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The Effectiveness of the Realistic Mathematics Education (RME) Approach on Student Mathematics Learning Outcomes: A Meta-Analysis

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Abstrak

Penelitian ini bertujuan untuk mengevaluasi efektivitas pendekatan Realistic Mathematics Education (RME) terhadap hasil belajar matematika siswa melalui metode meta-analisis. Meta-analisis dilakukan terhadap 11 artikel yang memenuhi kriteria inklusi, yaitu menggunakan desain eksperimen dengan kelompok kontrol dan eksperimen serta melaporkan data kuantitatif berupa nilai rata-rata, standar deviasi, dan ukuran sampel. Hasil analisis menunjukkan bahwa 73% artikel memiliki ukuran efek sangat besar, 18% besar, dan 9% sangat kecil. Selain itu, hasil uji dua rata-rata menunjukkan bahwa nilai rata-rata hasil belajar siswa pada kelompok eksperimen yang menggunakan pendekatan RME (78,66) secara signifikan lebih tinggi dibandingkan dengan kelompok kontrol (67,82), dengan nilai t-hitung sebesar 5,605 yang melebihi nilai t-tabel. Temuan ini menunjukkan bahwa pendekatan RME efektif dalam meningkatkan hasil belajar matematika siswa. RME menjadikan pembelajaran lebih kontekstual, bermakna, dan relevan dengan kehidupan sehari-hari siswa, sehingga meningkatkan motivasi, partisipasi aktif, dan pemahaman konsep. Dengan demikian, pendekatan ini layak diterapkan secara luas dalam pembelajaran matematika di jenjang pendidikan dasar dan menengah.

Kata Kunci: Realistic Mathematics Education (RME), Hasil Belajar Matematika, Pembelajaran Matematika, Meta-Analisis

Abstract

This study aims to evaluate the effectiveness of the Realistic Mathematics Education (RME) approach on student mathematics learning outcomes through meta-analysis. A meta-analysis was conducted on 11 articles that met the inclusion criteria, namely using an experimental design with control and experimental groups and reporting quantitative data in the form of mean values, standard deviations, and sample sizes. The results of the analysis showed that 73% of the articles had a very large effect size, 18% had a large effect size, and 9% had a very small effect size. In addition, the results of the two-mean test showed that the mean value of student learning outcomes in the experimental group using the RME approach (78.66) was significantly higher than that of the control group (67.82), with a t-value of 5.605 exceeding the t-table value. These findings indicate that the RME approach is effective in improving students' mathematics learning outcomes. RME makes learning more contextual, meaningful, and relevant to students' daily lives, thereby increasing motivation, active participation, and conceptual understanding. Thus, this approach deserves to be widely applied in mathematics learning at the primary and secondary education levels.

Keywords: Realistic Mathematics Education (RME).Mathematics Learning Outcomes, Mathematics Instruction, Meta-Analysis

Introduction

Mathematics education is an important component of the education system that plays a major role in developing students' logical, critical, and analytical thinking skills. However, the reality in the field shows that mathematics is still often viewed as a difficult and unpopular subject by many students. Based on the results of the 2018 annual Programme for International Student Assessment (PISA) study conducted by the Organization for Economic Cooperation and Development (OECD) an agency under the United Nations based in Paris it is known that the mathematical literacy skills of Indonesian students are still relatively low. In mathematics, Indonesia ranked 7th from the bottom out of 73 countries with an average score of 379, down from 63rd in 2015 (Hidayat et al., 2020). The low mathematical ability of students poses a challenge for the Indonesian education sector to improve students' ability to learn mathematics. This condition is certainly the shared responsibility of various parties in the world of education, from students, teachers, to schools and other related elements (Laia et al., 2023). Many learning processes in schools have not optimally implemented contextual or real-world approaches. The learning approach and learning motivation are two main factors that influence learning outcomes, especially in mathematics learning in schools. This condition leads to a lack of meaning in the learning process for students, making learning seem far from real life. As a result, students find it difficult to relate and apply their mathematical knowledge to everyday life (Chandra et al., 2024)

