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Analysis of the Use of Domino Cards in Improving Mathematics Learning Outcomes for Grade V at SDN 1 Nata

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Abstract

This study aims to analyze the effectiveness of using domino card media to improve the mathematics learning outcomes of fifth-grade students at SDN 1 Nata. The research background is based on the students' low understanding of multiplication concepts and the lack of engaging instructional methods. A quantitative approach with a quasi-experimental method was employed, involving two groups: an experimental group using domino cards and a control group using conventional teaching methods. Instruments included pretest and posttest assessments and student activity observation sheets. The results showed that the use of domino cards increased the average student score from 52 to 80, while the control group only reached 60. Additionally, students in the experimental group demonstrated active participation, collaboration, and high enthusiasm during the learning process. These findings suggest that domino card media is effective in enhancing students' mathematics learning outcomes and can serve as an innovative alternative in elementary school instruction.

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1. INTRODUCTION

Improving mathematics learning outcomes at the elementary school level is crucial for developing students' logical, analytical, and systematic thinking skills. Optimal learning outcomes reflect the achievement of learning objectives across the cognitive, affective, and psychomotor domains. Various approaches have been implemented to support this improvement, such as inquiry-based learning, authentic assessment, and strengthening the relationship between learning behavior and academic achievement. The inquiry approach, for example, has been shown to improve learning outcomes by up to 52.39% in number operations and encourage students' active involvement in critical thinking and problem-solving (Gawe, 2023). Authentic assessment, on the other hand, has increased students' motivation, critical thinking, and problem-solving skills (Mega & Faisal Madani, 2023). Other research has shown a strong correlation between positive learning behavior and high learning outcomes, with an average score of 83.60 (Subagio et al., 2024).

However, conditions in the field indicate a gap between theoretical expectations and reality. Based on observations in fifth grade students at State Elementary School X, more than 50% of students scored below the Minimum Completion Criteria (KKM) in number operations. This problem is exacerbated by a poor understanding of basic mathematical concepts, a lack of varied learning methods, and low student motivation (Nahdania & Ain, 2024; Setiawan et al., 2024; Sidik & Wakih, 2020). This low numeracy literacy demonstrates the need for innovative and enjoyable learning approaches to engage and motivate students in the learning process.

One solution that can be implemented to overcome this problem is the use of educational game media, such as dominoes modified for mathematics. This media has been proven to increase student interest and motivation through a play-while-learning approach. The use of dominoes encourages students to think strategically, work collaboratively, and be active in learning. Research shows that the use of dominoes can increase student engagement from 46.7% to 76.7% (Idapitasari, 2021), and increase average mathematics learning outcomes by up to 83% (Asiya et al., 2024). Furthermore, this game encourages the development of social and cognitive skills simultaneously (Jasmawati, 2023).

However, several previous studies have shown that the implementation of domino cards as a learning medium is not yet fully optimal. Problems often arise from media design that is not aligned with the curriculum or implementation that is not systematically structured. Most studies also do not specifically cover fifth grade students or do not focus on number operations as the main topic of study (Anabella & Wulandari, 2024; Azahra & Dewi, 2022). Therefore, more specific and targeted follow-up research is needed to test the effectiveness of domino cards in this context.

The procedure in the domino card game is: Players are in groups with a maximum of 4 students, each person is dealt 4 cards, the first player and the direction of the round is based on an agreement between both parties. Players take turns matching the results according to the multiplication operation. After the player who fails to match the card, it continues with the next player, the game continues until all the cards match. In this domino game, whoever runs out of cards the fastest wins.

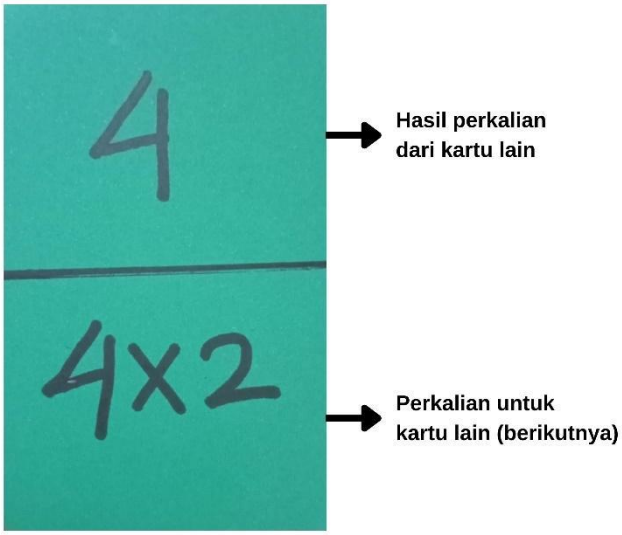

Figure 1. Mathematical Domino Cards

This research is highly urgent because it can significantly contribute to improving the quality of mathematics learning at the elementary level. Through an innovative, fun, and activity-based approach, it is hoped that meaningful learning will be created and have a direct impact on improving student learning outcomes. The purpose of this study was to analyze the effectiveness of using domino cards in improving fifth-grade elementary school students' mathematics learning outcomes and to identify the extent to which this medium can encourage active student engagement in the process of learning number operations.

