The Influence of Domino Learning Media on Mathematics Learning Outcomes

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Abstract

This study aims to influence the use of Domino learning media through the Make a Match learning model to improve Mathematics learning outcomes. The method used in this research is quantitative research with the type of research Quasi-Experimental Design. The research sample consisted of grade III students divided into experimental and control classes. The results of data analysis show that the use of domino media in learning Mathematics has a positive impact on student learning outcomes. Normality and homogeneity tests show that the data is usually distributed and has a homogeneous variance, allowing the use of parametric statistical tests. Hypothesis testing using Baron & Kenny's mediation method revealed a significant influence of using domino media on improving students' learning outcomes. The findings show that in addition to students' initial scores (pretest), the improvement in learning outcomes is also mediated by the effectiveness of the learning methods. The study results conclude that house learning media influences the Make-a-Match model, which has a role in improving student learning outcomes.
Keywords Domino Media; Make A Match Model; Learning Outcomes

Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh penggunaan media pembelajaran Domino melalui model pembelajaran Make a Match terhadap hasil belajar Matematika. Metode yang digunakan dalam penelitian ini adalah penelitian kuantitatif dengan jenis penelitian Quasi-Experimental Design. Sampel penelitian ini adalah siswa kelas III yang dibagi menjadi kelas eksperimen dan kelas kontrol. Hasil analisis data menunjukkan bahwa penggunaan media Domino dalam pembelajaran Matematika memberikan pengaruh positif terhadap hasil belajar siswa. Uji normalitas dan homogenitas menunjukkan bahwa data berdistribusi normal dan memiliki varians yang homogen, sehingga memungkinkan untuk dilakukan uji statistik parametrik. Pengujian hipotesis menggunakan metode mediasi Baron & Kenny menunjukkan adanya pengaruh yang signifikan penggunaan media Domino terhadap peningkatan hasil belajar siswa. Hasil penelitian menunjukkan bahwa selain nilai awal siswa (pretest), peningkatan hasil belajar juga dimediasi oleh keefektifan metode pembelajaran. Hasil penelitian menyimpulkan bahwa media pembelajaran rumah berpengaruh terhadap model Make-a-Match yang berperan dalam peningkatan hasil belajar siswa.
Kata Kunci Media Domino; Model *Make A Match*; Hasil Belajar

INTRODUCTION

Mathematics is one of the most essential basic subjects in the education curriculum in many countries, including Indonesia (Saleh et al., 2024). Mathematics learning not only underlies the understanding of other scientific concepts but also forms logical and analytical thinking skills that are much needed in everyday life. However, despite the importance of mathematics in education, many students face difficulties in understanding mathematical concepts, which leads to low learning outcomes (Ardiansyah & Ridwan, 2024). One of the main reasons for low mathematics learning outcomes among students is their lack of interest and active involvement in the learning process. This is not only caused by the complexity of the material being taught but also by teaching methods that tend to be conventional and inadequate in stimulating students' curiosity. Therefore, developing a learning approach that can overcome this problem and improve students' mathematics learning outcomes is very important (Meri Marwiah, Sunanih, 2023).

Various educational innovations continue to be sought to solve this challenge, including using more interesting and interactive learning media. Interesting learning media stimulates active student involvement, reduces boredom, and facilitates understanding of complex concepts (Sugiarto, 2022). One form of learning media that has begun to be introduced and has attracted quite a lot of attention is the use of games, especially card or domino-based games. Domino-based learning media has the

potential to make mathematics learning more fun by utilizing competitive and collaborative game elements (Favor et al., 2023). One approach that can be integrated with domino learning media is the Match Model, a learning model that encourages students to find the correct answer pairs in a fun and interactive atmosphere (Hardiansyah, 2023).

