Focus **ACT**ion **O**f **R**esearch **M**athematic
Volume 9, No. 2, 2026
Page 374-398
https://jurnalfaktarbiyah.iainkediri.ac.id/index.php/factorm/

ISSN: 2655-3511 (print)
ISSN: 2656-307X (online)

Digital Realistic Mathematics Education (dRME) based on local culture: Systematic literature review on the development of mathematical problem-solving skills

Nanang Nabhar Fakhri Auliya[1], Scolastika Mariani[1*], Bambang Eko Susilo[1]

[1]Mathematics Education Department, Universitas Negeri Semarang, Central Java, Indonesia
***Correspondence**: mariani.mat@mail.unnes.ac.id

© The Author(s) 2026

Abstract

This study systematically examines the integration of Realistic Mathematics Education (RME) with digital technologies to support students' mathematical problem-solving skills. Employing a Systematic Literature Review (SLR) based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, the study searched the Scopus database and identified 419 records published between 2016 and 2026. Following screening, eligibility assessment, and quality evaluation, 23 empirical studies were included and analyzed using thematic synthesis. The synthesis indicates that digital technologies extend RME implementation by supporting guided reinvention, progressive mathematization, visualization, and mathematical modelling in contextual, technology-enhanced learning environments. These technologies support contextual, interactive, and student-centered mathematics learning while facilitating guided reinvention, progressive mathematization, visualization, and mathematical modelling. The review also reveals a growing trend toward Digital Realistic Mathematics Education (dRME), which integrates digital innovation with local cultural contexts. However, current research remains concentrated in Indonesia. It predominantly focuses on junior high school education, indicating the need for broader investigations across diverse educational levels, cultural settings, and emerging digital technologies. Overall, this review synthesizes current developments in dRME and offers directions for future research and practice in technology-enhanced mathematics education.

Keywords: Realistic Mathematics Education (RME), Digital Learning, Educational Technology, Mathematical Problem-Solving, Local Wisdom, Systematic Literature Review (SLR)

This is an open-access article under the CC BY license.

How to Cite: Auliya, N. N. F., Mariani, S., & Susilo, B. E. (2026). Digital Realistic Mathematics Education (dRME) based on local culture: Systematic literature review on the development of mathematical problem-solving skills. *Journal Focus Action of Research Mathematic (Factor M), 9*(2), 374-398. http://doi.org/10.30762/f_m.v9i2.8358

INTRODUCTION

Problem-solving skills are central to modern math learning. The National Council of Teachers of Mathematics (NCTM, 2000) emphasizes that problem solving is both a goal and a means to develop conceptual understanding, reasoning, and reflective thinking. However, international assessments such as the Programme for International Student Assessment indicate that Indonesian students' problem-solving ability remains low, ranking 69th out of 81 countries (OECD, 2023). Students also experience various errors in solving mathematical problems, particularly in understanding and planning solutions (Handayani & Anggraini, 2024), as well as difficulties in interpreting contextual situations, modeling real problems, and evaluating solutions (Darta & Saputra, 2018; Dianti et al., 2021; Sinurat et al., 2021). Therefore, contextual and meaningful problem-solving tasks are needed, as PMRI-based tasks have been shown to support students' mathematical understanding and reasoning (Domu et al., 2022).

One of the approaches that has been recognized as effective in bridging abstract concepts and real experience is Realistic Mathematics Education (RME), developed by Freudenthal in the Netherlands. Freudenthal (2002) views mathematics as a human activity, so learning must depart from a context meaningful to students. Through guided reinvention principles and mathematization processes (horizontal and vertical), RME helps students build knowledge through modeling and reflection activities (Mahmudi et al., 2022; Trung et al., 2021; Wardono et al., 2021). Various studies show that applying RME contributes to improving students' problem-solving skills, mathematical reasoning, and conceptual understanding (Dinglasan et al., 2023; Lady et al., 2018; Septianisha et al., 2024; Tong et al., 2022).

However, the times demand a mathematical learning approach that is adaptive to digital transformation. The Society 5.0 era makes digital technology an integral part of learning activities, including mathematics learning. Integrating technologies such as GeoGebra, Desmos, digital modules, learning management systems, and interactive simulations has been shown to increase student engagement and facilitate the visual exploration of abstract concepts (Cirneanu & Moldoveanu, 2024; Engelbrecht & Borba, 2024; Mahmudi et al., 2022). In this context, RME principles need to be integrated with various media and digital learning environments so that a real-context-oriented approach can be adapted to digital learning environments.

 http://doi.org/10.30762/f_m.v9i2.8358

Integrating RME and digital technology is believed to strengthen the mathematization process. Technology serves as a didactical tool that visualizes the relationship between the real world and mathematical representations and supports students in self-reinvention (Li & Li, 2024; Novita & Herman, 2021). In addition, digital media-facilitated RME-based learning can foster higher-order thinking skills, including problem-solving and metacognitive reflection (Palinussa et al., 2024; Purnomo et al., 2024).

Digital Realistic Mathematics Education (dRME) extends the principles of Realistic Mathematics Education by integrating digital technologies with meaningful local cultural contexts. In this framework, RME provides the pedagogical foundation through contextual learning and progressive mathematization, digital technology functions as a cognitive tool that supports visualization, interaction, and mathematical exploration. At the same time, local culture offers authentic contexts that connect mathematical concepts with students' everyday experiences. Integrating these three components creates a meaningful learning environment that supports conceptual understanding and strengthens students' mathematical problem-solving skills through culturally relevant, technology-enhanced learning experiences.

