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The Influence of the RME Learning Model on Mathematical Problem Solving and Communication Skills in Mathematics Learning in Students of SMP 1 Bangkinang City

Adityawarman Hidayat[1*], Nurhaswinda[2], Etika Yusrina[3], Veronica McCauley[4]
[1,2,3]Universitas Pahlawan Tuanku Tambusai, Riau, Indonesoa
[4]University of Galway, Galway, Irlandia

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ABSTRACT
Objective: This study aims to examine the effect of implementing the Realistic Mathematics Education (RME) learning model on students' mathematical problem-solving skills and mathematical communication abilities at SMP Negeri 1 Bangkinang Kota. The study emphasizes how context-based learning grounded in real-life situations can enhance students' conceptual understanding, higher-order thinking skills, and their ability to communicate mathematical ideas systematically and effectively. **Research Method**: This study employed a quasi-experimental design using a Pretest–Posttest Control Group Design. The research sample consisted of 40 eighth-grade students of SMP Negeri 1 Bangkinang Kota, divided into two groups: an experimental group (20 students) taught using the RME model and a control group (20 students) taught using conventional mathematics instruction. Data were collected through a mathematical problem-solving test and a rubric-based assessment of mathematical communication skills. Data analysis was conducted using descriptive statistics and inferential statistics, specifically an independent samples t-test, after fulfilling the assumptions of normality and homogeneity. **Research Findings:** The results indicate a significant difference between the experimental and control groups in terms of mathematical problem-solving skills and mathematical communication abilities. The posttest scores of students in the experimental group were significantly higher than those of the control group. These findings demonstrate that the implementation of the RME model is effective in improving students' mathematical problem-solving and communication skills. **Novelty:** This study clarifies the novelty of RME by explaining the classroom mechanism that integrates contextual problem exploration, group discussion, and student presentations. Through these processes, students simultaneously develop mathematical communication and problem-solving skills within collaborative and reflective learning activities.

INTRODUCTION

Mathematics is one of the subjects that plays a crucial role in developing students' logical, analytical, and creative thinking skills. These abilities are not only essential for solving mathematical problems but also for dealing with everyday life situations that require critical and systematic thinking. At the junior high school level, mathematics learning often faces challenges because students experience difficulties in understanding abstract concepts, connecting theory with practice, and clearly communicating ideas or problem-solving strategies. These issues indicate the need for learning approaches that can enhance conceptual understanding and students' ability to solve problems effectively (Susanto et al. 2024).

One approach that has gained increasing attention in mathematics education is the implementation of the Realistic Mathematics Education (RME) model. RME emphasizes learning that connects mathematical concepts with real-life contexts or everyday situations, enabling students to develop a deeper and more meaningful understanding of mathematics. According to Sugiarti et al. (2025) mathematics learning should be grounded in students' real experiences so that mathematical reasoning can develop naturally. In the context of junior high schools, this approach allows teachers to present problems that are relevant to students' daily lives, enabling students not only to learn theoretically but also to apply mathematical concepts in concrete situations (Widana, 2021).

Problem-solving ability is one of the key indicators of success in mathematics learning. Mathematical problem solving requires not only computational skills but also critical thinking, strategic planning, and the ability to evaluate the effectiveness of solutions. Students with strong problem-solving skills tend to approach various mathematical problems and challenges with greater confidence. However, research indicates that many junior high school students still struggle with problem solving, particularly when dealing with contextual problems or tasks that require complex analysis. This condition highlights the importance of learning approaches that emphasize real-world contexts and active student engagement (Aulia et al. 2025).

In addition to problem-solving skills, mathematical communication is also a vital aspect of mathematics learning. Mathematical communication refers to students' ability to express ideas, arguments, and problem-solving strategies using appropriate mathematical language and symbols. This ability also involves discussion and collaboration skills, enabling students to develop shared understanding and enhance critical thinking. Improving mathematical communication skills is believed to strengthen conceptual understanding and support students' success in solving mathematical problems more effectively (Trisnawati et al. 2023).