The main problem in this study is the low mathematics learning outcomes among students caused by the lack of active student involvement in the learning process. This problem is often exacerbated by the use of learning methods that are still monotonous and tend to only prioritize theory without actively involving students (Ummah, 2019). Along with technological advances and the development of innovative approaches in the world of education, it is essential to explore how more interesting and creative learning media, such as domino media, can help improve student learning outcomes in mathematics. However, although the use of learning media in mathematics education has been widely studied, domino media as a learning medium in mathematics, especially with the Make-a-Match learning model, is still limited. Therefore, this study aims to explore and assess the effectiveness of using domino learning media through the Make-a-Match model in improving students' mathematics learning outcomes (Meri Marwiah, Sunanih, 2023).

Improving the quality of mathematics education in Indonesia, especially in areas with geographical and socio-economic challenges such as the Sumenep Regency, is a strategic issue to create a competent generation ready to face global dynamics. Although various policies and programs have been launched, students' mathematics learning outcomes in Sumenep show figures that still need serious attention. Quantitative data from several local studies provide a real picture of this condition. A study in an elementary school in Sumenep Regency showed that in cycle I, only 55% of students achieved learning completion with an average score of 61.35. However, after implementing the Teams Games Tournament (TGT) cooperative learning model, in cycle II, learning completion increased to 100%, with an average score of 82.36 (Dini Silikon, 2024). This indicates that an innovative and interactive learning approach can significantly improve student learning outcomes. In addition, further research shows that hanging stacking media in mathematics learning can improve student learning outcomes. The t-test results showed a significant difference between the experimental and control groups, with a t-count value of -2.346 and a significance value of 0.025 (Putri & Taufina, 2020). This finding confirms the importance of choosing the right learning media to improve students' understanding of mathematics material (Romansyah et al., 2022).

These findings clearly show that students' mathematics learning outcomes in Sumenep Regency still require serious attention. Innovative learning methods, such as game-based learning media and active learning models, are critical to improving student engagement and understanding. This study aims to fill the gap in the literature by exploring the effect of domino learning media through the Make-a-Match model on students' mathematics learning outcomes (Want, 2022). This study's results can improve the quality of mathematics education in Sumenep Regency and other similar areas.

The urgency of this research is apparent, considering the importance of finding and developing more effective learning methods to overcome challenges in mathematics learning. Amidst technological developments and educational transformation, educators face the challenge of making mathematics learning more interesting and enjoyable (Khoirunissa et al., 2024). The learning approach used by teachers often influences student learning outcomes. Monotonous methods that do not invite student involvement can cause students to feel bored and less motivated to learn. In this case, applying active and fun learning models is very important to improve learning outcomes; one is by utilizing game media such as dominoes. This study is expected to provide insight into how innovative learning media can improve student motivation and learning outcomes and provide recommendations for educators in designing more effective mathematics learning.

The formulation of the problem in this study focuses on the influence of domino learning media on students' mathematics learning outcomes and the effectiveness of the Make-a-Match model in improving students' understanding of mathematics material. Specifically, this study will answer several central questions: (1) How does using domino learning media affect students' mathematics learning outcomes? (2) To what extent can the application of the Make a Match model improve students' mathematics learning outcomes? (3) Is there a difference in mathematics learning outcomes between students who use domino learning media with the Make-a-Match model compared to students who learn using traditional methods? By answering these questions, this study aims to contribute to our understanding of the use of innovative learning media in mathematics learning. The main objective of this study is to assess and analyze the influence of the use of domino learning media on students' mathematics learning outcomes. In addition, this study also aims to explore the effectiveness of the Make a Match model in improving mathematics learning outcomes. This study is expected to provide empirical evidence regarding the benefits of a more interactive and enjoyable learning approach and practical recommendations for implementing these learning models in schools.

