

The Influence of the Realistic Mathematics Education Model Assisted by "Lutik" Media on the Mathematical Problem-Solving Ability of Elementary School Students

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INFORMASI ARTIKEL	ABSTRAK
Article History: Received: 10 June 2026 Revised: 11 June 2026 Accepted: 13 June 2026 Published: 31 July 2026 Kata Kunci: Realistic Mathematics Education (RME); Ludo Matematik; Kemampuan Pemecahan Masalah	Penelitian ini bertujuan untuk mengetahui pengaruh model pembelajaran <i>Realistic Mathematics Education</i> (RME) berbantuan media Ludo Matematik terhadap kemampuan pemecahan masalah matematis siswa kelas IVSDN Margajaya 04 dengan siswa 26 siswa kelas eksperimen dan 26 siswa kelas kontrol pada materi Pengukuran Volume. Penelitian ini menggunakan kuantitatif dengan metode <i>quasi experiment</i> dengan desain <i>non-equivalent control group</i>. Hasil penelitian menunjukkan bahwa rata-rata post-test kelas eksperimen sebesar 88,25 lebih tinggi dibandingkan kelas kontrol yaitu 75,85. Hasil uji independent sample t-test menunjukkan signifikansi $0,000 < 0,05$ sehingga dapat dilihat bahwa terdapat pengaruh yang signifikan dari penerapan model pembelajaran RME berbantuan Ludo Matematik terhadap kemampuan pemecahan masalah matematis siswa. Kemudian hasil N-Gain kelas eksperimen menunjukkan peningkatan sebesar 0,6970 lebih tinggi dibandingkan kelas kontrol sebesar 0,6348 dengan kategori sedang. Dengan demikian, model RME berbantuan Ludo Matematik berpengaruh positif terhadap kemampuan pemecahan masalah matematis siswa dibandingkan model discovery learning berbantuan Ludo Matematik.
Keywords: Realistic Mathematics Education (RME); Ludo Matematik; problem-solving ability	ABSTRACT This study aims to determine the effect of the Realistic Mathematics Education (RME) learning model assisted by Ludo Matematik media on the mathematical problem-solving abilities of fourth-grade students at SDN Margajaya 04, with 26 students in the experimental class and 26 students in the control class on the topic of Volume Measurement. This research uses a quantitative method with a quasi-experimental design and a non-equivalent control group. The research results show that the average post-test score of the experimental class was 88.25, higher than the control class at 75.85. The independent sample t-test results indicate a significance of $0.000 < 0.05$, suggesting a significant effect of the RME learning model assisted by Ludo Matematik on students' mathematical problem-solving abilities. Furthermore, the N-Gain results of the experimental class showed an increase of 0.6970, higher than the control class at 0.6348, categorized as moderate. Thus, the RME model assisted by Ludo Matematik has a positive effect on students' mathematical problem-solving abilities compared to the discovery learning model assisted by Ludo Matematik. This is an open access article under the CC-BY-SA license. 

1. Introduction

Mathematics is one of the important subjects, especially in elementary school, because through mathematics lessons, students are trained to think logically and systematically (Akkas et al., 2025). In addition, mathematics can help people understand and solve various problems in life, such as social, economic, and natural problems. Problem-solving skills are important to learn in education. This is in line with the opinion of the National Council of Teachers of Mathematics NCTM (in Siswanto & Meiliasari, 2024), which establishes five important abilities in mathematics learning. One of these abilities is the ability to solve problems.

Problem-solving skills are one of the important skills that students must have in learning. This ability allows students to understand problems, to determine the right strategies, and to find solutions well. Polya (in Wildaniati et al., 2021) explains the indicators or steps to solve mathematical problems, namely: a. Understanding the problem, b. Developing a plan or planning a solution to existing problems, c. Solve problems, d. Double-check the results obtained in solving a problem by drawing conclusions.

The problem in education is low learning outcomes in mathematics. Especially in mathematics problems in the form of story problems that students must solve with good solutions. Based on research conducted by Yetri et al. (2019) in one of the State Elementary Schools in the Padang area, it shows that the problem that occurs is the low ability to solve mathematical problems. The causative factors are boring learning and the use of conventional learning models or methods (Anzila et al., 2024; Devi et al., 2025).

To change the way students view mathematics lessons, teachers need an effective way, namely by using a learning model that can increase students' ability to solve problems in mathematics lessons. One of the learning models that teachers can use is the Realistic Mathematics Education (RME) learning model. The Realistic Mathematics Education (RME) model is a learning model whose main focus is on relating learning to real conditions and problems in daily life (Widad & Hadi, 2025). The steps in this RME model, according to Shoimin, A. (2014), are as follows. 1) understand the problem; 2) solve problems; 3) compare and discuss results; 4) draw conclusions.

In order to increase student activeness in learning, the application of the RME model can be integrated with interesting learning media, one of which is Ludo Mathematics. Ludo Mathematics is a game that uses a board as the field, with competition among groups to reach the final position; in addition, this media is combined with mathematics question cards that students can work on, so the atmosphere can be fun.