Several previous review studies have examined the implementation of Realistic Mathematics Education (RME), educational technology, and ethnomathematics in mathematics education. For instance, previous systematic literature reviews (SLRs) have extensively mapped two decades of RME research in Indonesia (Prahmana et al., 2020) and synthesized ethnomathematics research (Iffah et al., 2025). However, a significant gap remains: these previous reviews have largely examined RME, educational technology, and cultural contexts as isolated areas of inquiry. Most existing SLRs examine specific digital tools or individual RME implementations and fail to provide a comprehensive synthesis of how modern digital technology and RME principles converge. To the best of our knowledge, no previous systematic review has synthesized empirical evidence on integrating RME principles, advanced digital technologies (such as AI, AR, and dynamic software), local cultural contexts, and mathematical problem-solving skills within a single, integrated analytical framework.

Despite the growing number of empirical studies, evidence on implementing Digital Realistic Mathematics Education (dRME) remains scattered across different

 http://doi.org/10.30762/f_m.v9i2.8358

educational contexts, technologies, and research focuses. Most studies examine specific digital tools or individual RME implementations rather than providing a comprehensive synthesis of how digital technology and RME principles support mathematical problem-solving skills. Furthermore, integrating local cultural contexts into mathematics learning has been shown to enhance students' engagement and conceptual understanding, making learning more meaningful (Vrasetya & Noperta, 2026). However, this aspect has rarely been synthesized within the Digital Realistic Mathematics Education (dRME) framework. Therefore, this review integrates empirical evidence by examining the interaction among RME principles, digital technologies, local cultural contexts, and mathematical problem-solving skills within a single analytical framework. This integrated perspective is expected to offer a more comprehensive understanding of current research developments and identify directions for future studies.

To address this gap, this study makes a novel contribution by synthesizing the latest empirical evidence (2016–2026) on implementing Digital Realistic Mathematics Education (dRME). Unlike previous studies, this review's key contribution is its comprehensive mapping of interactions among RME principles, digital technological innovations, local cultural contexts, and mathematical problem-solving skills across educational levels. By synthesizing this scattered empirical evidence, this study offers a new, holistic perspective on how digital technology functions as a cognitive tool within RME, while identifying current research trends, technological innovations, and remaining research gaps to guide future studies.

Based on these objectives, this systematic review is focused on answering the following research questions:

1. How has Realistic Mathematics Education (RME) been integrated with digital technologies or learning media in the context of mathematics learning?
2. What types of technologies, media, or digital learning environments are used in the implementation of RME, and how does it contribute to the development of students' mathematical problem-solving skills?
3. What empirical evidence has been reported on the integration of RME and digital technology in supporting students' mathematical problem-solving skills across different educational levels and contexts?

 http://doi.org/10.30762/f_m.v9i2.8358

4. What are the latest trends, innovations, and research gaps related to the integration of RME and digital technology in mathematics problem-solving learning?

METHODS

This study uses a Systematic Literature Review (SLR) approach to systematically examine research on integrating Realistic Mathematics Education (RME) and digital technology in the context of developing mathematical problem-solving skills. The study follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Higgins et al., 2019; Newman & Gough, 2019), ensuring that the process of identifying, selecting, and synthesizing articles is transparent and systematic.

This study uses data from the Scopus database because it is a highly reputable database of international journals and has a broad scope in mathematics education. Using Scopus also ensures that the articles analyzed have undergone peer review and are published in credible journals.

The literature search was conducted in the Scopus database on 19 July 2026 using the TITLE-ABS-KEY search field with the following Boolean query:

("Realistic Mathematics Education" OR "RME") AND ("digital" OR technology OR ICT OR GeoGebra OR "Augmented Reality" OR AI OR "mobile learning")

Pencarian dilakukan sekali, dan semua catatan yang ditemukan diekspor ke Microsoft Excel untuk penyaringan dan manajemen data. The search filter is limited to English-language articles with article document types, open access status, inclusion in the Social Sciences and Mathematics subject area, and publication between 2016 and 2026. The search flow and the amount of literature identified in the PRISMA framework are shown in Figure 1. The inclusion and exclusion criteria for article selection are described in Table 1.

The screening process consisted of three stages. First, titles were screened to remove clearly irrelevant studies. Second, abstracts were evaluated against the predefined inclusion and exclusion criteria. Finally, the full texts of potentially eligible studies were assessed for suitability for inclusion in the review. Because the literature search was conducted exclusively in Scopus, no duplicate records were identified during screening. The final set of eligible studies was subsequently subjected to a quality

 http://doi.org/10.30762/f_m.v9i2.8358

assessment before data extraction and thematic synthesis.