This study aims to improve understanding of the importance of game media in mathematics learning and open up opportunities for further research in this field. As part of the literature review, this study will refer to various previous studies relevant to the topic being discussed, namely the use of learning media in mathematics education and the application of active and interactive learning models, such as the Make-a-Match Model. Several previous studies have discussed the benefits of using game-based learning media in improving student motivation and learning outcomes. However, although many studies have reviewed the application of various active learning models in mathematics, very few studies still examine the use of domino learning media through the Make-a-Match Model in this context. Therefore, this study seeks to fill the gap in the existing literature by exploring and testing the potential of domino media as a learning tool to improve students' mathematics learning outcomes. In addition, this study also contributes to the analysis of gaps in the existing literature. Although many studies have discussed using fun and active learning media, studies combining domino media with the Make-a-Match model are still very limited. Therefore, this study aims to fill the gap by providing empirical evidence on the impact of the combination of domino media and the Make-a-Match model in mathematics learning. Thus, this study not only focuses on the application of domino media but also investigates the effectiveness of learning models that can significantly improve students' understanding and learning outcomes.

The novelty of this study lies in the combination of two essential elements, namely domino learning media and the Make-a-Match model, in the context of mathematics education. Although these two elements have been separated in previous studies, their combination in one study focusing on mathematics learning is relatively new. This study will provide new insights into mathematics education, especially creating more interactive, fun, and effective learning methods. The justification for the importance of this study lies in its ability to provide practical solutions that can be applied in schools to improve student's learning outcomes in mathematics. Therefore, this study is expected to contribute significantly to developing more innovative and effective learning methods in theory and practice.

METHOD

This study uses a quantitative approach with a Quasi-Experimental research design. This approach was chosen because it aims to test the effect of using domino learning media through the Make-a-Match model on students' mathematics learning outcomes in grade III. This quasi-experimental design was used because it allows researchers to compare two groups—the experimental and control classes—without completely random assignment. The decision to use this design is based on the limitations of completely random experiments in educational courses,

especially in the context of structured school learning, where researchers cannot fully control external variables that may affect the results. With this design, this study can still provide empirical evidence on the effect of using domino media and the Make-a-Match model in improving students' mathematics learning outcomes. To create appropriate domino learning media, researchers must design engaging and effective domino games that support mathematics learning, especially in teaching basic concepts such as addition, subtraction, multiplication, and division. Here are the steps to design domino learning media for mathematics learning: Materials and Size: dominoes can be made of strong plastic or cardboard with standard domino sizes (about 5 x 2 cm for each piece). Colors and Images: Choose bright colors but do not interfere with students' concentration. Each domino card will have numbers or images related to mathematical concepts. For example, numbers or pictures representing objects (such as five apples, three cakes, and so on) can be used to illustrate mathematical operations. Each domino card will have two sides with different numbers. The first side shows the number that must be added to the number on the other side. Example: 3 + 4 on the first side, and the other side is 7. Students must match the cards that have results that match the numbers. By using domino learning media like this, students are expected to improve their basic math skills and feel a more enjoyable and interactive learning experience. This can help students better understand mathematical operations and, ultimately, improve their learning outcomes. Here is a picture of a domino that the researcher has designed.

Figure 1. Domino Math Learning Media

The population in this study were grade III students at an elementary school in Sumenep Regency. The research sample consisted of 28 students divided into two classes: one experimental class that used domino learning media through the Make-a-Match model and one control class that used traditional learning methods. Sample selection was carried out by random sampling to ensure the representativeness of the sample to be tested in this study, where each student had an equal opportunity to be selected as part of the experimental or control group. With a limited sample size, it is expected that this study can provide a valid picture of the influence of learning media on student learning outcomes.

The instrument used in this study was a test consisting of 20 multiple-choice questions adjusted to the criteria and level of understanding of grade III students in mathematics material. These questions cover various basic topics in mathematics, such as addition, subtraction, multiplication, and division, relevant to the curriculum taught at that level. This test measured students' mathematics learning outcomes after applying different learning models between the experimental and control groups.