Efforts to renew or innovate mathematics learning need to be made in order to achieve learning objectives and improve quality optimally. One form of renewal is through the application of various learning models and approaches. One approach that is considered effective in improving the quality of mathematics learning is Realistic Mathematics Education (RME), which in Indonesia is known as Realistic Mathematics Education (PMR) (Elih Yunianingsih, Meiliasari, 2024). The main principles in RME, such as guided reinvention of mathematical concepts, didactical phenomenology, and self-developed models, can help students build mathematical understanding actively, creatively, and meaningfully, according to Gravemeijer (Fadilla et al., 2025)

The RME approach was first introduced in Indonesia by Jansen Marpaung in 1996 through research on the application of RME in education. Subsequently, on August 20, 2001, RME was officially introduced in Indonesia under the name Indonesian Realistic Mathematics Education (PMRI) by the PMRI Center (Natalia, 2017). In the learning process, teachers do not act as direct providers of information, but rather as facilitators who create learning activities that enable students to construct their own mathematical knowledge. There are three main principles in RME (Gravemeijer, 1994), namely: (1) guided reinvention and progressive mathematization; (2) didactical phenomenology; and (3) self-developed models (Anita, 2020).

A number of studies have been conducted to assess the effectiveness of applying the Realistic Mathematics Education (RME) approach on mathematics learning outcomes. The study (Subekhi et al., 2024) shows that the application of the realistic mathematics education (RME) approach has a positive impact on the mathematical abilities of students in the experimental class.

This study has several important differences compared to previous studies that also examined the RME approach in learning. Many previous studies, such as those conducted by (Astridewi et al.,

2025),(Yandiana & Ariani, 2020), used a direct experimental approach with limited coverage, both in terms of region and sample size. These studies only provide a contextual and local picture of the effectiveness of the RME approach on students' mathematics learning outcomes.

In contrast, this study aims to evaluate the effectiveness of the Realistic Mathematics Education approach on student mathematics learning outcomes based on empirical studies conducted over the past few years. This study focuses on articles that use experimental designs with control and experimental groups and report quantitative data such as mean scores, standard deviations, and sample sizes. The results of this meta-analysis are expected to provide a clearer picture of the contribution of RME in improving students' mathematics learning achievement at various levels of education.

Furthermore, the results of this study are expected to contribute to teachers, researchers, policy makers, and education practitioners in designing more effective learning strategies that are tailored to the needs of students. Thus, the RME approach is not only seen as a pedagogical trend, but also as a real solution in addressing the challenge of low mathematics learning outcomes among students in Indonesia and globally. This study also opens up space for further research that can explore the effectiveness of RME in other aspects, such as problem-solving skills, conceptual understanding, and attitudes toward mathematics.

Methods

This study uses meta-analysis to evaluate the effectiveness of the Realistic Mathematics Education (RME) approach on students' mathematics learning outcomes. Meta-analysis is a statistical method used to combine the results of several similar and homogeneous studies, thereby producing more accurate, robust, and comprehensive conclusions than the results of each study separately (Yu et al., 2022).Through this approach, the study aims to consolidate, analyze, and interpret the results of previous studies to provide a deeper and more comprehensive understanding of a phenomenon or effect that has been observed in scientific literature (Nurniyati et al., 2024).

The steps in meta-analysis research include: determining article inclusion criteria, conducting literature searches and selection, coding selected articles, performing statistical analysis by calculating effect size, conducting homogeneity tests to determine the appropriate analysis model, testing the null hypothesis, and compiling interpretations based on the analysis results obtained (N. S. Putri et al., 2022).

The search was conducted through Publish or Perish using the keywords "Realistic Mathematics Education (RME)" and "learning outcomes," and the inferential data used in this study referred to inclusion criteria, such as sample size, mean value, and standard deviation. Based on the data collection results, 100 articles published from 2019 to 2025 were found to match the search keywords. After screening, the number of articles that met the inclusion criteria was reduced to 11, covering elementary and junior high school levels. All articles that had been further identified were coded. The variables used in the coding and data collection process included the researcher's name, year of publication, title, and research source. Each article was coded from A1 to A11 according to the predetermined variables.

Coding aims to facilitate data analysis. This coding is necessary when researchers need additional information to interpret the results of meta-analysis. Article coding includes article codes, authors, year of research, education level, and source (Sutisna et al., 2023). This study

divides the year of research into seven categories, namely 2021, 2022, 2023, 2024, 2025; the level of education is divided into 2 categories, namely SD/MI, SMP/MTS.