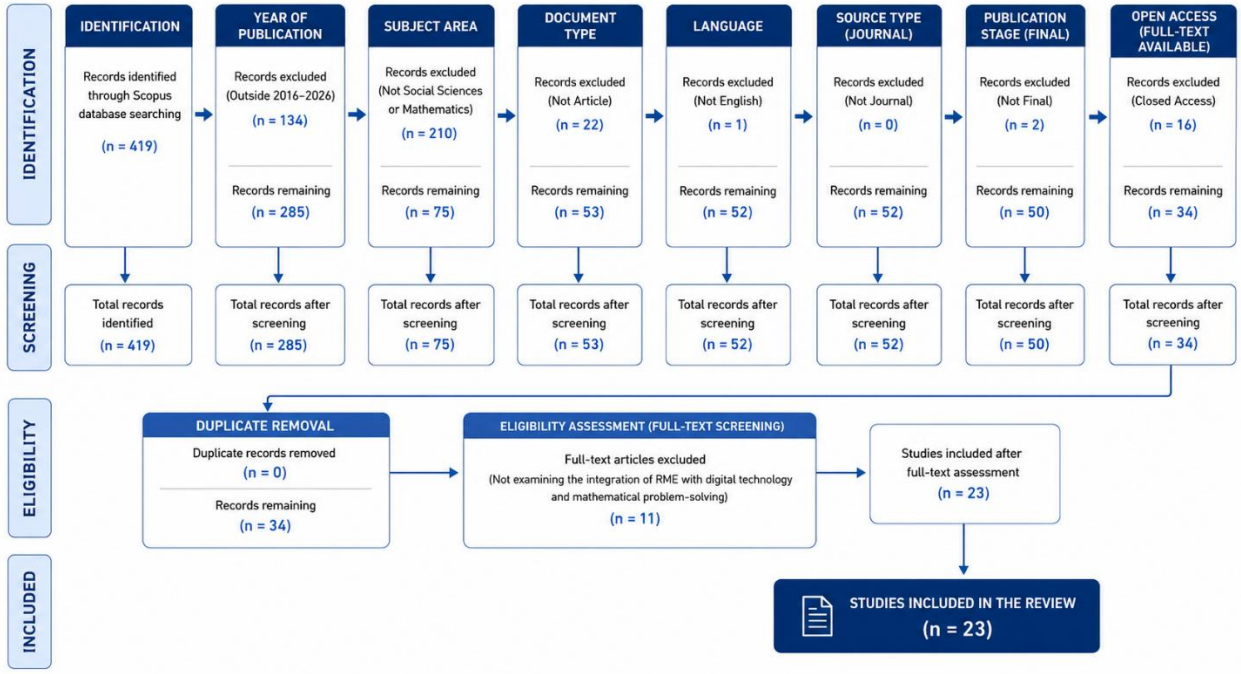

Figure 1. PRISMA Procedure

Table 1. Inclusion and Exclusion Criteria

Criterion	Inclusion Criteria	Exclusion Criteria
Publication source	Journal articles indexed in Scopus	Conference papers, book chapters, review articles, editorials, dissertations, or non-Scopus publications
Publication period	Published between 2016 and 2026	Published before 2016
Language	English	Non-English publications
Study design	Empirical studies employing quantitative, qualitative, mixed-methods, or research and development (R&D) designs	Purely theoretical, conceptual, opinion, or literature review papers
Population	Participants involved in mathematics education at elementary, secondary, or higher education levels	Studies conducted outside mathematics education contexts
Intervention /Focus	Studies investigating the integration of Realistic Mathematics Education (RME) with digital technology or digital learning media	Studies discussing only RME or only digital technology without integration
Outcome	Studies reporting mathematical problem-solving skills or closely related mathematical learning outcomes (e.g., mathematical reasoning, modelling, representation)	Studies that do not report mathematics learning outcomes related to problem-solving

 http://doi.org/10.30762/f_m.v9i2.8358

To enhance the review's credibility, we assessed the methodological quality of the included studies using four predefined criteria adapted from quality appraisal approaches commonly used in systematic literature reviews in education (Xiao & Watson, 2019). Each criterion was evaluated using a binary scale (Yes = 1; No = 0), and only studies that satisfied all quality criteria were retained for the final thematic synthesis. The quality assessment criteria are presented in Table 2.

Table 2. Quality Assessment Criteria

Code	Quality Criterion	Assessment
QA1	Clearly stated research objectives	Yes / No
QA2	Research design appropriately aligned with the study objectives	Yes / No
QA3	Transparent description of data collection and analysis procedures	Yes / No
QA4	Findings directly relevant to the objectives of this systematic review	Yes / No

All 23 included studies fulfilled the four quality assessment criteria. Therefore, no studies were excluded during the quality appraisal stage, and all were retained for the final thematic synthesis.

We developed a standardized data extraction form before analysis to ensure consistency across included studies. For each article, we extracted the author(s), publication year, country, educational level, research design, participant characteristics, RME implementation, type of digital technology or learning media, mathematical learning outcomes, and key findings related to mathematical problem-solving. The extracted data were coded manually using descriptive coding. Studies addressing similar themes were grouped into the same category before synthesis.

The extracted data were analyzed using thematic synthesis. We systematically coded similar findings across the included studies and grouped them into thematic categories aligned with the predefined research questions. This process enabled cross-study comparison by integrating RME with digital technology, the types of technologies and learning media used, empirical evidence of dRME implementation, and emerging research trends and gaps. The mapping of the data extraction properties to the research questions is presented in Table 3.

 http://doi.org/10.30762/f_m.v9i2.8358

Table 3. Data Extraction Framework

Data Extraction Item	Description	Related RQ
Bibliographic information	Author and publication year	All
Country	Country where the study was conducted	RQ4
Educational level	Elementary, secondary, higher education	RQ3
Research design	Quantitative, qualitative, mixed methods, R&D	RQ3
Digital technology	GeoGebra, AI, AR, mobile learning, etc.	RQ2
RME implementation	Integration of RME principles with technology	RQ1
Learning outcomes	Problem solving, reasoning, modelling, representation	RQ3
Research trends and gaps	Emerging technologies and future directions	RQ4

The synthesized findings were subsequently organized into thematic narratives corresponding to the four research questions, providing a structured overview of the integration of Digital Realistic Mathematics Education (dRME) and digital technology in mathematics education.