Several studies have shown that this RME model can improve students' mathematical problem-solving abilities. One of them is a study conducted by Fadila et al. (2026) on Class V students, which shows that the RME learning model can improve mathematical problem-solving skills, as seen from the results of class scores for classes that apply the higher Realistic Mathematics Education (RME) model. In addition to using the RME learning model, which is considered to improve students' mathematical problem-solving skills, this study also integrates it with learning media (Khoerunnisa et al., 2025).

However, research on the application of the RME model assisted by Ludo Mathematics media to students' mathematical problem-solving abilities is still limited, so further research is needed. Based on this description, this study aims to determine the effect of the application of the Realistic Mathematics Education (RME) learning model assisted by Ludo Mathematics media on the mathematical problem-solving ability of elementary school students.

2. Metode Penelitian

The research method used is Quasi Experiment; according to Sugiyono (2013), a quasi experiment is a research method with the aim of determining the influence of certain treatments. As for the research design used, namely the Nonequivalent Control Group Design, in this design the experimental group and the control group were not randomly selected (Sugiyono, 2013).

Table 1 Design Non-equivalent Control Group

Classes	<i>Pre-test</i>	<i>Treatment</i>	<i>Post-test</i>
Eksperiment	O_1	X_1	O_2
Control	O_1	X_2	O_2

(Sumber: Sugiono, 2023)

Description:

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O-1. = Pre-test for students' mathematical solving abilities in experimental grade IV and control classes.

O-2. = Post-test to measure students' mathematical solving ability in experimental IV grade and control class.

X-1. = Treatment using the Realistic Mathematics Education (RME) learning model assisted by LUTIK (Ludo Mathematics) media.

X-2. = Treatment using the Discovery Learning learning model assisted by LUTIK (Ludo Mathematics) media.

Then the samples used are class IV A as an experimental class and class IV B as a control class in one of the State Elementary Schools in Bogor City in 2025/2026. The sampling technique in this study is purposive sampling, with a total of 52 students. The data collection techniques used are tests, observations, and documentation. Test instruments are in the form of pre-test and post-test description question sheets, and observation instruments are in the form of observation sheets on the implementation of learning by teachers and student activities. The data obtained were then analyzed using descriptive and inferential statistics. Namely, by a normality test, a homogeneity test, an independent-samples t-test, and an N-Gain test. The N-Gain test was used here to see an improvement in mathematical problem-solving abilities.

3. Results and Discussion

This study aims to determine the influence of the Realistic Mathematics Education (RME) model assisted by Ludo Matematik media on the mathematical problem-solving ability of elementary school students. The research data were obtained from pre-test and post-test mathematical problem-solving ability tests. In addition, observations were made to determine the implementation of learning during the study. The data obtained were then analyzed using several tests. In addition, the descriptive results of the students' mathematical problem-solving ability test are presented in Table 2.

Table 2. Descriptive Statistics of Experimental Classes and Control Classes

Classes		N	Value		Average	Standard Deviation
			Minimum	Maximum		
Eksperiment	<i>Pre-test</i>	26	20	65	46,63	11,810
	<i>Post-test</i>	26	70	97,5	88,25	6,966
Control	<i>Pre-test</i>	26	20	50	33,75	9,199
	<i>Post-test</i>	26	60	90	75,85	7,259

(Source: Research Results, 2026)

Based on Table 2, the average *pre-test* for the experimental class was 46.63, and the control class was 33.75. After being given treatment in both classes, the average post-test of the experimental class was 88.25, while the control class was 75.85. These results show that, based on the average scores obtained, both classes increased after being given treatment. The tests used to analyze the data in this study are.

a. Normality Test

The normality test was carried out to find out whether the data in the study were normally distributed. The normality test used was the *Shapiro-Wilk method*. In addition, the normality test is also used to determine the statistical analysis that will be used for the next stage. The results of the normality test are from *pre-test* and *post-test* scores.

Table 3. Results of Pre-test and Post-test Normality Tests

Classes	Shapiro-Wilk			Explanation
	Statistic	df	p-value (Sig.)	
Pre-test Eksperiment	0,957	26	0,344	Normal
Pre-test Control	0,947	26	0,199	Normal
Post-test Eksperiment	0,972	26	0,671	Normal
Post-test Control	0,974	26	0,734	Normal

(Source: Research Results, 2026)

Based on the results of the normality test in Table 3. Above, significance values were obtained for the *pre-test* and *post-test data* of the experimental class and control class; these results show that the significance value (Sig.) was greater than 0.05. value of 0.05. With that, the research data of the two classes are distributed normally, so they are eligible for further analysis.

b. Homogeneity Test

This homogeneity test was carried out to determine the similarity of the variance of post-test data in the experimental class and the control class. The decision-making criteria in this homogeneity test are that if the significance value is > 0.05 , then the two groups are declared homogeneous; if the significance value is < 0.05 , then the two groups are declared inhomogeneous. The following are the results of the homogeneity test.

