✓	✓
9.	Fariz Naufal	✗	✓
10.	Haffaza Justin Gilbert	✓	✓
11.	Hasya Yuri Barokatul A.	✗	✓
12.	Jihan Nafisa Asyura	✓	✓
13.	Mirza Alrifqi	✗	✓
14.	Muhammad Gilang Hilmi	✗	✓

Continued Table 1. Active Participation Levels of 2nd Grade Students at SDI Al-Hadad Before and After the Jarimatika Method

No.	Student Name	Before Jarimatika Method	After Jarimatika Method
15.	Muhammad Hakim Tahmid	✗	✗
16.	Najma Kholidatul Husna	✓	✓
17.	Rakha Hayfa Afsheen	✗	✗
18.	Rima Anggrayni	✓	✓
19.	Roger Reno Bramantio	✗	✗
20.	Biyon Agung Dwi Permadi	✗	✗

Table 2. Accuracy in Multiplication of 2nd Grade Students at SDI Al-Hadad Before and After the Jarimatika Method

No.	Student Name	Before Jarimatika Method	After Jarimatika Method
1.	Achmad Nathan Ardiansyah	✓	✓
2.	Achmad Nur Musthofa	✓	✓
3.	Aghninanisa Tsania	✓	✓
4.	Ahmad Ainun Najib	✓	✓
5.	Auliya Izatunnisa	✓	✓
6.	Diva Ayu Puspaningrum	✗	✓
7.	Eka Rifqi Elwafie	✗	✓
8.	Faris Dwi Kusuma	✓	✓
9.	Fariz Naufal	✗	✓
10.	Haffaza Justin Gilbert	✓	✓
11.	Hasya Yuri Barokatul A.	✗	✓
12.	Jihan Nafisa Asyura	✓	✓
13.	Mirza Alrifqi	✗	✓
14.	Muhammad Gilang Hilmi	✗	✓
15.	Muhammad Hakim Tahmid	✗	✓
16.	Najma Kholidatul Husna	✓	✓
17.	Rakha Hayfa Afsheen	✗	✗
18.	Rima Anggrayni	✓	✓
19.	Roger Reno Bramantio	✗	✓
20.	Biyon Agung Dwi Permadi	✗	✗