After data collection, data analysis was carried out with a series of statistical tests to ensure the validity of the research results. The data analysis process begins with a validity test to ensure that the test instrument used can measure what is intended, namely students' mathematics learning outcomes. This validity test is carried out by calculating the Pearson correlation coefficient between test items and total scores to account for the instrument's validity. Furthermore, a reliability test is carried out to determine the extent of the consistency of the test results. This reliability test uses

Cronbach's alpha, which is commonly used for multiple-choice tests, where higher results indicate good instrument consistency. After ensuring the validity and reliability of the test instrument, the collected data will be tested with a normality test to determine whether the distribution of student learning outcome data in both groups follows a normal distribution. The normality test uses the Shapiro-Wilk test, which is suitable for small samples such as in this study (n <50). If the data is normally distributed, the next step is a homogeneity test using Levene's Test to evaluate whether the two groups have the same variance. A homogeneity test is needed because one of the basic assumptions for using the t-test is that the variance between groups must be homogeneous.

After the data is declared regular and homogeneous, the hypothesis test is carried out using the t-test for independent samples to compare the average learning outcomes between the experimental and control groups. This t-test is used because the groups already have a normal distribution and homogeneous variance, so it can be used to determine whether there is a significant difference between the two groups. However, if the data does not meet the assumptions of normality and homogeneity, then the data analysis will switch to a non-parametric test, especially the Mann-Whitney U test. This non-parametric test compares two independent groups that are not normally distributed or have different variances. The selection of this non-parametric test is the right step because this test does not assume a normal data distribution, so it can overcome the data distribution limitations that do not meet parametric assumptions. Thus, the data analysis method used in this study has been adjusted to the characteristics of the data collected and ensures valid and accountable results. The selection of the proper statistical test will provide accurate results and allow researchers to draw valid conclusions regarding the effect of domino learning media through the Make-a-Match model on students' mathematics learning outcomes in grade III.

RESULT AND DISCUSSION

Statistical tests to see the results of this study were carried out with the help of the SPSS application to provide accurate and precise results regarding research on the influence of Domino media through the make-a-match learning model to improve mathematics learning outcomes. The normality test helps determine whether this study's independent and dependent variables are typically distributed, approaching normal, or not—model regression Which Good own distribution data standard or approach normal. Test normality of study This test uses the Kolmogorov-Smirnov test, which is said to be expected if the residual value that is typically distributed has a probability of significance greater than 0.05. The results of the normality test can be seen in Table 1.

Table 1. Test Normality

	Shapiro-Wilk		
	Statistic	Df	Sig.
PreTest III A	.957	15	.640
Post Test III A	.952	15	.558
PreTest III B	.899	15	.092
Post Test III B	.956	15	.620

Based on the results in Table 1, pre-test III A has a Shapiro-Wilk Statistic value of 0.957 with a significance (Sig.) of 0.640, greater than 0.05. This indicates that the pre-test III A data is usually distributed because the significance value is greater than 0.05, which means there is no sufficient evidence to reject the null hypothesis that the data follows a normal distribution. Likewise, post-test III A shows a Shapiro-Wilk Statistic value of 0.952 with a significance of 0.558, also greater than 0.05. This means the post-test III A data is also normally distributed, with no significant evidence

indicating deviation from the normal distribution. Meanwhile, for pre-test III B, the Shapiro-Wilk Statistic value is 0.899 with a significance of 0.092. Although this value is smaller compared to group III A, the recorded significance is still greater than 0.05, which means that the pre-test III B data can also be said to be normally distributed. Although there is a slight decrease in statistical value, it still shows that the data does not deviate significantly from the normal distribution. Finally, the post-test III B has a Shapiro-Wilk Statistic value of 0.956 with a significance of 0.620, greater than 0.05, indicating that the post-test III B data is usually distributed. These results suggest that the pre-test and post-test data in both groups, III A and III B, have a normal distribution, allowing parametric statistical tests to be used in further analysis. Overall, the results of this normality test indicate that the data obtained from the experimental and control groups are normally distributed. Therefore, further analysis can be carried out using the t-test to test the differences in learning outcomes between the two groups, assuming that the data meets the requirements for normal distribution.