The RME model not only emphasizes conceptual understanding through real-life contexts but also encourages interaction among students during the learning process. Through group discussions, presentations, and collective reflection, students are encouraged to communicate their mathematical ideas, listen to their peers' perspectives, and evaluate proposed solutions. This approach aligns with the goals of modern mathematics education, which aim to develop students who are critical, creative, and collaborative thinkers. Several studies have shown that RME can improve students' problem-solving abilities and foster better mathematical communication skills compared to conventional instructional approaches (Simamora, 2024).

Previous studies on RME have largely focused on its effectiveness in improving conceptual understanding and problem-solving skills. For example, research conducted by Susanto et al. (2024) demonstrated that students who participated in RME-based learning achieved significantly higher problem-solving scores than those who learned through traditional methods. However, research examining the effect of RME on students' mathematical communication skills remains relatively limited. This gap is important to address, as communication is one of the core competencies emphasized in both the Merdeka Curriculum and the 2013 Curriculum, which prioritize 21st-century skills such as collaboration, communication, and critical thinking (Widad & Hadi, 2024).

In the context of SMP Negeri 1 Bangkinang Kota, mathematics teachers face challenges in simultaneously improving students' problem-solving and communication skills. Many students are able to solve problems individually but struggle to explain their reasoning or engage in discussions with peers. This condition indicates a gap between cognitive ability and communication skills. Therefore, the implementation of RME is expected to bridge this gap, as the model emphasizes contextual, collaborative, and interactive learning experiences (Fitriyani et al. 2024).

Based on the above discussion, this study aims to analyze the effect of implementing the RME model on students' mathematical problem-solving skills and mathematical communication abilities at SMP Negeri 1 Bangkinang Kota. Using a quasi-experimental approach, this study is expected to provide empirical evidence regarding the effectiveness of RME in enhancing students' mathematical competencies, both individually and in collaborative learning contexts (Utami et al. 2022).

Furthermore, this study contributes to the development of mathematics education at the junior high school level, particularly in the context of contextual learning that supports 21st-century skills. By emphasizing the connection between mathematical concepts and real-life situations and encouraging interaction and communication among students, the RME model is expected to enhance students' learning motivation and academic achievement. This study also opens opportunities for future research on the development of innovative and holistic mathematics learning strategies, thereby contributing to the continuous improvement of mathematics education quality at the junior high school level (Palinussa et al. 2021).

Therefore, the objective of this study is to examine the effect of implementing the Realistic Mathematics Education (RME) model on students' mathematical problem-solving skills and mathematical communication abilities at SMP Negeri 1 Bangkinang Kota. Specifically, this research aims to determine whether the use of the RME learning model can significantly improve students' problem-solving abilities and their capacity to communicate mathematical ideas compared with conventional mathematics instruction.

RESEARCH METHOD

1. Research Design

This study employed a quasi-experimental design using a pretest–posttest control group design. This design was selected because full randomization of participants was not feasible; however, it still allows for a comparison of the effectiveness of the Realistic Mathematics Education (RME) learning model on students' mathematical problem-solving skills and mathematical communication abilities in comparison with conventional instruction. In this design, both groups were administered a pretest prior to the treatment and a posttest after the treatment, enabling a comparative analysis of learning outcomes.

Table 1. Research Design

Group	Pretest	Treatment	Posttest
Experimental	O1	RME Model	O2
Control	O3	Conventional Model	O4

Notes:
O1, O3 = Pretest (initial assessment before treatment)
O2, O4 = Posttest (final assessment after treatment)

2. Population and Sample

The population of this study consisted of all eighth-grade students of SMP Negeri 1 Bangkinang Kota in the 2025/2026 academic year. The sample was selected using purposive sampling based on class representativeness and students' willingness to participate in the study. A total of 40 students were involved and divided into two groups:

a. Experimental group: 20 students who received instruction using the RME model.
b. Control group: 20 students who received conventional mathematics instruction.