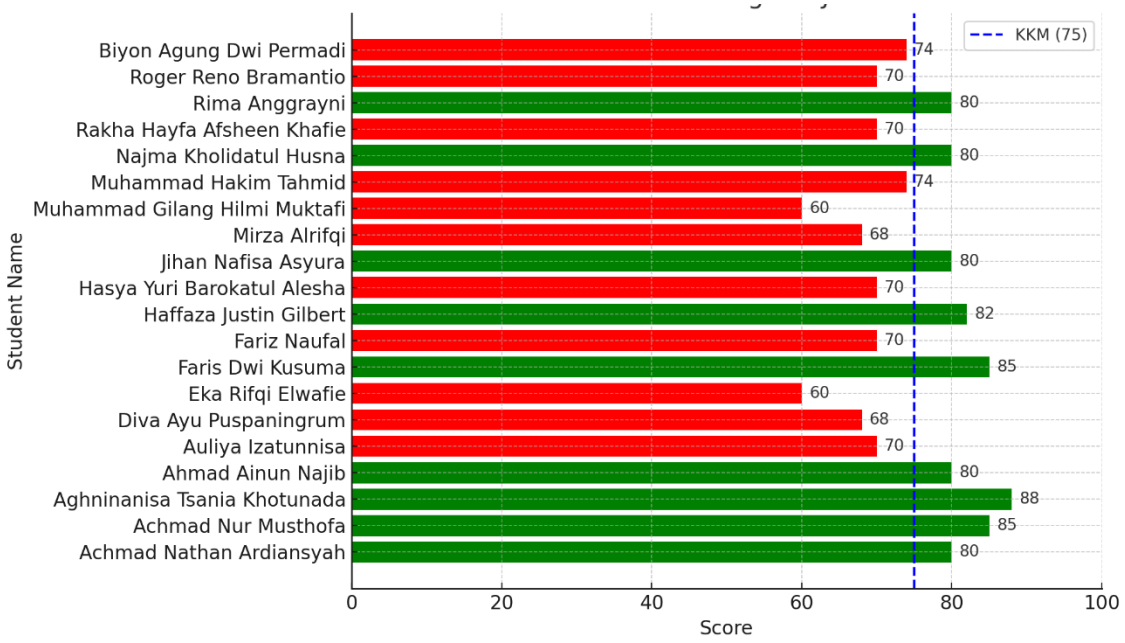

Figure 1. Multiplication Learning Outcomes Before Jarimatika Method

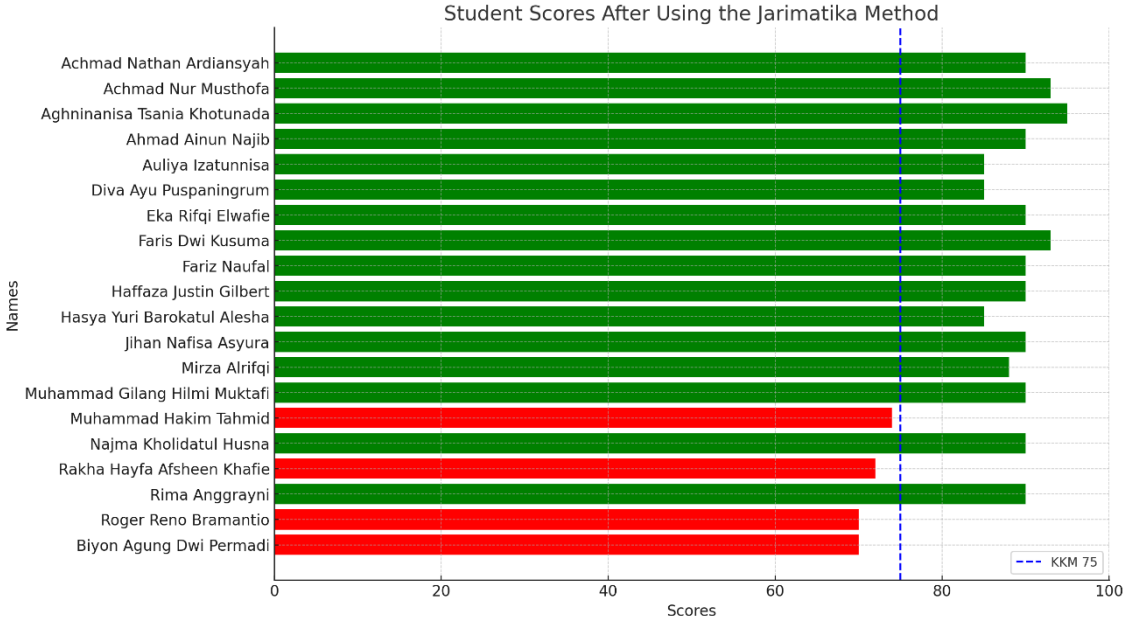

Figure 2. Multiplication Learning Outcomes After Jarimatika Method

Discussion

Implementation of the Jarimatika Method in Improving Multiplication Numeracy Skills in Mathematics Subject

This study examines the implementation of the jarimatika method in teaching multiplication at SDI Al Hadad, which began in 2022. The method has been instrumental in helping students practice arithmetic independently, thereby addressing challenges in math proficiency. Further research is recommended to enhance the effectiveness of this creative innovation, particularly in overcoming difficulties with multiplication at the elementary school level. Encouraging students to think creatively

and critically can significantly impact their ability to approach math problems in new and effective ways. Creative and innovative skills will flourish if students are encouraged to think broadly and are stimulated to think outside conventional habits. This involves adopting new ways of thinking, providing opportunities to present new ideas and solutions, asking unconventional questions, and attempting to propose answers (Triwahyuningtyas et al., 2021).