Analyzing the statistics in this study involves calculating the effect size of each article and measuring the effectiveness of RME on learning outcomes. The effect size in this study follows the classification according to Cohen et al. (2007) (ratna, nurdin, rustiani, suart djafar, 2025) . As follows:

$$d = \frac{\bar{x}_1 - \bar{x}_2}{s}$$

with

$$s = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

Where d denotes the effect size, $\bar{x}_1$ is the mean score of the experimental group, $\bar{x}_2$ is the mean score of the control group, s is the combined standard deviation, n_1 is the sample size of the experimental group, n_2 is the sample size of the control group, s_1^2 is the variance of the experimental group, and s_2^2 is the variance of the control group.

Table 1. Interpretation of *effect size*

Effect size (*d*)	Interpretation
$\boldsymbol{0 < d \leq 0,2}$	Small
$\boldsymbol{0,2 < d \leq 0,5}$	Moderate
$\boldsymbol{0,5 < d \leq 0,8}$	Large
$\boldsymbol{d > 0,8}$	Very large

The two-sample t-test uses the following formula (Sudjana, 2005) in (Nurniyati et al. 2024)

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

With

$$s = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

t Where is the calculated value, $\bar{x}_1$ is the mean value of the experimental group, $\bar{x}_2$ is the mean value of the control group, s is the combined standard deviation, n_1 is the sample size of the experimental group, n_2 is the sample size of the control group, s_1^2 is the variance of the experimental group, and s_2^2 is the variance of the control group.

Test category: reject, H_0 if $t_{count} > t_{tabel}$ with where $t_{tabel} = t_{1-\frac{1}{2}\alpha}$ with $\alpha = 50\% = 0{,}05, dk = (n_1 + n_2 - 2)$.

Results and Discussion

Results

This article aims to systematically review and analyze a number of studies discussing the effectiveness of the Realistic Mathematics Education (RME) approach on student learning outcomes. The steps taken include collecting data on the effectiveness of the Realistic Mathematics Education (RME) approach on mathematics learning outcomes through Google Scholar and Publish or Perish. The articles found were then selected based on inclusion criteria, resulting in 11 articles to be analyzed. The selected articles were coded as follows:

Table 2. Previous Research

NO	ARTICLE CODE	RESEARCHER NAME	YEAR OF RESEARCH	RESEARCH TITLE	EDUCATIONAL LEVEL	SOURCE
1	A1	Sri Nola Yandiana, Yetti Ariani, Education	2020	The Effect of the Realistic Mathematics Education (RME) Approach on Learning Outcomes in Fractions	Elementary	*Tambusai Education Journal*

				in Elementary Schools		
2	A2	Eneng Indriyani Fitri Hidayat, Indhira Asih Vivi Yandhari, Trian Pamungkas Alamsyah	2020	The Effectiveness of the Realistic Mathematics Education (RME) Approach in Improving Fifth Grade Students' Mathematical Concept Comprehension Skills	Elementary	*Elementary School Scientific Journal*
3	A3	Yhasinta Agustyarini, Hanik Masruroh	2022	The Effectiveness of the PMRI Approach on the Learning Outcomes of Fourth Grade Students on Equivalent Fractions at MIS Setia Bhakti Trawas	E	*Chalim Journal of Teaching and Learning*
4	A4	Andri Imam Subekhi, Yuliana Aristian, Ayu Lestari	2024	The Effect of the Realistic Mathematics Education (RME) Approach on the Mathematics Learning Outcomes of Fifth-Grade Students at SDN Cililitan 1 Elementary School, Picung District, Pandeglang Regency Andri	Elementary	*Arjuna Journal: Publication of Education, Language, and Mathematics*
5	A5	Devita Permata Putri, Iis Holisin, Junaidi Fery Efendi	2021	The Effect of the RME Approach with the Hybrid Learning Model on mathematical critical thinking skills ( )	Junior High School	*Journal of Mathematics Education*
6	A6	Marsiani Niska Laia, Dewi Risalah, Sandie	2023	The Effect of the Realistic Mathematics Education Model Approach on Student Learning Outcomes	Junior High School	*Sigma Journal of Learning and Mathematics (JPMS)*
7	A7	Hendri Delano Lololuan, Mesak	2024	The Realistic Mathematics Education (RME) Approach in	Junior High School	*JUPEIS: Journal of Education and Social Sciences*