3. Research Variables

a. Independent variable:
The Realistic Mathematics Education (RME) learning model.
b. Dependent variables:
1) Students' mathematical problem-solving skills.
2) Students' mathematical communication skills.

4. Research Instruments

The research instruments consisted of two components:

a. Mathematical Problem-Solving Test

The mathematical problem-solving test was designed based on Polya's four stages of problem solving: (1) understanding the problem, (2) devising a plan, (3) carrying out the plan, and (4) reviewing the solution.

1) The test consisted of 10 essay-type questions covering algebraic expressions and linear equations in two variables, which were aligned with the Grade VIII curriculum. The items included both contextual problems (real-life situations such as budgeting, distance-speed-time, and comparison scenarios) and non-routine problems requiring analytical reasoning and strategy development.
2) Each item was scored using an analytical scoring rubric with a maximum score of 10 points per item, distributed proportionally across the four problem-solving stages. Thus, the maximum total score was 100.
3) Prior to implementation, the instrument was piloted on 10 students from another class with similar characteristics. Item validity was analyzed using the Pearson Product-Moment correlation coefficient. All items showed correlation coefficients higher than the critical value ($r > 0.30$), indicating acceptable item validity.
4) Reliability analysis was conducted using Cronbach's alpha. The reliability coefficient obtained was 0.82, which indicates high internal consistency and confirms that the instrument was reliable for measuring students' mathematical problem-solving skills.

b. Mathematical Communication Skills Assessment Rubric

Students' mathematical communication skills were assessed through both written responses (in the problem-solving test) and oral participation during classroom discussions.

The assessment rubric was developed based on three main indicators:

1) Clarity in expressing mathematical ideas logically and systematically
2) Appropriate use of mathematical language, representations, and symbols
3) Active participation and ability to respond to peers' arguments during discussions

Each indicator was rated using a 4-point Likert scale:

1 = Very Low
2 = Low
3 = High
4 = Very High

The total communication score was obtained by summing the scores across indicators. The maximum possible score was 12 for each student.

Content validity of the rubric was evaluated by three experts in mathematics education. Revisions were made based on expert feedback to ensure alignment with the objectives of mathematical communication competence in junior high school mathematics learning.

5. Research Procedure

a. A pretest was administered to both groups to measure students' initial mathematical problem-solving and communication skills.
b. Treatment:
   1) The experimental group received instruction using the RME model for four weeks, incorporating strategies such as problem contextualization, group discussions, and reflective activities.
   2) The control group received conventional mathematics instruction commonly used in the classroom. The teacher explained the concepts through direct instruction using textbooks and board explanations, followed by demonstrations of problem-solving procedures. Afterward, students completed routine practice exercises individually based on the examples provided by the teacher. Classroom interaction was limited, and learning activities mainly focused on procedural practice and teacher-guided explanations.
c. A posttest was administered to both groups after the completion of the treatment to measure improvements in students' abilities.

6. Data Analysis Techniques

Data analysis was conducted in several stages:

1) Descriptive Statistics

Mean, standard deviation, minimum score, and maximum score were calculated for both pretest and posttest scores in the experimental and control groups.

2) Assumption Testing

Before hypothesis testing, prerequisite tests were conducted:

a) Normality test using the Shapiro–Wilk test

b) Homogeneity of variance test using Levene's test

3) Inferential Statistical Analysis

To examine the effect of the RME model on students' mathematical problem-solving and communication skills, the following statistical tests were applied:

a) An independent samples t-test was used to compare the posttest scores between the experimental and control groups.

b) A paired samples t-test was conducted to analyze differences between pretest and posttest scores within each group.

In addition, the normalized gain (N-gain) score was calculated to determine the magnitude of improvement in each group. The N-gain results were categorized into low, medium, and high improvement levels. All statistical analyses were performed using SPSS version 26 with a significance level of $\alpha = 0.05$.