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2. MATERIALS AND METHOD

This research uses a quantitative approach with a quasi-experimental method (quasi-experimental) for test. The effect of domino cards on mathematics learning outcomes of fifth-grade students at SDN 1 Nata. The subjects consisted of two parallel classes: one class as an experimental group (using domino cards), and one class as a control group (using conventional methods).

The main instrument was a multiple-choice test administered before (pretest) and after (posttest) treatment to measure learning outcomes in multiplication operations. Additionally,

observation sheets were used to record student activities such as participation, cooperation, and learning focus.

The research procedure will be carried out in several stages, namely: (1) the preparation stage, which includes the preparation of learning tools and evaluation instruments; (2) the pretest implementation stage to measure students' initial abilities; (3) the treatment stage, namely the implementation of learning with domino cards for several meetings; (4) the posttest implementation stage to measure improvements in learning outcomes; and (5) the data analysis stage.

The data obtained from the pretest and posttest were analyzed using uji-t (paired sample t-test) To see significant differences between student learning outcomes before and after using domino cards, and to compare learning outcomes between the experimental and control groups. Statistical tests were conducted using the latest version of SPSS software or other relevant statistical software.

3. RESULTS

The use of domino cards as a learning medium for mathematics in multiplication operations for fifth-grade students at SDN 1 Nata has shown a positive impact on improving learning outcomes. The domino cards used are designed with two parts: the top part contains the result of a multiplication operation, and the bottom part contains a multiplication problem for the next player to match, as shown inFigure 1This design allows students to engage in chain-based matching activities, making the learning process interactive, collaborative, and challenging.

The study involved 10 students divided into two groups: an experimental group (using domino cards) and a control group (using conventional methods). Each group consisted of five students. Tests were administered before (pretest) and after (posttest) the learning process to measure learning outcomes.

In the experimental group, the average value increased from52 become 80, with significant improvements in all students. Meanwhile, the control group experienced lower improvements, from52 become 60This shows that the learning approach using domino cards is more effective in improving understanding of basic multiplication concepts than conventional methods.

In addition to test results, observations during the learning process showed that students in the experimental group were more active in asking questions, working collaboratively to solve problems, and showing high enthusiasm in participating in the game. These activities demonstrate that playing dominoes not only improves cognitive outcomes but also fosters social skills and a positive attitude toward mathematics.

Thus, the application of domino card media in mathematics learning has been proven to contribute to improving students' learning outcomes as a whole, both academically and affectively.

The results of the study showed that domino cards played a significant role in improving students' mathematics learning outcomes in multiplication operations. The average score of the experimental group increased from 52 to 80, while the control group only increased from 52 to 60. This difference indicates that learning with domino cards is more effective than conventional methods. This finding is in line with previous research by Asiya et al. (2024) which stated that domino media can significantly improve students' mathematics learning outcomes in thematic learning.

Theoretically, this improvement can be explained through an active and meaningful learning approach. Dominoes allow students to interact directly with the material through matching and multiplication activities, as shown in Figure 1. This mechanism encourages quick thinking, simple logical processing, and the strengthening of conceptual understanding. In this context, Vygotsky's constructivist theory is highly relevant, where social interaction and group work are key to the formation of new knowledge.

Furthermore, domino cards encouraged active student engagement in learning, both individually and in groups. Observations showed that students in the experimental group asked more questions, engaged in discussions, and demonstrated high learning motivation. This supports the

findings of Idapitasari (2021), who reported an increase in student participation from 46.7% to 76.7% when using domino cards. This suggests that using fun and interactive media can reduce learning boredom and improve student concentration.

From an effective perspective, the use of dominoes can also create a more positive learning atmosphere. Students feel challenged but not burdened because the game is played in a healthy competitive manner. Previously passive students become more active because they don't want to be left behind in the game. This factor also influences student learning outcomes. Jasmawati (2023) also emphasized that game-based media such as dominoes can develop social skills and increase students' confidence in solving math problems.

On the other hand, the conventional learning methods applied to the control group tended to be monotonous and lacked variety. This led to students' disinterest and rapid boredom. Although learning outcomes improved, they were not as optimal as those in the experimental group. These findings reinforce the importance of innovation in learning design, especially in subjects often considered difficult and boring, such as mathematics.

Overall, the results of this study support the argument that contextually designed and appropriately designed domino cards can be an effective alternative for improving student learning outcomes. Learning mathematics requires not only appropriate materials but also media capable of bridging abstract concepts into concrete and enjoyable learning experiences.

4. CONCLUSION

Based on the research results and discussion, it can be concluded that the use of domino cards media can significantly improve the mathematics learning outcomes of fifth-grade students of SDN 1 Nata on the topic of multiplication operations. This is evidenced by the increase in the average score of the experimental group from 52 to 80, compared to the control group which only increased from 52 to 60. In addition to improving cognitive aspects, this media also encourages active involvement, cooperation, and student learning motivation in a fun learning atmosphere. Therefore, domino cards media is worthy of being used as an innovative alternative in mathematics learning in elementary schools, especially for materials that are conceptual and require visual and interactive reinforcement.

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6. DECLARATIONS

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