		Ratuanik, Karten Halirat		Improving Learning Outcomes of Seventh Grade Junior High School Students		
8	A8	Dedi Chandra, Adityawarman Hidayat, Astuti	2024	The Effect of the Realistic Mathematics Education (RME) Approach on the Mathematics Learning Outcomes of Seventh Grade Students	Junior High School	*Journal of Educational Dedication*
9	A9	Sastika Astridewi, Vina Vijaya Kusumma, Sundanah, Reinhard Salamor	2025	The Effect of the Realistic Mathematics Education (RME) Approach on Mathematics Learning Outcomes	Junior High School	*Umpatti Mathematics Education Journal*
10	A10	Lana Sugiarti, Eufrasia Jeramat, Silfanus Jelatu, Yakobus Frediki Harjo	2025	The Effect of the Realistic Mathematics Education (RME) Approach Education (RME) on Students' Mathematical Problem-Solving Skills as Viewed from Mathematical Anxiety	Junior High	*Journal of Education*
11	A11	Jihan Fadilla, Astri Wahyuni, Suripah, Reni Wahyuni, Gida Kadarisma,	2025	Efforts to Improve Mathematical Creative Thinking Skills Through the Realistic Mathematics Education (RME) Approach in Students at YLPI P. Marpoyan Junior High School	Junior High	*Cendekia Journal: Journal of Mathematics Education*

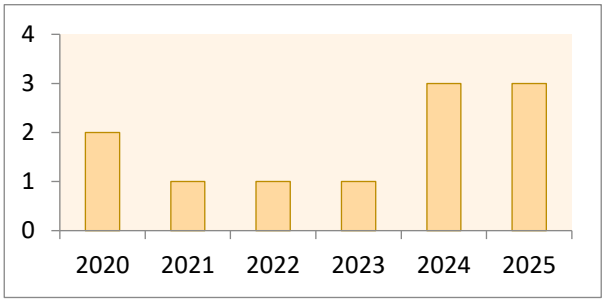

Figure 1. Number of articles by year

Based on the figure above, there are 11 articles that will be analyzed within the last 6 years. From the figure, it can be seen that 2024 and 2025 dominate the published articles with three articles each. Then followed by 2020 with two articles, then 2021, 2022, and 2023 with one article each.

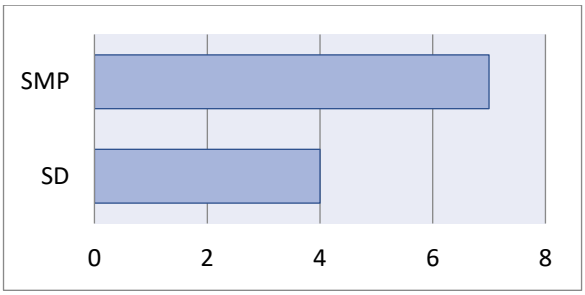

Figure 2. Number of articles based on samples

As seen in Figure 2, based on the sample articles, it can be concluded that the research samples are dominated by junior high school/equivalent level with seven articles. Then, there are four articles at the elementary school/equivalent level. No articles from other levels passed the selection.

After coding, the evaluation of the effect caused by the application of the Realistic Mathematics Education (RME) approach was conducted by calculating *the effect size* in each analyzed article. The results of these calculations are presented as follows:

Table 3. Effect size of each article

ARTICLE CODE	N		MEAN		SD		SD COMBINED	EFFECT SIZE	CATEGORY
	CONTROL	EXPERIMENT	CONTROL	EXPERIMENT	CONTROL	EXPERIMENT			
A1	16	16	75.31	85.31	10.71	9.03	9.9057	1.0095	Very Large
A2	26	26	73.19	81.19	8.70	8.83	8.7652	0.9127	Very Large
A3	25	25	62.04	78.92	7.7	9.447	8.6179	1.9587	Very Large
A4	20	23	74.50	81.74	9,987	9.841	9.9089	0.7307	Large
A5	31	31	72.6129	84.7419	12.99404	9.05527	11.1992	1.083	Very Large
A6	30	32	70.40	80.69	9.43	7.63	8.5475	1.2039	Very Large
A7	15	15	63.87	78.40	10,999	8,870	9.9914	1.4543	Very Large
A8	29	29	72.24	83.45	10,052	11,810	10.9663	1.0222	Very Large
A9	40	39	53.5	60.6	193.08	93.6	152.3339	0.0466	Very Small
A10	23	26	72.082	80,284.62	7,919.56	5,839.4	6.8917	1.1902	Very Large
A11	25	25	56.36	70.04	18.12889	20.31108	19.2509	0.7106	Large