Mathematics is also a powerful means of communication that is concise and clear. It can present information in various ways, enhance logical thinking, precision, and spatial awareness, and provide satisfaction from solving complex numbers-related problems (Yudha, 2020). There are several stages that teachers and students must follow to achieve more effective and efficient learning. Teachers and students teachers and students must follow must be followed by teachers and students to facilitate the implementation of the jarimatika method in the learning process. The steps in using the jarimatika method to teach multiplication in mathematics lessons:

First, introduction. Teachers at SDI Al Hadad introduce multiplication topics by familiarising students with the basic multiplication concepts from 1 to 5 using repetitive addition songs with an increasing melody, such as "Delman," because young children find it easier to grasp the material when sung together. The numbers in the song can be adjusted according to the multiplication material being learned. Before learning the jarimatika method for multiplication topics, students must memorize multiplication from 1 to 5. This aims to prepare them to apply the method more readily. Next, students will learn multiplication operations to recognize multiplication symbols from 6 to 10 used in the jarimatika method. This is done by direct practice, where students are asked to raise their hands and show the finger formations used in the jarimatika method for multiplication topics.

Second, implementation. After applying the jarimatika method, the teacher practices slowly and engagingly so that students can understand well how to use the method according to the instruction. The teacher strives to create an active and enjoyable classroom atmosphere to facilitate students' understanding of the jarimatika method. This approach aligns with Trivia Astuti's viewpoint that the jarimatika method is a fun and easy way to perform mathematical calculations using our fingers (Astuti, 2013). It means that teachers should do their best to create an active and enjoyable classroom environment so that students can quickly grasp the application of the jarimatika method.

They are third, deepening. After practicing applying the jarimatika method, students are given exercises to sharpen their understanding of what the teacher conveys. If students have not mastered the material, a review will be in the next meeting. This approach is supported by theories showing that the jarimatika method excels in helping students understand abstract concepts while providing a fun and challenging learning experience. Students feel like they are playing while learning, thus feeling challenged using the jarimatika method. However, there are some shortcomings. Students often make mistakes in multiplication and addition, and not all problems can be solved with

Jarimatics. Without sufficient practice, students may be slower at calculations than jarimatika tools, and specific formulas are involved (Rohmah et al., 2023).

Therefore, applying the jarimatika method dramatically assists students in learning multiplication in mathematics. Through the jarimatika method, students can solve multiplication problems quickly without making any scribbles.

Factors Inhibiting and Supporting the Implementation of the Jarimatika Method in Improving Multiplication Arithmetic Skills in Mathematics Subject

The success of the jarimatika method is supported by its ease of use and practicality, as well as the teachers' ability to create a conducive learning environment. Teachers at SDI Al Hadad have effectively used this method to make learning multiplication more engaging and accessible. Their ability to manage the classroom, provide clear explanations, and encourage active participation has been crucial in the method's success. The inhibiting factors for implementing the jarimatika method to improve multiplication arithmetic skills in second-grade mathematics at SDI Al Hadad Kedungjambe Singgahan Tuban are as follows. Firstly, students who are noisy and often talk to themselves disruptively. Students frequently become noisy and engage in self-conversation due to the proximity of their seating arrangements, which can disrupt the learning process and reduce other students' concentration. This aligns with Muhammad Aflah's view that the significant improvement in multiplication skills indicates that the applied intervention successfully strengthened students' basic mathematical skills. This can have a positive impact on their ability to solve more complex math problems in the future (Aflah et al., 2024).

Secondly, the student's level of understanding is low. This is due to some students being lazy to study, not paying attention when the teacher explains, and lacking guidance from parents, resulting in their understanding being below average. Teachers' teaching methods can influence how well students understand and master lessons. Interactive methods that suit students' learning styles can enhance their understanding according to their cognitive development levels and stages. At the pre-action stage, it was observed that students had difficulty solving multiplication problems (Adawiyah & Akbar, 2024).