RESULT AND DISCUSSION

Research Overview

Based on the literature screening in the Scopus database, 23 articles met the inclusion criteria and were analyzed further.

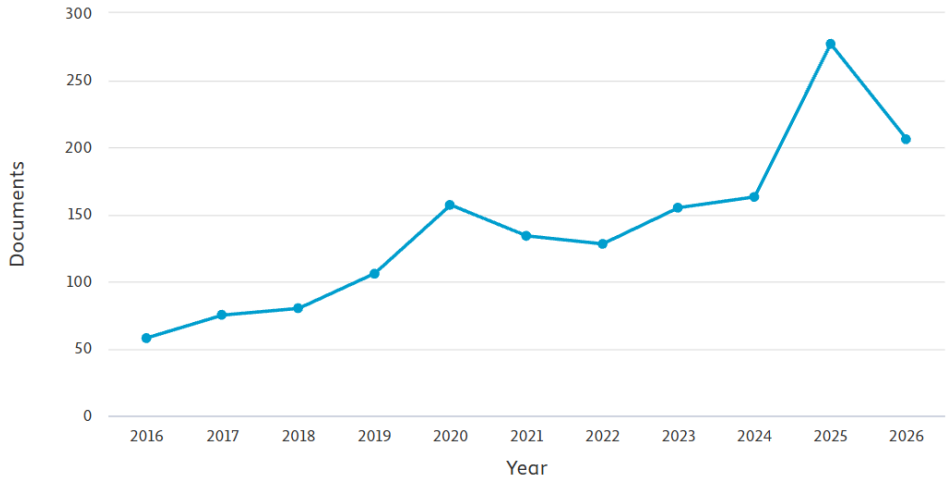

Figure 2. Document by Year

Figure 2 illustrates the temporal distribution of the studies included in this review. Overall, the publication trend indicates a growing research interest in integrating Realistic Mathematics Education (RME) with digital technologies, although the development was not continuous throughout the review period. Research activity

 http://doi.org/10.30762/f_m.v9i2.8358

remained relatively limited during the early years, suggesting that the application of digital technologies within RME had not yet become a major research focus. In contrast, the substantial increase in publications in later years reflects the growing adoption of digital learning environments, advances in educational technologies, and increased attention to contextual mathematics learning in the post-pandemic era. This trend also coincides with the emergence of innovative technologies, such as Artificial Intelligence (AI), Augmented Reality (AR), dynamic mathematics software, and interactive digital learning media, which have expanded the implementation of Digital Realistic Mathematics Education (dRME) across diverse educational contexts.

Figure 3 illustrates the temporal distribution of the studies included in this review. Overall, the publication trend indicates a growing research interest in integrating Realistic Mathematics Education (RME) with digital technologies, although the development was not continuous throughout the review period. Research activity remained relatively limited in the early years, suggesting that applying digital technologies within RME had not yet become a major research focus.

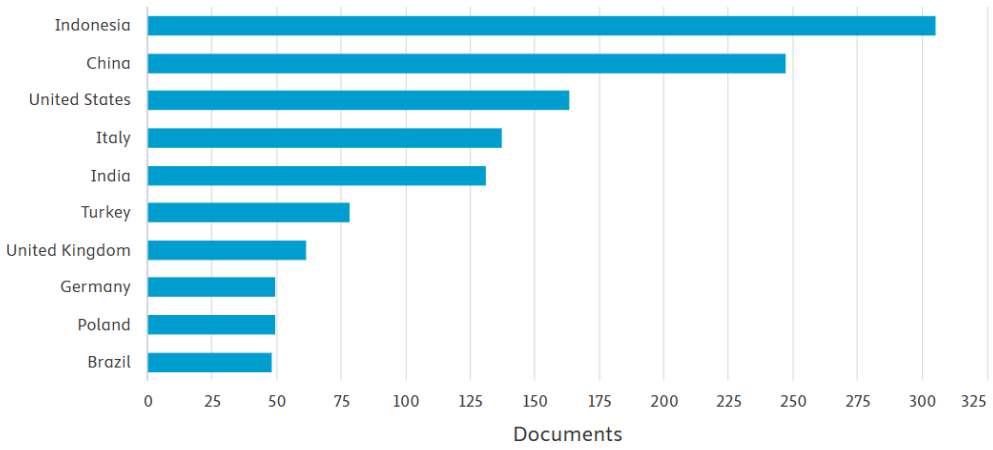

Figure 3. Documents by Country

In contrast, the substantial increase in publications in later years reflects the growing adoption of digital learning environments, advances in educational technologies, and increased attention to contextual mathematics learning in the post-pandemic era. This trend also coincides with the emergence of innovative technologies, such as Artificial Intelligence (AI), Augmented Reality (AR), dynamic mathematics software, and interactive digital learning media, which have expanded the implementation of Digital Realistic Mathematics Education (dRME) across diverse educational contexts.

 http://doi.org/10.30762/f_m.v9i2.8358

The reviewed studies in Table 4 were predominantly conducted at the junior high school level (12 studies), indicating that this educational stage remains the primary context for implementing Digital Realistic Mathematics Education (dRME). Comparatively, five studies were conducted in higher education and three in elementary education, while three review-based studies synthesized evidence across multiple educational levels. Notably, no empirical studies specifically focused on senior secondary education. This distribution suggests that future research should broaden the implementation of dRME across more diverse educational levels, particularly senior secondary education, to provide a more comprehensive understanding of its educational impact.