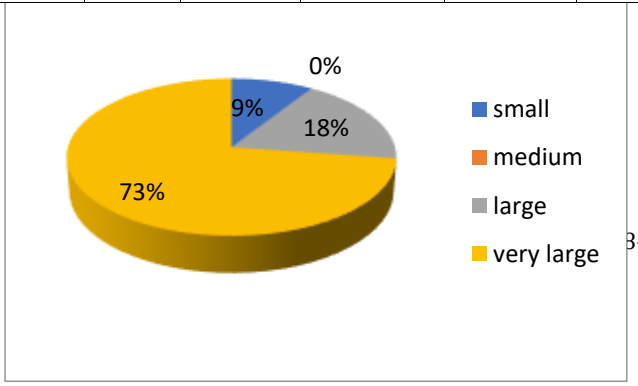

Figure 3. Percentage based on effect size

Based on Table 3 and Figure 3 above, it can be seen that of the 11 articles analyzed, there were eight articles in the very large category with a percentage of 73%, two

articles in the large category with a percentage of 18%, and one article in the small category with a percentage of 9%. This data shows an increase in learning outcomes through the application of the Realistic Mathematics Education (RME) approach at the elementary and junior high school levels.

Furthermore, a two-mean test was conducted to determine whether the Realistic Mathematics Education (RME) approach was effective in improving student learning outcomes. The average scores of the experimental and control groups are as follows:

Table 4. Average scores of the experimental and control groups

ARTICLE CODE	N		MEAN		SD		SD COMBINED
	CONTROL	EXPERIMENT	CONTROL	EXPERIMENT	EXPERIMENT	CONTROL	
A1	16	16	75.31	85.31	9.03	10.71	9.9057
A2	26	26	73.19	81.19	8.83	8.70	8.7652
A3	25	25	62.04	78.92	9.447	7.7	8.6179
A4	20	23	74.50	81.74	9,841	9.987	9.9089
A5	31	31	72.6129	84.7419	9.05527	12.99404	11.1992
A6	30	32	70.40	80.69	7.63	9.43	8.5475
A7	15	15	63.87	78.40	8,870	10,999	9.9914
A8	29	29	72.24	83.45	11,810	10,052	10.9663
A9	40	39	53.5	60.6	93.6	193.08	152.3339
A10	23	26	72.082	80.28462	5,8394	7,919.56	6.8917
A11	25	25	56.3600	70.0400	20.31108	18.12889	19.2509
	280	287	67.82	78.66	27.24	17.66	23.30

Testing two means is done with a one-tailed approach, which includes the following steps:

1. Hypothesis Setting:
   - Null hypothesis (H_0): $\mu_1 \leq \mu_1$.
   - Alternative hypothesis H_1): $\mu_1 > \mu_1$.
- Significance Level:

  The significance level used is $\alpha = 0{,}005$ atau 5%
- Test Criteria:

  The null hypothesis (H_0) is rejected if t_{count} exceed t_{tabel}

Next, calculate t_{tabel} .

$$dk = (n_1 + n_2 - 2) = (287 + 280 - 2) = 565$$

$$t_{tabel} = t_{1-\frac{1}{2}\alpha} = t_{1-\frac{1}{2}(0{,}05)} = t_{1-0{,}025} = t_{0{,}975}$$

With *dk* 565 we obtain $t_{tabel=1{,}96}$

Next, determine t_{count}:

$$t_{count} = \frac{\bar{x}_1 - \bar{x}_2}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} = \frac{78{,}66 - 67{,}82}{23{,}30\sqrt{\frac{1}{287} + \frac{1}{280}}} = \frac{10{,}84}{23{,}30(0{,}083)} = 5{,}605$$

Next, draw a conclusion, obtaining the value of t_{count} = 5.605 and $t_{tabel=1,96}$. Since t_{count} = 5.605 > $t_{tabel} = 1,96$, then H_0 is rejected. This means that the average of the experimental group is higher than that of the control group, indicating the effectiveness of the *Realistic Mathematics Education* (RME) approach in improving student learning outcomes.