RESULTS AND DISCUSSION

Results

A. Descriptive Data of Pretest and Posttest

This study involved 40 eighth-grade students from SMP Negeri 1 Bangkinang Kota, who were proportionally divided into two groups: 20 students in the experimental group who received instruction using the Realistic Mathematics Education (RME) model and 20 students in the control group who received conventional mathematics instruction. The students' ages ranged from 13 to 15 years, which corresponds to the developmental characteristics of junior high school students.

All students in both groups participated in two stages of assessment, namely the pretest and the posttest, which were designed to measure mathematical problem-solving skills and mathematical communication abilities before and after the implementation of the instructional treatment. The pretest was administered to determine students' initial abilities and to ensure the equivalence of competencies between the experimental and control groups. Subsequently, the posttest was administered after the completion of the instructional process to examine changes and improvements in students' abilities as a result of the implemented learning model.

The pretest and posttest data were analyzed descriptively using the mean, median, and standard deviation to provide an overall overview of score tendencies and data dispersion in each group. The results of this descriptive analysis served as a preliminary basis for evaluating the effectiveness of the RME model prior to conducting further inferential statistical analyses.

Table 2. Descriptive Statistics of Students' Mathematical Problem-Solving Scores

Group	N	Mean	Median	Std. Dev.	Min	Max
Experimental Pretest	20	60.25	61.00	5.12	50	69
Experimental Posttest	20	78.90	79.00	4.33	70	85
Control Pretest	20	61.10	61.50	5.25	50	70
Control Posttest	20	68.45	69.00	4.88	60	75

Table 3. Descriptive Statistics of Mathematical Communication Skills

Group	N	Mean	Median	Std. Dev.	Min	Max
Experimental Pretest	20	58.30	58.50	4.50	50	65
Experimental Posttest	20	81.25	82.00	3.95	74	88
Control Pretest	20	59.10	59.00	4.60	51	66
Control Posttest	20	69.20	69.00	4.50	60	75

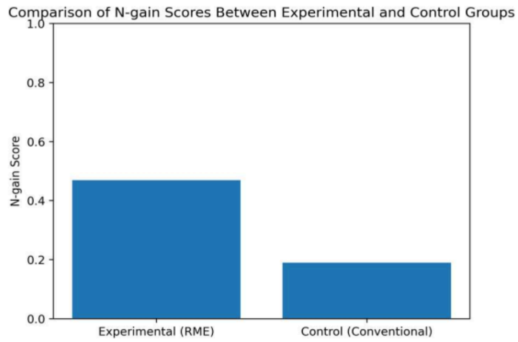

Figure 1. Comparison of N-Gain Scores Between Experimental and Control Groups

To provide a clearer visualization of students' learning improvement, an N-gain analysis was conducted. The experimental class that implemented the RME model achieved an average N-gain score of 0.47, which falls into the moderate improvement category. Meanwhile, the control class obtained an N-gain score of 0.19, which is categorized as low improvement.

The graphical representation in Figure 1 illustrates that students who participated in RME-based learning experienced a significantly higher learning gain compared with students who learned through conventional instruction. This visualization supports the descriptive findings and highlights the effectiveness of the RME model in improving both mathematical problem-solving and communication skills.

B. Inferential Analysis

Prior to conducting the independent samples t-test, normality and homogeneity tests were performed to ensure that the data met the assumptions required for parametric statistical analysis.

a. Normality Test

The normality test is a statistical procedure used to determine whether the sample data are drawn from a normally distributed population. In this study, the normality of the pretest and posttest data was examined using the Kolmogorov–Smirnov test. The analysis was conducted using SPSS Statistics version 25 with a total sample size of 40 students.

The criteria for interpreting the normality test results were as follows:

1) If the significance value (p) > 0.05, the data are normally distributed.
2) If the significance value (p) < 0.05, the data are not normally distributed.