Tabel 4. Hasil Uji Homogenitas Post-test Kelas Eksperimen dan Kontrol

Data	p-value (Sig.)	Interpretasi
Post-test of Experimental Class and Control Class	0,862	Homogen

(Source: Research Results, 2026)

Based on Table 4, the results of the homogeneity test showed a significance value of $0.862 > 0.05$. Thus, the homogeneity test of the post-test data variance for the experimental and control classes is homogeneous, so it can be continued in the next hypothesis test.

c. Independent Sample T-test

This hypothesis test was carried out to determine the influence of the *Realistic Mathematics Education* (RME) model assisted by Ludo Matematik media on students' mathematical problem-solving skills. This test was carried out using the Independent-Samples T-Test by comparing the post-test results between the experimental class using the RME model assisted by Ludo Mathematics media and the control class using *Discovery Learning media*. The results of the independent sample t-test are shown in Table 5.

Table 5. Independent Sample T-test Results

Equal Variances assumed	Df	Two-sided p	T	Interpretasi
	50	$< 0,001$	-3,752	H ₀ Accepted (Signifikan)

(Source: Research Results, 2026)

Based on Table 5, a significance value (Sig. 2-tailed) of $0.001 < 0.05$ was obtained. This value is smaller than 0.05, so there is a significant difference between the mathematical problem-solving ability of the experimental class using the *Realistic Mathematics Education* (RME) model assisted by Ludo Mathematics media and the control class using the *Discovery Learning model*.

Furthermore, to determine the improvement in students' mathematical problem-solving skills after participating in learning, an N-Gain analysis was conducted. This analysis was carried out based on pre-test and post-test in the experimental class and the control class. The results of the N-Gain analysis are presented in Table 6 below.

Table 6. N-Gain Score and N-Gain Percent Results

Classes	N-Gain score	Explanation	N-gain percent	Explanation
Eksperiment (RME Model)	0,6970	Medium	69%	Quite Effective
Control (Discovery Learning)	0,6348	Medium	63%	Quite Effective

(Source: Research Results, 2026)

Based on Table 6, above, the average N-gain score of the experimental class was 0.69, and the control class was 0.63. From the N-Gain interpretation criteria, both classes fall into the medium category. However, the average value of N-Gain in the experimental class was higher than that of the control class. This shows that there is an increase in mathematical problem-solving skills in students who use the Realistic Mathematics Education (RME) model assisted by Ludo Mathematics media better than students who learn using the Discovery Learning model.

Discussion

The findings of this study prove that the Realistic Mathematics Education (RME) model assisted by Ludo Matematik media can improve mathematical problem-solving skills in grade IV elementary school students. From each test carried out, starting from the normality test and the homogeneity test, it shows a significance value exceeding 0.05, meaning that the data is normally distributed and the data variance in the two groups is aligned. Therefore, the test analysis is continued to the next stage, namely the independent sample t-test stage. The results of the independent sample t-test obtained a significance value of 0.000, which means that there is a difference in the post-test values of the experimental class and the control class. In line with the research conducted by Dorisno et al. (2024), the use of the Realistic Mathematics Education (RME) learning model in mathematics learning has a positive effect on students' mathematical problem-solving abilities.

The improvement of students' mathematical problem-solving skills in the experimental class occurs because, in this RME model, the initial step or syntax is to present problems that are close to students' daily lives, for which students are encouraged to find concepts learned independently. This is based on Freudenthal's theory, which explains that the RME model relates mathematics learning to the context of daily real life (Mutmainah & Karimah, 2024).

In addition to the application of RME, the use of Ludo Mathematics media also influences the improvement of students' mathematical problem-solving skills. This game-based learning media will create an active and fun learning atmosphere so that students will be enthusiastic in carrying out the learning process. This is in line with research that shows that game-based learning media can increase student involvement in the learning process (Daniatun et al., 2022). The results of this study are in line with the research conducted by Fadila et al, (2026), which shows that the RME model can improve students' mathematical problem-solving skills. The use of mathematics game media can also improve students' abilities, motivation and activeness in learning. Freudhental (Da, N, T., 2022) states that "mathematics is an activity that should be connected with real conditions so that learning is more meaningful," meaning that mathematics is a human activity that must be associated with real conditions so that learning is more memorable. For this reason, the RME model is suitable for improving mathematical problem-solving skills because this model relates real conditions to learning.

4. Conclusion

Based on the results of the research that has been carried out, the Realistic Mathematics Education (RME) model assisted by Ludo Mathematics media has a positive effect on the mathematical problem-solving ability of grade IV elementary school students in volume measurement materials. This increase was reviewed from the acquisition of N-Gain values in the experimental class using the RME model assisted by Ludo Mathematics media of 0.69 in the medium category, while the control class using the Discovery Learning model obtained an N-Gain value of 0.63 in the medium category—the results of the hypothesis test show that there is a significant difference between the two classes. Therefore, the RME model can be used as a choice for teachers to improve the mathematical problem-solving skills of elementary school students.

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