Discussion

Based on Table 3, the effect size values of each article are known. Effect size is a statistical indicator used to show the magnitude of influence or difference in a study. This measure helps describe how strong the relationship between the variables studied is. Not only does it show that there is a difference, but the effect size also emphasizes the importance of the impact in practical terms. This makes the research results more meaningful and relevant to apply in a real context. In educational research, for example, the effect size can show the extent to which a learning method effectively improves student learning outcomes. Therefore, effect size is an important element in evaluating the success of an intervention. To calculate effect size, we can take the difference between the mean of the experimental group and the mean of the control group, then divide it by the combined standard deviation. Based on this calculation, the effect sizes obtained from 11 articles were categorized into several levels, namely small, medium, large, and very large. One article was found to have a very small effect size, namely (Astridewi et al., 2025), two articles had a large effect size, namely (Subekhi et al., 2024) and (Fadilla et al., 2025), and eight articles had a very large effect size, namely (Agustyarini & Masruroh, 2022; Chandra et al., 2024; Hidayat et al., 2020; Laia et al., 2023; Lololuan et al., 2024; D. P. Putri et al., 2021; Sugiarti et al., 2025; Yandiana & Ariani, 2020)

Based on the effect size results from 11 articles, there are 8 articles that show a very large effect size. This indicates that the Realistic Mathematics Education (RME) approach consistently has a strong influence on improving students' mathematics learning outcomes. A large effect size indicates that the difference between the group using the RME approach and the control group is very significant, not only statistically but also practically. Thus, RME has been proven effective in helping students understand mathematical concepts more deeply through real contexts that are relevant to their daily lives. These findings reinforce the argument that contextual approaches such as RME are worthy of wider implementation in mathematics learning.

Realistic Mathematics Education (RME) is a student-oriented approach to learning mathematics, with the view that mathematics is *a human* activity. This approach emphasizes that mathematics learning must be realistically linked to the context of students' daily lives so that the learning process becomes meaningful and oriented towards real experiences. The real world in the context of RME is understood as everything outside the realm of mathematics itself, such as daily life, the surrounding environment, and other relevant topics that can be used as learning contexts. (Chandra et al., 2024). This is in line with the characteristics of PMRI/RME (Sembiring, 2010) in (Agustyarini & Masruroh, 2022) which states that the characteristics of the PMRI approach are: (1) students become more active in thinking, (2) the context and teaching materials used are directly related to the school or student environment, and (3) teachers play a more active role in designing the teaching materials used.

Curriculum requirements for mathematics learning require teachers to

design more meaningful learning. Teachers can choose and apply the appropriate approach or method in accordance with the characteristics of the mathematics learning to be taught (Astridewi et al., 2025). The application of the RME approach supported by exploration-based problems can increase students' interest in learning mathematics, as evidenced by the fact that the learning outcomes of the experimental class were better than those of the control class. This is in line with research conducted by (D. P. Putri et al., 2021) , which states that with the application of the RME approach, students' responses to mathematics learning are very good.

Learning that does not use the *Realistic Mathematics Education* (RME) approach tends to place teachers as the main source of information in the learning process. The delivery of material is still oriented towards textbooks, so that the content of learning is not closely related to real problems faced by students in their daily lives. In this situation, students play a passive role as listeners and only wait for instructions from the teacher to solve math problems according to the examples given. Interaction between students is also rare, so that the understanding gained is not deep and does not last long in their memory. This is because the knowledge gained only comes from the teacher's explanation, not from the students' own experiences and thinking processes (Lololuan et al., 2024) . The application of the *Realistic Mathematics Education* (RME) approach in mathematics learning is expected to be an alternative solution to improve students' thinking skills in understanding mathematical concepts. In addition, this approach is also expected to create a more enjoyable and meaningful learning atmosphere, so that mathematics is no longer a subject that students fear (Laia et al., 2023).