Table 4. Results of the Normality Test

Variable	Group	N	*p*-value	Conclusion
Mathematical Problem-Solving	Experimental	20	0.200	Normal
	Control	20	0.181	Normal
Mathematical Communication	Experimental	20	0.172	Normal
	Control	20	0.190	Normal

The results of the normality test using the Kolmogorov–Smirnov method indicate that all data related to students' mathematical problem-solving skills and mathematical communication abilities were normally distributed. In the experimental group, the pretest results for mathematical problem-solving skills yielded a significance value of 0.200, while the posttest also produced a significance value of 0.200, both of which exceeded the threshold of 0.05. In the control group, the pretest significance value was 0.181 and the posttest value was 0.190, which likewise exceeded 0.05.

Consistent results were observed for the mathematical communication skills data. In the experimental group, the pretest significance value was 0.172 and the posttest value was 0.200, whereas in the control group, the pretest significance value was 0.185 and the posttest value was 0.190. All of these significance values were greater than 0.05, indicating that the data followed a normal distribution.

Based on these findings, it can be concluded that all research groups satisfied the normality assumption. Therefore, parametric statistical analyses could be appropriately applied in the subsequent stages of data analysis.

b. Homogeneity Test

After confirming that the data were normally distributed, a homogeneity test was conducted to determine whether the variances of the two groups were equal. This test was performed to ensure that the assumption of homogeneity of variance required for parametric analysis was met. With a significance level of 0.05, the data were considered homogeneous if the significance value (p) was greater than 0.05.

Table 5. Results of the Homogeneity Test

Variable	Levene Statistic	df1	df2	*p*-value	Conclusion
Mathematical Problem-Solving	0.563	1	38	0.457	Homogeneous
Mathematical Communication	0.721	1	38	0.401	Homogeneous

The results of the homogeneity of variance test using Levene's Test indicate that the data for both mathematical problem-solving skills and mathematical communication skills in the experimental and control groups were homogeneous. For the mathematical problem-solving variable, the Levene Statistic was 0.563 with df1 = 1 and df2 = 38, and a significance value (p) of 0.457. Meanwhile, for the mathematical communication variable, the Levene Statistic was 0.721 with df1 = 1 and df2 = 38, and a significance value (p) of 0.401.

Both significance values exceeded the threshold of 0.05, indicating that there were no significant differences in variances between the experimental and control groups for the two variables examined. Therefore, the assumption of homogeneity of variance was satisfied, and parametric statistical analyses, particularly the independent samples t-test, could be appropriately conducted to test the research hypotheses.

c. Hypothesis Testing / Independent Samples t-Test

To test the research hypotheses, an independent samples t-test was conducted. This test was used to determine whether there were significant differences in mean scores between the experimental group and the control group. Based on the results of the normality and homogeneity tests, the data were normally distributed and had homogeneous variances; therefore, parametric statistical analysis was appropriate. The significance level used in this study was 5% ($\alpha = 0.05$).

Table 6. Results of the Independent Samples t-Test

Variable	*t*	df	*p*-value
Mathematical Problem-Solving	6.54	38	0.000
Mathematical Communication	7.12	38	0.000

The results of hypothesis testing using the independent samples t-test indicate that there were statistically significant differences between the experimental and control groups for both variables examined. For mathematical problem-solving skills, the analysis yielded a t-value of 6.54 with 38 degrees of freedom (df = 38) and a significance value (p) of 0.000. Since the p-value was lower than 0.05, it can be concluded that there was a significant difference in mathematical problem-solving skills between students who were taught using the Realistic Mathematics Education (RME) model and those who received conventional mathematics instruction.

For mathematical communication skills, the t-test results showed a t-value of 7.12 with df = 38 and a p-value of 0.000. This significance value was also lower than 0.05, indicating a significant difference in mathematical communication skills between the experimental and control groups. Therefore, the alternative hypothesis (H_1) was accepted, while the null hypothesis (H_0) was rejected.

These results indicate that the implementation of the RME model was more effective in improving students' mathematical problem-solving skills and mathematical communication abilities than conventional mathematics instruction.