Table 4. Summary of Studies Reviewed (2016–2026)

Author(s) – Year	Educational Level	Technology Category	Outcome Domain	Key Analytical Findings
Payadnya et al. (2026)	Secondary	AI Adaptive Systems	Cognitive	AI adaptive feedback scaffolded ethno-mathematical reasoning, directly improving numeracy skills.
Fessakis et al. (2018)	Secondary	Mobile Learning	Cognitive	Mobile Math Trails facilitated horizontal mathematization in outdoor contexts, enhancing computational thinking.
Johar et al. (2025)	Secondary	Interactive E-Modules	Cognitive	Interactive designs visually scaffolded the Iceberg Model, aiding the transition to abstract algebra.
Amelia et al. (2026)	Secondary	E-Miracle (Scratch)	Cognitive	Scratch-based inquiry enabled dynamic problem decomposition, fostering 6C skills.
Wanabuliandari et al. (2025)	Special Education	DIMSMOVE (Audio-Digital)	Cognitive	Audio-digital scaffolding reduced cognitive load and strengthened logical thinking for students with intellectual disabilities.
Susilawati et al. (2025)	Secondary	AI & Gamification	Affective & Cognitive	Gamification synergized immediate rewards with AI feedback, boosting motivation and problem-solving execution.
Siswanto et al. (2025)	Secondary	Interactive E-Comic	Affective & Cognitive	E-comics visually contextualized mathematical narratives, promoting

 http://doi.org/10.30762/f_m.v9i2.8358

Author(s) – Year	Educational Level	Technology Category	Outcome Domain	Key Analytical Findings
				engagement and creative mathematical thinking.
Turgut et al. (2022)	Higher Education	Dynamic Geometry (DGE)	Cognitive	GeoGebra's dynamic manipulation supported advanced multimodal reasoning in abstract linear algebra.
Johar et al. (2025)	Secondary	Immersive/ Spatial Tools	Cognitive	Combining GeoGebra and Google Earth anchored real-world cultural architecture into 3D spatial modeling.
Prahmana et al. (2020)	Various	Multimedia	Cognitive	SLR confirmed interactive multimedia consistently facilitates *guided reinvention* across various contexts.
Hardiyanto et al. (2024)	Secondary	Dynamic Geometry (DGE)	Metacog nitive	Interactive visualization specifically prompted metacognitive evaluation and mathematical reflection.
Turgut (2022)	Higher Education	Dynamic Geometry (DGE)	Cognitive	DGE enabled visual-algebraic translations, supporting multimodal reasoning in linear transformations.
Octaria et al. (2025)	Secondary	Contextual Digital Media	Cognitive	Museum-based digital contexts specifically improved spatial literacy and reasoning.
Suparatulatorn et al. (2023)	Secondary	Interactive E-Modules	Cognitive	Technology-Enhanced RME tasks improved critical thinking and mathematical modeling.
Nursyahidah et al. (2025)	Secondary	Contextual Digital Tools	Cognitive	Ethnomathematics integration into TE-RME enhanced both mathematical representation and reasoning.
Putri et al. (2025)	Various	Interactive E-Modules	Cognitive	Multicontextual digital modules strengthened the overall progressive mathematization process.
Andzin et al. (2024)	Secondary	Immersive Tech (AR)	Cognitive	Augmented Reality significantly improved 3D spatial representation and visualization.
Seloane et al. (2025)	Higher Education	Dynamic Geometry (DGE)	Cognitive	GeoGebra acted as a cognitive modeling tool to mitigate misconceptions in undergraduate engineering math.

 http://doi.org/10.30762/f_m.v9i2.8358

Author(s) – Year	Educational Level	Technology Category	Outcome Domain	Key Analytical Findings
Putra et al. (2023)	Secondary	Mobile/Android Learning	Cognitive	Mobile integration (Android-CBL) enhanced problem-solving representation.
Nursyahidah et al. (2025b)	Secondary	Animation Video	Cognitive	Animated ethnomathematics videos bridged concrete contexts to improve problem-solving.
Siswantari et al. (2025)	Secondary	DGE & Mobile	Cognitive	Multi-device integration strengthened mathematical reasoning and communication.
Meryansumayeka et al. (2022)	Secondary	ICT & Video	Cognitive	Geometry-focused digital videos promoted Higher-Order Thinking Skills (HOTS).
Nursyahidah et al. (2025)	Secondary	Animation (Adobe)	Cognitive	Digital animations of local wisdom (Nyadran) improved contextual understanding.

The reviewed studies demonstrate that Digital Realistic Mathematics Education (dRME) has been implemented through a wide range of digital technologies and learning media. The most frequently reported technologies include dynamic mathematics software, such as GeoGebra and Dynamic Geometry Environment (DGE), interactive multimedia, including digital modules, e-comics, animation, and Scratch, as well as immersive and location-based technologies such as Augmented Reality (AR) and Google Earth. More recent studies also indicate a growing adoption of Artificial Intelligence (AI), adaptive e-learning systems, and interactive online platforms to support personalized and collaborative learning. Overall, these technologies function not merely as instructional tools but as cognitive mediators that facilitate visualization, mathematical modelling, contextual exploration, and progressive mathematization within authentic learning environments.

Overall, preliminary synthesis results show that integrating RME and digital technologies has strong potential to improve student engagement, problem-solving skills, and mathematical conceptual understanding. In addition, some studies show a new trend of combining dRME with a local wisdom-based approach, which enriches the learning context and reinforces the relevance of mathematics to students' real lives.