From the results of the two-mean test, it is known that the average learning outcome of the experimental group (applying the RME approach) is 78.66, while the control group only scores 67.82. With a combined standard deviation of 23.30, where the sample size for the experimental group was 280 and the control group was 287, a t-value of 5.605 was obtained, which far exceeded the t-table value of 1.96. This shows that there is a significant difference between the group that applied the RME approach and the group that did not. Therefore, it can be concluded that the application of the RME approach in mathematics learning is very effective and relevant in efforts to improve student learning outcomes. In addition, the application of the RME approach also reduces students' anxiety towards mathematics because the material is presented through real situations that are easier to understand. When students feel that learning is relevant to their experiences, their motivation to learn increases, their active participation increases, and their courage in solving problems becomes higher. These conditions create a positive and constructive learning atmosphere, thereby encouraging better conceptual understanding and impacting on improving student learning outcomes.

Discussion

Based on an analysis of 11 articles on the application of the Realistic Mathematics Education (RME) approach, it can be concluded that this approach **is effective** in mathematics learning and has a significant impact on improving student learning outcomes. A total of 73% of articles showed a very large effect size, 18% showed a large effect size, and only 9% showed a small effect size, indicating that the RME approach has a consistently strong influence in various learning contexts. The results of the two-means test reinforce these findings, where the average value of student learning outcomes in the experimental group was 78.66, significantly

higher than the control group at 67.82, with a t-value of 5.605, which far exceeded the significance limit.

The RME approach makes mathematics learning more contextual, meaningful, and relevant to students' daily lives, thereby helping them build a deeper understanding of concepts. RME also encourages students' active involvement in the learning process, increases their confidence, and reduces their fear of mathematics. In addition to improving cognitive learning outcomes, RME also contributes to the development of critical thinking skills, problem solving, and a positive attitude towards mathematics. Therefore, RME can be recommended as an effective and feasible approach to be widely applied in primary and secondary education.

REFERENCES

Agustyarini, Y., & Masruroh, H. (2022). Efektivitas Pendekatan PMRI Terhadap Hasil Belajar Siswa Kelas IV Materi Pecahan Senilai di Mis Setia Bhakti Trawas. *Chalim Journal of Teaching and Learning*, *1*(2), 182–189. https://doi.org/10.31538/cjotl.v1i2.146

Anita, F. D. (2020). *PENERAPAN PENDEKATAN REALISTIC MATHEMATICS EDUCATION (RME) MELALUI PERANGKAT PEMBELAJARAN TERHADAP MOTIVASI BELAJAR Fidi Dwi Anita*. *3*(2), 55–59.

Astridewi, S., Kusumma, vina vijaya, Sundanah, & Salamor, R. (2025). *Pengaruh Pendekatan Realistic Mathematics Education (RME) Terhadap Hasil Belajar Matematika Siswa SMP Negeri 9 Pekanbaru*. *6*(April), 56–60. https://repository.uir.ac.id/14123/%0Ahttps://repository.uir.ac.id/14123/1/156410820.pdf

Chandra, D., Hidayat, A., & Astuti. (2024). Pengaruh Pendekatan Realistic Mathematics Education (RME) Terhadap Hasil Belajar Matematika Siswa Kelas VII. *Angewandte Chemie International Edition, 6(11), 951–952.*, *8*, 5–24. http://repo.iain-tulungagung.ac.id/5510/5/BAB 2.pdf

Elih Yunianingsih, Meiliasari, I. J. (2024). Systematic Literatur Review : Analisis Pendekatan Realistic Mathematic Education (Rme) Dalam Pembelajaran Matematika Di Sekolah Dasar. *Prosiding MAHASENDIKA III Tahun 2024*, 150–164.

Fadilla, J., Wahyuni, A., Suripah, Wahyuni, R., & Kadarisma, G. (2025). *Upaya Meningkatkan Kemampuan Berpikir Kreatif Matematis Melalui Pendekatan Realistic Mathematics Education (RME) Pada Siswa SMP*. *09*(113), 618–627.