Discussion

The findings of this study indicate that the implementation of the Realistic Mathematics Education (RME) model has a significant effect on students' mathematical problem-solving skills. This result is consistent with Widana (2021) who argues that RME encourages students to construct mathematical concepts through real-life experiences, making the thinking process more meaningful. Furthermore, Susanto et al. (2024) emphasize that the use of realistic contexts in mathematics learning enhances students' ability to understand problems, design solution strategies, and systematically evaluate the solutions obtained. The improvement occurs because RME situates abstract mathematical concepts within meaningful real-world contexts, enabling students to activate prior knowledge, interpret problems more deeply, and engage in structured reasoning processes rather than memorizing procedures.

The improvement in problem-solving skills observed in the experimental group demonstrates that RME is effective in developing higher-order thinking skills. This finding aligns with Sugiarti et al. (2025) who report that RME helps students connect mathematical concepts with contextual situations, resulting in more structured problem-solving processes. Similarly, Aulia et al. (2025) highlight that the RME approach not only improves problem-solving skills but also strengthens students' mathematical dispositions, such as perseverance and self-confidence. This indicates that RME enhances metacognitive awareness, as students are encouraged to plan, monitor, and evaluate their strategies during progressive mathematization, which directly supports the development of higher-order thinking skills.

In addition to problem-solving skills, this study also reveals a significant improvement in students' mathematical communication abilities. This finding supports the results of Trisnawati et al. (2023) who found that RME enhances students' ability to express mathematical ideas and arguments through group discussions and presentations. Palinussa et al. (2021) further assert that RME-based learning provides opportunities for students to articulate their mathematical thinking both orally and in written form, thereby fostering the optimal development of mathematical communication skills. The structured use of contextual problems followed by discussion and representation activities allows students to translate informal reasoning into formal mathematical language, which explains the observed improvement in communication skills.

The improvement in mathematical communication skills in the experimental group is closely related to the social interaction characteristics inherent in RME-based learning. Utami et al. (2022) explain that discussions in RME classrooms help students use mathematical language accurately and systematically. This perspective is consistent with Van (2020) who emphasizes that communication is an integral component of realistic mathematics education, as it allows students to reflect on and clarify their conceptual understanding collaboratively. Through collaborative negotiation of meaning, students refine their conceptual understanding and internalize mathematical vocabulary, demonstrating that communication is not merely an outcome but a mechanism for conceptual growth in RME classrooms.

The significant differences between the experimental and control groups also highlight the limitations of conventional mathematics instruction. Simamora (2024) notes that traditional teaching approaches tend to focus on formula transmission without connecting mathematical concepts to real-life contexts. Similarly, Gravemeijer (2019) argues that non-contextual mathematics instruction limits students' opportunities to develop problem-solving and communication skills, as students are positioned merely as passive recipients of information. Without contextualization and active engagement, students rely on procedural imitation, which restricts conceptual understanding and limits opportunities to develop strategic and communicative competencies.

The success of the RME implementation in this study is also influenced by students' active engagement during the learning process. Fitriyani et al. (2024) report that the RME approach increases students' participation in discussions and problem-solving activities. This is further supported by Treffers (2018) who emphasizes that progressive mathematization in RME encourages students to actively construct knowledge through interaction and reflection. Active engagement functions as a pedagogical catalyst, as students' involvement in modeling, discussing, and refining solutions strengthens cognitive connections and deepens conceptual mastery.

From a curricular perspective, the findings of this study are highly relevant to the demands of the Merdeka Curriculum, which emphasizes the development of 21st-century competencies. Widad and Hadi (2025) state that RME supports the simultaneous development of students' critical thinking and communication skills. In addition, Hidayat and Marlina (2025) assert that contextual learning based on RME creates a more meaningful learning environment that is responsive to students' needs. Thus, RME represents an innovative learning and teaching strategy that aligns instructional design with competency-based curriculum goals by integrating contextualization, collaboration, and reflective thinking into classroom practice.