The homogeneity test or test of equality of two variances aims to determine whether both data are homogeneous by comparing their variances. Testing homogeneity was done on class III A as a class experiment and class III B as a control class to determine the effect of Domino learning media through the make-a-match model to improve learning outcomes in mathematics subjects. The test used is the homogeneity of variance test. Homogeneity testing is done by analyzing the Test of Homogeneity of Variance through the SPSS 20 program. According to (Yuliana et al., 2022), the homogeneous requirement is if the probability (Sig) > 0.05, and if the probability (Sig) < 0.05, then the data is not homogeneous.

Table 2. Homogeneity Test

	Levene Statistic	df1	df2	Sig.
Result Based on Mean	.131	3	56	.941
Based on Median	.085	3	56	.968
Based on Median and with adjusted df	.085	3	50	.968
Based on trimmed mean	.144	3	56	.933

Results of the homogeneity variance test using Levene's Test show that the data owns variance that is homogeneous between groups tested. Based on various approaches, all tests' significance value (p-value) is more significant than 0.05, indicating that the variance between groups is homogeneous. In the Based on test Mean, the mark significance is 0.941; for test Based on Median The significance value is 0.968, for the test Based on Median with adjusted df the significance value is 0.968, and in the test Based on Trimmed Mean, the significance value is 0.933. Because the significance of all approaches is more significant than 0.05, we can conclude that the variance between groups in this study is homogeneous. This allows the use of parametric statistical tests in further analysis because the Wrong assumption For the use of the test is homogeneity between-group variance.

In this study, a hypothesis test was conducted using the Baron & Kenny Mediation Test to determine whether there was a significant difference between the Pretest III A and Posttest III A scores after the application of the Domino learning media through the make-a-match model.

Table 3. Test Regression X to Y Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	18.783	2.940		6.388	.000
	PreTest III A	.912	.044	.985	20.872	.000

Based on the results regression between variable Pretest III A (X) And Post Test III A (Y), it found that mark coefficient regression as significant as 0.912 with level significance 0.000 (< 0.05), showing that Pretest influential positive And significant to Post Test. A beta value of 0.985 indicates a robust relationship between variables X and Y, where the increase in the PreTest score contributes substantially to the increase in the post-test score. Thus, the first step in the Baron & Kenny has been fulfilled, that is, the independent variable directly influences the dependent variable.

Table 4. Test Regression X to M Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.145	.119		-1.223	.243
	PreTest III A	.011	.002	.871	6.391	.000

Based on the regression results between the variables PreTest III A (X) and NGain_Eks (M), a regression coefficient of 0.011 was obtained with a significance value of 0.000 (<0.05), which indicates that PreTest III A has a positive and significant effect on the mediator variable, namely NGain_Eks. The Beta value of 0.871 indicates that the relationship between X and M is quite strong. However, the insignificant constant value (p = 0.243) indicates that without the influence of PreTest III A, the NGain_Eks value is not significantly different from zero. Thus, the second step in the Baron mediation test and Kenny has been fulfilled, in which the independent influence variable is significant to the mediator variable.

Table 5. Test Regression M to Y Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	39.505	5.484		7.204	.000
	NGain_Eks	64.769	8.460	.905	7.656	.000

Based on the regression results between the mediator variable NGain_Eks (M) and the dependent variable Post Test III A (Y), the regression coefficient obtained was 64.769 with a significance level of 0.000 (< 0.05), Which shows that NGain_Eks influential positive and significant to Post Test III-A. The Beta value of 0.905 indicates that the relationship between M and

Y is potent, so the increase in NGain_Eks is substantial—increase mark Post Test III-A. Thus, step third in Baron & Kenny's mediation test has been met, where the mediator variable significantly influences the dependent variable.