Hidayat, E. I. F., Vivi Yandhari, I. A., & Alamsyah, T. P. (2020). Efektivitas Pendekatan Realistic Mathematics Education (RME) Untuk Meningkatkan Kemampuan Pemahaman Konsep Matematika Siswa Kelas V. *Jurnal Ilmiah Sekolah Dasar*, *4*(1), 106. https://doi.org/10.23887/jisd.v4i1.21103

Laia, M. N., Risalah, D., & Sandie. (2023). *PENGARUH PENDEKATAN MODEL REALISTIC MATHEMATIC EDUCATION TERHADAP HASIL BELAJAR SISWA THE INFLUENCE OF THE REALISTIC MATHEMATIC EDUCATION MODEL APPROACH TO STUDENT LEARNING OUTCOMES*. *9*(2), 172–176.

Lololuan, H. D., Ratuanik, M., & Halirat, K. (2024). Pendekatan Pembelajaran Realistic Mathematics Education (RME) Dalam Meningkatkan Hasil Belajar Peserta Didik Kelas VII SMP. *JUPEIS : Jurnal Pendidikan Dan Ilmu Sosial*, *3*(2), 26–33. https://doi.org/10.57218/jupeis.vol3.iss2.1055

Natalia, S. (2017). Realistic Mathematics Education: Suatu Langkah Mendidik Berpikir Matematis. *Jurnal Dinamika Pendidikan*, *10*(1), 81–96.

Nurniyati, T., Djafar, S., S, P., & Nurdin. (2024). *Meta Analisis Pendekatan*

Etnomatematika dalam MeningkatkanKemampuan Pemecahan Masalah Matematis. *08*(November), 1981–1992.

Putri, D. P., Holisin, I., Efendi, J. F., Surabaya, U. M., Surabaya, U. M., & Surabaya, U. M. (2021). *PENGARUH PENDEKATAN RME DENGAN MODEL PEMBELAJARAN HYBRID LEARNING*. *7*, 83–96.

Putri, N. S., Juandi, D., & Jupri, A. (2022). Pengaruh Model Pembelajaran Kooperatif Tipe Think-Talk-Write terhadap Kemampuan Komunikasi Matematis Siswa: Studi Meta-Analisis. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *6*(1), 771–785. https://doi.org/10.31004/cendekia.v6i1.1264

ratna, nurdin, rustiani, suart djafar, purtiany s. (2025). *META ANALISIS : MODEL PROJECT-BASED LEARNING (PjBL) UNTUK MENINGKATKAN HASIL BELAJAR*. *10*, 438–456.

Subekhi, A. I., Aristian, Y., & Lestar, A. (2024). Pengaruh Pendekatan Realistic Mathematics Education (RME) Terhadap Hasil Belajar Matematika Pada Siswa Kelas V SDN Lembaya Kabupaten Gowa. *Jurnal Arjuna : Publikasi Ilmu Pendidikan, Bahasa Dan Matematika*, *2*(3), 123–134. https://doi.org/10.61132/arjuna.v2i3.822

Sugiarti, L., Jeramat, E., Jelatu, S., & Harjo, yakobus frediki. (2025). Pengaruh Pendekatan Pembelajaran Matematika Realistik (PMR) terhadap Kemampuan Pemecahan Masalah Matematika ditinjau dari Kecemasan Matematis Siswa. *JagoMIPA: Jurnal IProses Belajar IMatematika Idan IIPA*, *13*(2), 215–225. https://jurnaldidaktika.org

Sutisna, E., Syamsuri, S., Hendrayana, A., & Mutaqin, A. (2023). Meta-Analysis: Pengaruh Model Problem Based Learning terhadap Kemampuan Pemecahan Masalah Matematis. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *7*(3), 3148–3161. https://doi.org/10.31004/cendekia.v7i3.1453

Yandiana, S. N., & Ariani, Y. (2020). Pengaruh Pendekatan Pendidikan Matematika Realistik (PMR) terhadap Hasil Belajar Pecahan di Sekolah Dasar. *Jurnal Pendidikan Tambusai*, *4*(3), 2945–2951.

Yu, G., Liu, C., Zheng, Y., Chen, Y., Li, D., & Qin, W. (2022). Meta-analysis in the production chain of aquaculture: A review. *Information Processing in Agriculture*, *9*(4), 586–598. https://doi.org/10.1016/j.inpa.2021.04.002