Overall, the findings of this study strengthen the empirical evidence that the RME model is effective in improving junior high school students' mathematical problem-solving and communication skills. Freudenthal (1991) conceptualizes mathematics as a human activity that must be connected to real-life situations. In line with this view, Wijaya (2021) concludes that RME is a relevant and sustainable approach for improving the quality of mathematics education in a holistic manner. Therefore, the contribution of this study lies not only in confirming the effectiveness of RME but also in demonstrating how its pedagogical principles contextualization, progressive mathematization, and social interaction function as strategic innovations in contemporary mathematics teaching.

CONCLUSION

Fundamental Finding: Based on the results of the study and data analysis, it can be concluded that the implementation of the Realistic Mathematics Education (RME) learning model has a significant and positive effect on students' mathematical problem-solving skills and mathematical communication abilities at SMP Negeri 1 Bangkinang Kota. Students who participated in RME-based instruction showed greater improvement compared to those who learned through conventional teaching methods. The context-based learning activities provided by RME enabled students to construct a more meaningful understanding of mathematical concepts, develop systematic problem-solving strategies, and communicate their mathematical ideas more clearly and effectively. **Implications:** The findings of this study provide important practical implications for mathematics teachers, particularly in adopting RME as an innovative instructional alternative. Through the use of contextual problems, group discussions, and reflective activities, RME promotes active student engagement, enhances critical thinking skills, and supports the development of mathematical communication abilities. Moreover, the RME model aligns well with the principles of the Merdeka Curriculum, which emphasizes the strengthening of critical thinking, collaboration, and communication competencies as essential 21st-century skills. **Limitations:** This study has several limitations. First, the sample size was relatively small, and the research was conducted in only one school, which may limit the generalizability of the findings. Second, the relatively short duration of RME implementation may not fully capture its long-term effects on students' mathematical development and learning outcomes. **Future Research:** Future studies are recommended to involve larger sample sizes and diverse school contexts to enhance the external validity of the findings. Further research may also explore the long-term implementation of the RME model and investigate its integration with digital learning media to optimize the effectiveness and sustainability of mathematics instruction.

REFERENCES

Aulia, W. R., Wulandari, W., & Mahmuzah, R. (2025). Peningkatan kemampuan pemecahan masalah dan disposisi matematis siswa melalui penggunaan pendekatan Realistic Mathematics Education (RME). Jurnal Pendidikan Matematika Malikussaleh, 4(2), 85–97. https://doi.org/10.29103/jpmm.v4i2.17612

Fitriyani, F., Isrok'atun, I., & Sunaengsih, C. (2024). Penerapan pendekatan RME berbantuan media puzzle terhadap kemampuan pemecahan masalah matematis peserta didik kelas II. Jurnal Basicedu, 8(3), 125–133. https://doi.org/10.31004/basicedu.v8i3.7693

Freudenthal, H. (1991). Revisiting mathematics education: China lectures. Dordrecht: Kluwer Academic Publishers.

Gravemeijer, K. (2019). Developing realistic mathematics education. Utrecht: Freudenthal Institute.

Hidayat, A., & Marlina, S. (2023). Pembelajaran matematika kontekstual untuk meningkatkan kemampuan berpikir kritis siswa. Jurnal Pendidikan Matematika Indonesia, 8(1), 45–56. https://doi.org/10.26737/jpmi.v8i1.4123

Hudojo, H. (2019). Pengembangan kurikulum dan pembelajaran matematika. Malang: UM Press.