The supporting factors in using the jarimatika method to enhance multiplication arithmetic skills in second-grade mathematics at SDI Al Hadad Kedungjambe Singgahan Tuban are as follows. Firstly, it is more accessible and more practical. The jarimatika method is suitable because it is more accessible and practical, utilizing the fingers they bring daily. With the jarimatika method, teachers find it easier to develop better arithmetic skills, and students can quickly multiply numbers in their minds without relying on writing tools. Students become more enthusiastic and find it easier to understand counting. They also show greater eagerness to learn and faster calculation skills. Therefore, it can be concluded that this training has a positive impact on students' mathematics learning (Mawaddah, Nurjannah, & Kaswar, 2024).

Secondly, the teachers have teaching abilities. The teachers possess strategies in teaching, such as explaining lesson materials and providing such as explaining lesson materials, where they provide a little material during the lesson. However, in this case, the teachers emphasize practical application, making students interested in listening and quickly understanding the material. In managing the learning program, teachers must understand teaching approaches, basic teaching principles, various teaching methods, and the ability to design and utilize various facilities or learning media. These competencies are crucial for teachers, especially in pedagogical and professional aspects. Through collaborative work and mathematical communication, active learning fostered the development of various strategies to solve the proposed tasks (Vale & Barbosa, 2023).

Thirdly, the teachers can create a conducive environment in the classroom by giving warnings and reminders to students who are talking with their peers or sleeping during the learning process. Additionally, the teachers implement teaching methods that suit the students' conditions and use learning media that can engage students and ignite their enthusiasm for learning. The factors supporting the learning process include a teacher who employs various teaching methods and effectively conditions the classroom. The positive attitude that children exhibit when meeting their teacher or when the teacher is teaching a lesson can be a factor in increasing students' interest in learning (Dewi & Lestari, 2021).

Fourthly, Although the overall results were successful, 20% of students did not meet the KKM, which could be attributed to disruptive behavior, low levels of understanding, or a lack of engagement during lessons. To address this, targeted interventions are needed, including individualized tutoring or one-on-one assistance for struggling students, encouraging greater parental involvement to reinforce learning at home, and improving classroom management strategies to reduce distractions. The mathematics score data shows that students' multiplication abilities can enhance their overall arithmetic skills with consistent practice. This is consistent with the theory that the Jarimatika method positively affects students' multiplication understanding and arithmetic skills (Purwanti & Khoiriyah, 2020). Given these advantages, the author believes the Jarimatika method is highly suitable for improving students' understanding of multiplication concepts.

D. Conclusion

The application of the jarimatika method to multiplication skills in mathematics for second-grade students at SDI Al Hadad Kedungjambe Singgahan Tuban is conducted through three main stages: introduction, implementation, and deepening. The jarimatika method has proven effective in improving multiplication skills among students. Research results have shown an increase in their grades after each session. Based on the obtained grade data, it can be presented in percentages that 80% or 16 students have reached the Minimum Completeness Criteria (KKM), while 20% or four students have not. The KKM standard set is 75, recognizing that mathematics is

challenging. Additional support and intervention strategies may be required to help these students improve their skills and achieve the desired academic standards.

Factors that can hinder the implementation of the jarimatika method in improving multiplication skills in mathematics for second-grade students at SDI Al Hadad Kedungjambe Singgahan Tuban include noisy and frequently self-talking students, as well as students with low understanding/understanding levels. Supporting factors for the implementation of the jarimatika method in enhancing multiplication skills for second-grade students at SDI Al Hadad Kedungjambe Singgahan Tuban include: it is more accessible and more practical, teachers have teaching abilities, and teachers can create a conducive classroom environment.

The author acknowledges that this study has some limitations and shortcomings, such as the limited time for data collection, which could have allowed for more in-depth analysis. For future research, it is recommended that researchers delve deeper into the study object regarding the jarimatika method linked with the development of technology or interactive multimedia. This can be approached through research and development (R&D) methods to achieve higher-quality findings. Hopefully, this approach will enhance the application of the jarimatika method in improving multiplication calculation skills in mathematics for students in the future.

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