Based on the findings, the following discussion is organized into four themes aligned with the research questions: RME integration with digital technology, digital

 http://doi.org/10.30762/f_m.v9i2.8358

technologies and learning media, empirical evidence of dRME implementation, and research trends, innovations, and gaps.

Integration of RME with Digital Technology (RQ1)

The reviewed studies reveal that Realistic Mathematics Education (RME) has been integrated with digital technologies through contextual digital learning environments, interactive learning media, and technology-supported mathematical exploration. Rather than serving merely as instructional tools, digital technologies are embedded within the core principles of RME to facilitate guided reinvention, progressive mathematization, and the exploration of authentic mathematical situations. Across the reviewed studies, this integration is implemented through digital modules and adaptive e-learning systems, dynamic mathematics software, interactive multimedia, mobile learning, and technology-supported ethnomathematical learning environments (Amelia et al., 2026; Johar et al., 2025; Nursyahidah et al., 2025a; Nursyahidah et al., 2025b; Payadnya et al., 2026).

Another prominent pattern integrates local cultural contexts with digital technologies while preserving RME's contextual nature. Studies incorporated ethnomathematical contexts such as Balinese culture, the Nyadran tradition, and the Indrapatra Fort through technologies including GeoGebra, Augmented Reality, Google Earth, AI-assisted learning platforms, Scratch, animation, and mobile learning (Andzin et al., 2024; Fessakis et al., 2018; Johar et al., 2025; Nursyahidah et al., 2025a; Payadnya et al., 2026). Overall, most reviewed studies indicate that dRME is characterized by the integration of contextual learning, digital technology, and local culture into a unified learning environment that supports meaningful mathematical exploration.

Digital Technologies and Learning Media (RQ2)

The reviewed studies employed a wide range of digital technologies, media, and learning environments to support the implementation of Realistic Mathematics Education (RME). GeoGebra emerged as the most frequently used technology for dynamic mathematical visualization and modelling. Other studies also used Augmented Reality (AR), AI-assisted adaptive e-learning systems, Scratch-based digital modules, Google Earth, interactive e-comics, animation, mobile learning, and digital learning management platforms. In addition, several studies developed interactive digital modules using platforms such as Canva, Animaker, Liveworksheet, Quizizz, Adobe Animate, and DIMSMOVE to facilitate contextual mathematics learning in diverse educational settings

 http://doi.org/10.30762/f_m.v9i2.8358

(Amelia et al., 2026; Andzin et al., 2024; Fessakis et al., 2018; Johar et al., 2025; Payadnya et al., 2026; Siswanto et al., 2025; Wanabuliandari et al., 2025).

Despite the diversity of technologies employed, their contributions show several consistent patterns. Dynamic visualization tools such as GeoGebra and Augmented Reality primarily supported mathematical representation, spatial reasoning, and modelling. At the same time, AI-assisted systems and adaptive e-learning provided personalized learning experiences and scaffolding during problem-solving. Interactive multimedia, including digital modules, e-comics, animation, and mobile learning applications, enhanced students' engagement with contextual problems and facilitated the transition from concrete situations to abstract mathematical concepts. Technology choices also varied across educational contexts. Studies in junior secondary schools predominantly used GeoGebra, interactive multimedia, and contextual digital modules to support visualization and mathematization. In contrast, higher education studies more often used dynamic mathematics environments and AI-assisted learning to support advanced mathematical reasoning. Overall, digital technologies functioned not only as learning media but also as cognitive tools that strengthened students' mathematical exploration, reasoning, and problem-solving within the principles of Digital Realistic Mathematics Education (dRME) (Amelia et al., 2026; Andzin et al., 2024; Johar et al., 2025; Payadnya et al., 2026; Seloane et al., 2025; Suparatulatorn et al., 2023; Turgut et al., 2022).

Empirical Evidence (RQ3)

The synthesis of empirical evidence shows that integrating Realistic Mathematics Education (RME) and digital technology generally supports students' mathematical problem-solving skills. However, a deeper analysis indicates that these impacts vary significantly by targeted learning outcomes, technology complexity, and educational level.

Cognitive versus Affective Outcomes

Based on the reviewed studies, learning outcomes can be broadly categorized into cognitive and affective domains. Cognitive outcomes, such as mathematical representation, spatial reasoning, higher-order thinking skills, and problem-solving, were predominantly enhanced by dynamic visualization tools like GeoGebra, Augmented Reality (AR), and AI-assisted adaptive learning (Amelia et al., 2026; Faizien et al., 2023; Johar et al., 2025; Payadnya et al., 2026; Suparatulatorn et al., 2023). These digital tools

 http://doi.org/10.30762/f_m.v9i2.8358

act as cognitive scaffolds that help students translate contextual problems into formal mathematical models. Conversely, affective outcomes, including learning motivation, engagement, and positive attitudes toward mathematics, were more frequently associated with gamification, interactive e-comics, and multimedia modules (Siswantari et al., 2025; Siswanto et al., 2025; Susilawati et al., 2025).

Comparative Analysis by Educational Level and Technology Category

The empirical evidence also demonstrates distinct patterns when comparing educational levels and technology categories. In junior high school settings, which account for the majority of the reviewed literature, interventions predominantly utilized simple to moderately interactive technologies (e.g., e-modules, mobile learning, and video animation) to bridge concrete local wisdom contexts with foundational mathematical concepts (Nursyahidah et al., 2025a; Nursyahidah et al., 2025b). In contrast, studies in higher education settings often used more complex, immersive digital environments, such as Dynamic Geometry Environments (DGE), to support advanced abstract reasoning, logical thinking, and multimodal mathematical representations (Seloane et al., 2025; Turgut et al., 2022).

