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THE INFLUENCE OF USING DOMINO LEARNING MEDIA ON THE UNDERSTANDING OF MATHEMATICAL CONCEPTS IN ADDITION MATERIAL AMONG SECOND GRADE STUDENTS OF SD INPRES BAKUNG, GOWA REGENCY

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Abstract

This research aims to describe the use of domino learning media in mathematics lessons, assess students' understanding of mathematical concepts in addition, and examine the effect of using domino learning media on the mathematical concept comprehension of second-grade students at SD Inpres Bakung, Gowa Regency. This study is an experimental research with a quantitative approach. The research design employed is a quasi-experimental type with a Pretest-Posttest Control Group Design. The population consists of all second-grade students at SD Inpres Bakung, Gowa Regency. The sample includes 15 students in the experimental group and 15 students in the control group, selected through purposive sampling. Data were collected using observation sheets to monitor the implementation of the learning media and student achievement tests. Data analysis involved descriptive and inferential statistics. The descriptive analysis showed that the implementation of the learning process using domino media from the first to the third meeting was categorized as very good. This indicates that the improvement in students' understanding of mathematical concepts in addition was better in the experimental group compared to the control group. This is supported by the higher average posttest scores of the experimental group compared to the control group.In conclusion: (1) the learning process assisted by domino learning media was very effective, (2) test results revealed an improvement in students' understanding of mathematical concepts related to addition, and (3) using domino learning media significantly influenced the comprehension of mathematical concepts in addition among second-grade students at SD Inpres Bakung, Gowa Regency.

Keywords: Domino Learning Media, Mathematical Concept Comprehension (Addition).

INTRODUCTION

Education plays a crucial role in shaping character and enhancing the quality of human resources. A well-structured and planned educational process aims to improve knowledge, skills, and positive attitudes that can be applied in everyday life. With the advancement of the times, education in Indonesia is expected to adapt in order not to fall behind other countries. This aligns with Hasan et al. (2022), who emphasize that education is key to elevating the nation's standard of living. Basic education, which includes elementary and junior high school levels, serves as the essential foundation of the national education system.

According to Government Regulation No. 4 of 2022, basic education aims to develop students' abilities and shape their character comprehensively, based on the values of Pancasila. Within this context, efforts to improve educational quality continue, including through the design of curricula that are relevant to current needs. One subject prioritized in the Merdeka Curriculum is mathematics, introduced at the elementary school level to build students' understanding and skills.

A strong grasp of mathematical

concepts is vital because it enhances students' cognitive abilities in solving daily problems. However, research from TIMSS reveals that Indonesian students' mathematics performance remains low, pointing to challenges in the learning process that must be addressed. One such issue is students' lack of conceptual understanding, especially regarding addition.

Observations at SD Inpres Bakung show many students rely more on memorizing formulas than truly understanding the underlying concepts. This often results in difficulties when solving math problems, particularly word problems. A possible solution to improve conceptual understanding is the use of engaging learning media, such as domino-based teaching aids.

Incorporating domino learning media can boost student engagement and make it easier for them to grasp addition concepts. By making learning more enjoyable and interactive through this medium, students' comprehension of mathematical ideas is expected to improve.

This study aims to explore the effect of using domino learning media on second-grade students' understanding of addition concepts at SD Inpres Bakung, Gowa Regency. Mathematics education at the elementary level not only serves as an introduction to basic concepts but also lays the groundwork for continuing education at higher levels. Through this research, it is hoped to contribute to the development of more effective teaching methods in elementary mathematics education.

METHODE

This study employs a quantitative approach with a quasi-experimental design to examine the effect of domino-based learning media on the understanding of addition concepts among second-grade students at SD Inpres Bakung. The research was conducted during the second semester of the 2024/2025 academic year, specifically from February to March 2025, in the second-grade class at SD Inpres Bakung, located in Somba Opu District, Gowa Regency, South Sulawesi.

The study used a Pretest-Posttest Control Group Design with two groups: an experimental group that received instruction using domino media, and a control group taught using conventional methods. The subjects were all 30 second-grade students, randomly divided into two groups of 15 students each.

The research procedure began with a pretest to assess initial abilities, followed by three sessions of learning treatment, and concluded with a posttest to evaluate learning outcomes after the intervention.