Table 6. Test Regression X And M to Y Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	20.779	2.688		7.731	.000
	PreTest III A	.757	.077	.818	9.832	.000
	NGain_Eks	13.770	5.956	.192	2.312	.039

Based on the results of multiple regression between independent variables (PreTest III A), mediator variable (NGain_Eks), and dependent variable (Post Test III A), it was found that both variables had a significant influence on Post Test III A. PreTest III A still has a significant influence on Post Test III A with a regression coefficient value of 0.757 and a significance level of 0.000 (<0.05). Meanwhile, NGain_Eks also shows a significant influence with a regression coefficient of 13.770 and a significance level of 0.039 (<0.05). Compared with the previous regression results (Table 1.3), the coefficient value of Pre-Test III A against Post-Test III A decreased from 0.912 to 0.757 after the mediator variable (NGain_Eks) was entered into the model. This shows that NGain_Eks acts as a partial mediator because although the direct effect of Pre-Test III A on Post-Test III A is still significant, the value weakens after considering the role mediator. Thus, the improvement results of the Study (Post Test III A) are not only directly influenced by PreTest III A but also indirectly influenced through the increase in NGain_Eks as a mediator.

In this study, the results of the mediation test showed that the use of media learning Home through model Make a Match influences improving learning outcomes, although the impact is still partly influenced by other factors, such as students' initial understanding before participating in learning. This is proven based on the results of multiple regression between independent variables (PreTest III A), variable mediator (NGain_Eks), And variable dependent (Post Test III A); it was found that both variables had a significant influence on Post Test III A. PreTest III A still has a significant influence on Post Test III A with a regression coefficient value of 0.757 and a significance level of 0.000 (<0.05). Meanwhile, NGain_Eks also shows a significant influence with a regression coefficient of 13.770 and a significance level of 0.039 (<0.05).

Discussion

Based on research conducted on third-grade students in Sumenep Regency, domino learning media through the Make-a-Match model has significantly impacted students' mathematics learning outcomes. This aligns with the theory of active learning and constructivism, which emphasizes direct student involvement in the learning process. According to Piaget, learning occurs optimally when students are involved in activities requiring them to construct their knowledge through experience (Nurfitriyanti & Lestari, 2016). The Make-a-Match model applied in this study allows students to learn actively by collaborating in finding the right partner for math problems. Using domino media as a learning aid will enable students to understand mathematical concepts more easily because this

game integrates fun and competitive elements that can increase students' learning motivation (Zainuddin, 2023).

Meanwhile, there was no significant increase in student learning outcomes in the control group using conventional learning methods. This indicates that traditional methods, although still widely used, are ineffective enough to increase student involvement in mathematics learning. This conclusion confirms the findings of previous studies showing that learning involving physical and social activities, such as the Make-a-Match model, can be more effective in improving student understanding compared to passive approaches that only focus on the delivery of information by teachers.

This study provides an essential contribution to the theory of mathematics learning, especially in applying game-based learning media and active learning models. In the context of learning theory, these findings enrich the discourse on using game media as an effective tool in improving student learning outcomes. The multimedia theory proposed by (Want, 2022) states that learning that combines visual and verbal elements, such as those in domino media, can improve students' understanding and memory. In this study, domino media involving images and numbers, as well as the Make a Match model that encourages interaction between students, prove that this multimedia theory can be successfully applied in the context of mathematics learning.

In addition, these findings also contribute to the theory of constructivism, which emphasizes the importance of active and interactive learning. (Ardiansyah & Ridwan, 2024) argued that optimal learning occurs when students work in social situations that support their cognitive development. The Make a Match model, which emphasizes student collaboration and interaction, aligns with these constructivist principles. Thus, this study provides empirical evidence on the effectiveness of a learning model that emphasizes social interaction and active involvement in improving mathematics learning outcomes. In terms of practice, these findings can guide educators to implement more innovative and enjoyable learning methods, such as game-based learning media and active learning models. Using domino media through the Make-a-Match model allows students to learn in a more interactive and non-monotonous way, which can reduce boredom and increase learning motivation. Therefore, the results of this study provide practical recommendations for elementary mathematics teachers to integrate this method into their teaching, especially to improve students' learning outcomes in basic mathematical concepts.