Contradictory Findings and Implementation Challenges

Despite the predominantly positive reports, a critical examination of the literature reveals several inconsistencies and challenges in implementing Digital Realistic Mathematics Education (dRME). While immersive technologies like AR and AI-assisted platforms can enhance spatial visualization, they may introduce cognitive overload when students are unfamiliar with the digital interface, potentially distracting them from the mathematical problem-solving process. Furthermore, integrating complex digital tools in low-resource settings occasionally shifts the instructional focus from the RME progressive mathematization process to mere technological troubleshooting. Additionally, most empirical evidence relies on short-term interventions, leaving a significant gap in understanding the long-term retention of these mathematical problem-solving skills.

Overall, the empirical evidence suggests that integrating RME and digital technology offers promising educational benefits across diverse learning contexts. However, variation in outcomes and implementation challenges highlight that digital technology is not a panacea; its effectiveness depends on rigorous didactical design and

 http://doi.org/10.30762/f_m.v9i2.8358

alignment with students' educational levels, not merely on the presence of the technology itself.

Research Trends and Gaps (RQ4)

The reviewed studies reveal several emerging trends in integrating Realistic Mathematics Education (RME) with digital technology. Recent research has shifted from conventional digital media, such as GeoGebra and mobile learning, toward more advanced technologies, including Artificial Intelligence (AI), adaptive e-learning systems, Augmented Reality (AR), and interactive multimedia. At the same time, researchers have increasingly incorporated ethnomathematics and local cultural contexts into digital learning environments, resulting in the development of Digital Realistic Mathematics Education (dRME) that combines contextual learning, technology, and cultural relevance (Andzin et al., 2024; Johar et al., 2025; Nursyahidah et al., 2025a; Payadnya et al., 2026; Susilawati et al., 2025).

Despite these advances, several research gaps remain. Most reviewed studies were conducted in Indonesia and focused primarily on junior high school students, limiting the generalizability of current findings across different educational systems and learner populations. Furthermore, although AI-assisted learning and immersive technologies have recently attracted increasing attention, empirical evidence regarding their long-term implementation and sustained impact on mathematical learning remains limited. Another important gap is the limited integration of multiple emerging technologies within a single dRME framework, as most studies investigated individual technologies rather than complementary digital ecosystems. Future research should therefore explore diverse educational settings, conduct comparative international studies, investigate the long-term effectiveness of dRME interventions, and examine how combinations of emerging digital technologies can support various mathematical competencies.

Discussion

The findings of this review show that integrating digital technology into Realistic Mathematics Education (RME) represents a theoretical evolution rather than merely a methodological shift. Moving beyond previous perspectives that treat technology as a passive instructional medium, this synthesis reveals that digital tools within the Digital Realistic Mathematics Education (dRME) framework act as essential cognitive mediators. According to Drijvers (2020) and Van den Heuvel-Panhuizen & Drijvers (2020),

 http://doi.org/10.30762/f_m.v9i2.8358

contemporary RME requires dynamic learning environments. The reviewed studies show that digital technologies provide adaptive feedback and dynamic visualizations, which are crucial for facilitating progressive mathematization and allowing students to manipulate abstract concepts interactively.

The Pedagogical Role of Local Culture in dRME

A key finding of this review is the strong pedagogical value of integrating local culture (ethnomathematics) into dRME environments, which goes beyond mere contextual embellishment (Andzin et al., 2024; Johar et al., 2025; Nursyahidah et al., 2025). Grounded in Freudenthal (2002) concept of didactical phenomenology, mathematics must originate from reality. Culturally contextualized digital environments provide authentic "starting points" for students. When local cultural artifacts or practices (such as traditional architecture, local woven crafts, or historical sites) are integrated into digital formats like Augmented Reality or interactive animations, the cognitive distance between abstract mathematical models and students' lived realities shrinks significantly.

Pedagogically, these cultural-digital interfaces explicitly support mathematical problem-solving. First, they facilitate horizontal mathematization by letting students use their prior cultural knowledge to formulate mathematical problems from real-world phenomena intuitively. For instance, visualizing the geometry of a local cultural artifact through dynamic software helps students decompose complex spatial problems into manageable mathematical models. Subsequently, the digital tools scaffold vertical mathematization by providing the interactive capacity to test, manipulate, and evaluate these mathematical models abstractly. Thus, digital technology and local culture work synergistically: culture provides meaningful context to lower the cognitive barrier, while technology provides the interactive scaffolding necessary to elevate students' mathematical reasoning.

Interpreting the Geographical and Educational Patterns

Furthermore, the heavy concentration of research in Indonesia (18 out of 23 studies) requires critical interpretation. This geographical pattern is not coincidental; it reflects the robust, decades-long national movement of *Pendidikan Matematika Realistik Indonesia* (PMRI) (Prahmana et al., 2020; Zulkardi et al., 2020). However, while this strong national foundation has driven rapid localized innovation in dRME, it also highlights a critical need for international cross-cultural validation. The predominance of

 http://doi.org/10.30762/f_m.v9i2.8358

studies at the junior high school level also suggests that researchers find it easiest to align simple contextual technologies with early algebra and geometry curricula. Moving forward, the theoretical development of dRME must investigate how more advanced technologies (e.g., generative AI or immersive virtual reality) can support higher-order calculus or linear algebra in senior secondary and higher education contexts (Turgut et al., 2022).