Data collection involved a concept comprehension test consisting of multiple-choice questions and classroom observations to monitor the implementation of the domino media.

Data analysis included descriptive and inferential statistics, employing normality and homogeneity tests, as well as an Independent Sample t-Test to test the hypothesis regarding the impact of domino-based learning media on students' understanding of mathematical concepts.

RESEARCH RESULTS ANF DISCUSSION

Prior to the intervention, both groups were given a pretest to evaluate their baseline understanding of mathematical concepts. The experimental group was taught using domino-based instructional media, while the control group was taught with picture-based materials. According to the descriptive findings, the average pretest scores for both groups fell into the "low" category, indicating that there was no notable difference in conceptual understanding between the two groups before the treatment was applied.

The posttest results from both the experimental and control groups showed that, descriptively, students in the experimental group had a better understanding of mathematical concepts compared to those in the control group. The scores of students in the experimental group fell into the "very good" category, as indicated by an overall mean score of 82.73, with the highest percentage being 46.6%. In contrast, the control group had an overall mean score of 62.13, with the highest percentage being 50.7%, and the "adequate" category was predominantly represented by students in the control group with a percentage of 20%.

The comparison of the average percentage for each indicator of mathematical concept understanding between the two

groups is presented in the following diagram:

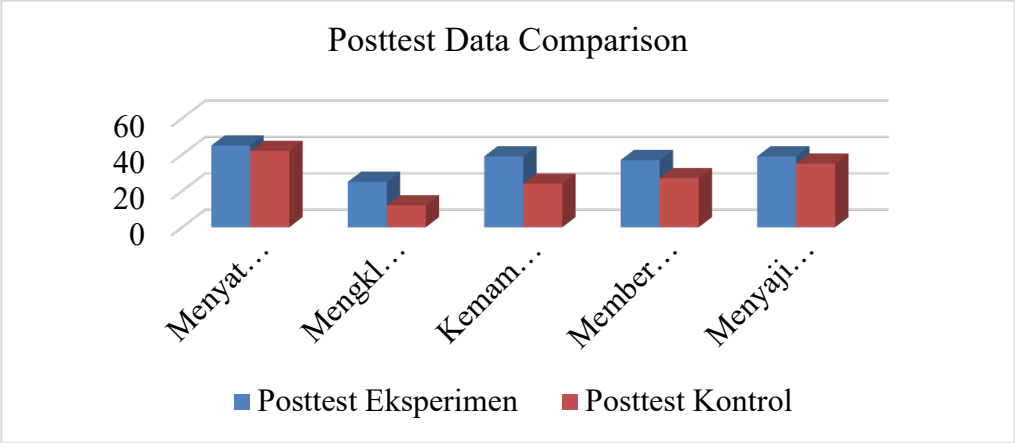

Figure 1. Posttest Results of Mathematical Concept Understanding in the Experimental and Control Groups

There is a difference in mathematical understanding between the two groups, as shown in the diagram above. This indicates that, compared to the control group that used only picture-based media, the use of domino-based learning media proved to be more effective in enhancing students' understanding of mathematical concepts.

Based on these results, it can be concluded that the experimental group showed better progress across all indicators, falling into the "very good" category. On the other hand, the control group also experienced improvement, although some indicators remained in the "adequate" category. The most significant improvements were observed in the indicators of restating concepts, applying concepts algorithmically, and presenting concepts, all of which reached the "very good" category. Subsequently, prerequisite tests were conducted, including normality and homogeneity tests, which showed that the data on conceptual understanding were normally distributed and homogeneous, as analyzed using SPSS.

The next step was hypothesis testing using the independent sample t-test. The data were considered statistically significant if the probability value (sig) did not exceed 0.05. This test was conducted to compare the understanding of mathematical concepts between the two groups. The output of the independent t-test for the pretest scores is shown below.

Table 1. *Independent* Sample *t-Test* Pretest Scores for the Experimental and Control Groups

Data	T	Df	Significance (2-tailed) Probability Value	Notes
Pretest of the Experimental Group and Pretest of the Control Group	0,797	28	0.432	0.432 > 0.05 = Homogen

Source: *IBM SPSS Statistic Version 20*

From Table 1 above, it can be seen that the significance value (0.432 > 0.05) indicates that Ho is accepted, meaning there is no difference in the average pretest scores between the experimental group and the control group. Furthermore, if the calculated t-value (t_h) is 0.797 and compared to the t-table value at a significance level of $\alpha = 5\%$ with degrees of freedom (df) = 28, the t-

table value is 2.048.