Although this study provides significant findings regarding the effect of domino learning media through the Make-a-Match model on mathematics learning outcomes, several limitations must be considered. One of the main limitations is the relatively small sample size, which is only 28 students divided into two groups, experimental and control. With a limited sample size, the results of this study may not be generalizable to a larger population. Research with a larger and more diverse sample will provide more representative and reliable results to test the effectiveness of domino learning media in various conditions and contexts. In addition, this study was only conducted in a relatively short time, namely one semester, which limits the ability to observe the long-term effects of the application of the Make a Match model on mathematics learning outcomes. Therefore, this study cannot provide information on the long-term impact of using domino learning media in mathematics learning. Further research with a longitudinal design involving the measurement of learning outcomes over a more extended period will provide a more complete picture of the effectiveness and sustainability of using this method. Another limitation is external factors that may

affect the results of the study, such as differences in motivation and socio-economic background of students that cannot be fully controlled in this study. These factors can affect how students respond to the learning methods applied, thus affecting the results obtained.

Based on the existing limitations, several suggestions for future research can expand the existing findings and overcome the limitations of this study. One of the leading suggestions is to develop the sample size and involve more schools from various regions and socio-economic backgrounds. Research involving larger and more diverse samples will increase the external validity of these findings and allow researchers to explore whether the influence of domino learning media through the Make-a-Match model can be widely applied in various educational contexts. In addition, longitudinal research examining the long-term impact of the Make a Match model in mathematics learning is needed. Research would provide insight into the sustainability of the effectiveness of this method and whether the improvements in learning outcomes observed in the short term can be maintained in the long term. Longitudinal research could also help explore whether this learning model has a greater effect on other aspects of learning, such as critical thinking skills or student creativity. Another suggestion is to examine different factors that may influence the effectiveness of the Make-a-Match model, such as student motivation, parental involvement, or the influence of environmental factors outside the classroom. More in-depth research on these factors could provide a more comprehensive understanding of the conditions that support or hinder the successful use of game-based learning media in mathematics learning.

This research also has significant social and ethical implications, especially in using digital technology in education. One social significance of these findings is that game-based learning media, such as Domino, can increase students' access to more engaging and interactive learning methods. This can reduce the educational gap between areas with limited access to technology and more traditional educational resources. By implementing this method, education can become more inclusive and provide opportunities for all students, regardless of their socio-economic background, to have a more meaningful learning experience.

However, the use of technology in education also brings several ethical considerations. First, it is essential to ensure that technology is used wisely and does not increase the digital divide between students with access to technological devices and those without access. Second, the use of student data in digital learning platforms must be done with due regard for privacy rights and data security. Teachers and educators need to be reminded of the importance of maintaining the confidentiality of students' data and ensuring that technology is used to support learning and not exploit students' personal information. Overall, the findings of this study indicate that Domino learning media through the Make-a-Match model can positively impact mathematics learning, with various implications that can be applied to teaching practices in the field as well as contributions to learning theory. However, further research with a more robust design is needed to broaden and deepen our understanding of this method's effectiveness and long-term potential.

CONCLUSION

Based on the research results, the use of domino learning media through the Make-a-Match model significantly influences the mathematics learning outcomes of grade III students in Sumenep Regency. Data analysis showed that students who used domino learning media with the Make-a-Match model had better learning outcomes than traditional learning methods. This study also

contributes to developing mathematics learning theory, especially in applying game-based media and active learning models in the classroom. Thus, this study proves that learning methods that involve students directly and integrate game elements can be an effective alternative to improve mathematics learning outcomes at the elementary level. These findings provide empirical evidence supporting the importance of implementing more innovative and enjoyable learning approaches in improving the quality of mathematics education in Indonesia. Although this study showed significant results, several limitations, such as the small sample size and limited study duration, affect the generalization of the findings. Therefore, further research with larger samples and more complex research designs is needed to broaden the understanding of the effectiveness of this learning model in a broader context.

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