Nurhayati, N. (2022). Kemampuan komunikasi matematis siswa dalam pembelajaran berbasis konteks. Jurnal Pendidikan Matematika, 6(1), 33–44. https://doi.org/10.24114/jpm.v6i1.3121

Palinussa, A. L., Molle, J. S., & Gaspersz, M. (2021). Realistic Mathematics Education: Mathematical reasoning and communication skills in rural contexts. International Journal of Evaluation and Research in Education, 10(2), 522–534. https://doi.org/10.11591/ijere.v10i2.20640

Simamora, R. (2024). Model Realistic Mathematics Education ditinjau dari aspek kemampuan pemecahan masalah aljabar. Jurnal Math Educator Nusantara, 6(1), 23–33. https://doi.org/10.29407/jmen.v6i1.14277

Sugiarti, L., Jeramat, E., Jelatu, S., & Harjo, Y. F. (2025). Pengaruh pendekatan pembelajaran Realistic Mathematics Education (RME) terhadap kemampuan pemecahan masalah matematika siswa ditinjau dari kecemasan matematis. JagoMIPA: Jurnal Pendidikan Matematika dan IPA, 5(1), 1–12. https://doi.org/10.53299/jagomipa.v5i1.1320

Suharto, S. (2020). Inovasi pembelajaran matematika di sekolah. Jakarta: RajaGrafindo Persada.

Susanto, H., Setiawati, D., & Apriani, W. (2024). The effect of Realistic Mathematics Education on students' mathematical problem-solving abilities. Journal Informatic, Education and Management, 7(2), 111–123. https://doi.org/10.61992/jiem.v7i2.111

Suryadi, D. (2020). Didaktik matematika. Bandung: PT Remaja Rosdakarya.

Treffers, A. (2018). Three dimensions: A model of goal and theory description in mathematics education. Dordrecht: Springer.

Trisnawati, T., Pratiwi, R., & Waziana, W. (2023). The effect of Realistic Mathematics Education on students' mathematical communication ability. Malikussaleh Journal of Mathematics Learning, 1(1), 15–27. https://doi.org/10.29103/mjml.v1i1.741

Utami, N. P., Aulia, S., & Yulia, Y. (2022). Pendekatan pembelajaran Realistic Mathematics Education (RME) dan kemampuan komunikasi matematis. Lattice Journal: Journal of Mathematics Education and Applied, 2(1), 53–63. https://doi.org/10.30983/lattice.v2i1.5586

Van den Heuvel-Panhuizen, M. (2020). International reflections on the Netherlands didactics of mathematics. Cham: Springer. https://doi.org/10.1007/978-3-030-33824-4

Widana, I. W. (2021). Realistic Mathematics Education (RME) untuk meningkatkan kemampuan pemecahan masalah matematis siswa di Indonesia. Jurnal Elemen, 7(2), 450–462. https://doi.org/10.29408/jel.v7i2.3744

Widad, H. D., & Hadi, M. S. (2025). Realistic Mathematics Education, kemampuan pemecahan masalah, dan pembelajaran matematika di sekolah dasar. JIIP – Jurnal Ilmiah Ilmu Pendidikan, 8(2), 2309–2315. https://doi.org/10.54371/jiip.v8i2.7146

Wijaya, A. (2021). Pendidikan matematika realistik: Teori, implementasi, dan tantangan. Yogyakarta: Graha Ilmu.

***Adityawarman Hidayat (Corresponding Author)**
Universitas Pahlawan Tuanku Tambusai, Riau, Indonesia,
Jl. Tuanku Tambusai No. 23, Kecamatan. Bangkinang, Kabupaten Kampar, Riau 28412
Email: adityawarmanhidayat89@gmail.com

Nurhaswinda
Universitas Pahlawan Tuanku Tambusai, Riau, Indonesia,
Jl. Tuanku Tambusai No. 23, Kecamatan Bangkinang, Kabupaten Kampar, Riau 28412
Email: nurhaswinda01@gmail.com

Etika Yusrina
Universitas Pahlawan Tuanku Tambusai, Riau, Indonesia,
Jl. Tuanku Tambusai No. 23, Kecamatan Bangkinang, Kabupaten Kampar, Riau 28412
Email: etikayusrina93@yahoo.com

Veronica McCauley
Universitas Debrecen, Hungaria
Debrecen, Egyetem tér 1, 4032 Hungaria
Email: veronica.mccauley@nuigalway.ie

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