Since the calculated t-value is smaller than the t-table value (0.797 < 2.048), it can be concluded that there is no significant difference between the pretest scores of the experimental group and the control group. The results of the hypothesis test for the posttest scores of both groups are presented in the table below.

Table 2. Independent Sample t-Test of Posttest Scores for the Experimental and Control Groups

Data	T	Df	Significance Probability Value (2-tailed)	Notes
Posttest of the Experimental Group and Posttest of the Control Group	5,380	28	0,001	0,001 > 0,05 = There is a difference

Referring to Table 2 above, the obtained significance level is below 0.05. This significance value (0.001 < 0.05) suggests that the null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted, indicating a difference in the mean posttest scores between the experimental and control groups. The computed t-value from the analysis is 5.380, while the critical t-value from the t-table at a 0.05 significance level and 28 degrees of freedom is 2.048. Since the computed t-value exceeds the critical value (5.380 > 2.048), it can be inferred that a statistically significant difference exists in the posttest results between the two groups.

Statistical analysis conducted through the independent t-test identified that the experimental and control groups differed in terms of mathematical concept understanding and scores, both before and after the treatment was applied.

The learning activities for both groups were carried out over five sessions. A pretest was administered during the first session, followed by treatment given to both groups in the second, third, and fourth sessions. Finally, a posttest was conducted in the fifth session. This study focused on teaching material related to addition.

The learning activities using domino-based instructional media followed the steps outlined by Hidayati (2020). First, the teacher introduced the domino game to the students, explained how to play it, and connected the game to the lesson topic, which was addition. Second, the teacher divided the students into small groups and provided each group with a set of dominoes.

Within their groups, students were asked to form pairs of numbers to be added. Through this activity, students practiced addition in a more concrete and enjoyable way. After the game, the teacher facilitated a discussion to analyze the results and ensure students' understanding of the addition concept.

The results of the achievement indicators for conceptual understanding of mathematics in the experimental group showed that second-grade students who learned using domino-based learning media were able to understand addition material more effectively. For the first indicator, students were able to restate the concept of addition in their own words when solving problems. For the second indicator, students could classify numbers based on criteria aligned with the concept of addition, such as distinguishing between pairs of numbers whose sum did or did not match a specific target. Next, in the third indicator—applying the concept algorithmically—most students were able to solve addition problems in real-life contexts or word problems.

For the fourth indicator, which relates to giving examples and non-examples, students could differentiate which number pairs produced the correct sum and which did not. Finally, in the fifth

indicator, which involves presenting concepts in various forms of representation, students were able to determine the result of addition using images or symbols on the domino cards used during learning.

Based on the analysis results, there is a significant difference in the understanding of mathematical concepts between the group that used domino-based learning media and the group that did not. This indicates that the use of domino media in teaching addition can enhance students' understanding across all indicators. This improvement is attributed to the fact that domino media provides a more concrete and enjoyable learning experience, making it easier for students to comprehend and retain the taught addition concepts.

The influence of using domino-based learning media on students' understanding of mathematical concepts in addition material among second-grade students cannot be separated from the advantages offered by the domino learning media itself. This aligns with Prasidya's (2018) view, which states that domino learning media has several physical advantages. It is practical because it is easy to carry and does not require much space during use. Additionally, dominoes can be played by 4–5 students, encouraging collaboration, responsibility, and active participation. Its use also trains students' thinking skills, patience, and accuracy in completing the game.

CONCLUSION

Drawing from the research findings and discussion, it can be inferred that incorporating domino-based instructional media positively influences second-grade students' grasp of addition concepts at SD Inpres Bakung in Gowa Regency. Utilizing domino media during the learning process successfully boosted students' involvement and active engagement throughout the lessons. This was evident in the experimental group's posttest scores, which fell into the "very good" category and were notably higher than those of the control group.

Further analysis using the independent sample t-test revealed a meaningful difference in conceptual understanding between students exposed to domino media and those who were not. Thus, it can be concluded that domino-based instructional tools are effective in enhancing students' comprehension of addition material and offer a dynamic and interactive alternative for early-grade mathematics instruction.

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