Implications

This review's findings have several implications for mathematics education research and practice. Theoretically, this review contributes to the ongoing development of Realistic Mathematics Education (RME) by demonstrating that digital technology should be conceptualized as an integral component of contemporary RME rather than merely as instructional support. The synthesis suggests that Digital Realistic Mathematics Education (dRME) extends the original principles of RME by integrating contextual learning, digital mediation, and local cultural relevance into a unified learning framework while preserving the core principles of guided reinvention, didactical phenomenology, and progressive mathematization.

Practically, to effectively implement dRME in classroom settings, this review provides several concrete recommendations for educational stakeholders:

1. **For Teachers:** Practitioners should prioritize the "guided reinvention" principle over pure technological novelty. Teachers are advised to use accessible interactive media (e.g., GeoGebra or contextual digital modules) to visualize culturally relevant problems, allowing students to construct mathematical models rather than passively consuming digital content.
2. **For Instructional Designers and Curriculum Developers:** dRME materials must be designed as cohesive digital ecosystems rather than isolated applications. Developers should systematically embed local cultural narratives into interactive e-learning platforms, ensuring that the progressive mathematization process is structured seamlessly across different curriculum levels.
3. **For Policymakers:** Given the disparities in technological infrastructure, policymakers must provide targeted professional development for mathematics teachers. This training should focus on pedagogical integration (developing Technological Pedagogical Content Knowledge/TPACK) rather than just technical

 http://doi.org/10.30762/f_m.v9i2.8358

operation, particularly in adapting dRME for diverse socioeconomic and cultural contexts.

Furthermore, the identified research gaps highlight the need for future studies involving more diverse educational levels, cross-cultural contexts, and emerging technologies such as generative AI, immersive learning environments, and intelligent tutoring systems. Future research should also validate and refine the proposed dRME framework across different educational systems to strengthen both its theoretical foundation and practical implementation in mathematics education.

CONCLUSION

This systematic literature review addressed its research objectives by synthesizing evidence from 23 Scopus-indexed studies on integrating Realistic Mathematics Education (RME) and digital technology. In addressing the research questions (RQ1 and RQ2), the findings demonstrate that digital technologies (such as GeoGebra, Augmented Reality, AI, and interactive e-modules) function not merely as instructional media, but as cognitive tools that actively support guided reinvention, visualization, and progressive mathematization within the Digital Realistic Mathematics Education (dRME) framework. Regarding empirical evidence (RQ3), the synthesis confirms that technology-enhanced RME effectively improves students' mathematical problem-solving skills across educational levels. However, junior high schools tend to use simpler interactive media than the complex dynamic environments used in higher education. Finally, by identifying current trends (RQ4), the review highlights the growing integration of digital technology with local cultural contexts (ethnomathematics), extending RME into a more culturally relevant digital learning environment.

However, the findings of this review must be interpreted in light of several explicit limitations. First, the literature search was restricted exclusively to the Scopus database, which may introduce publication bias by excluding relevant non-English literature or studies indexed in other databases. Second, the reviewed studies are strongly concentrated in Indonesia, limiting the global generalizability of the findings. Lastly, considerable methodological heterogeneity across the reviewed studies limited the feasibility of a quantitative meta-analysis.

To address these gaps, future research should investigate the long-term

 http://doi.org/10.30762/f_m.v9i2.8358

implementation of dRME across broader international and educational contexts. Furthermore, empirical studies exploring the integration of emerging technologies, such as generative AI and immersive virtual reality, are necessary to continue advancing the conceptual development of mathematics learning in the digital era.

ACKNOWLEDGMENTS

The author declares that this research was conducted without any commercial or financial interests that could potentially cause a conflict of interest.

FUNDING STATEMENT

This research received no specific grants from public, commercial, or non-profit funding agencies.

AUTHOR CONTRIBUTIONS

First Author: Conceptualization, writing - original draft, editing, and visualization;

Second Author: Writing - review & editing, formal analysis, and methodology;

Third Author: Validation and supervision.

REFERENCES

Amelia, R., Herman, T., Dasari, D., & Jupri, A. (2026). E-Miracle: An inquiry-realistic digital module to support students' 6C competencies. *Infinity Journal*, *15*(2), 483–508. https://doi.org/10.22460/infinity.v15i2.p483-508

Andzin, N. S., Sari, P. Y. P., Widodo, R. C., Sukowati, D. I., Indriastuti, S., & Nursyahidah, F. (2024). Arithmetic sequences and series learning using realistic mathematics education assisted by augmented reality. *Mathematics Education Journal*, *18*(1), 139–148. https://doi.org/10.22342/jpm.v18i1.pp139-148

Cirneanu, A. L., & Moldoveanu, C. E. (2024). Use of digital technology in integrated mathematics education. *Applied System Innovation*, *7*(4), Article 66. https://doi.org/10.3390/ASI7040066

Darta, & Saputra, J. (2018). Indicators that influence prospective mathematics teachers representational and reasoning abilities. *Journal of Physics: Conference Series*, *948*, Article 012053. https://doi.org/10.1088/1742-6596/948/1/012053

Dianti, A., Yensy, N. A., & Rusdi, R. (2021). Improvement of student mathematics learning outcome on polyhedra topic by applying generative learning model in the class. *Journal of Physics: Conference Series*, *1731*(1), Article 012045. https://doi.org/10.1088/1742-6596/1731/1/012045

Dinglasan, J. K. L., Caraan, D. R. C., & Ching, D. A. (2023). Effectiveness of realistic mathematics education approach on problem-solving skills of students. *International Journal of Educational Management and Development Studies*, *4*(2), 64–87. https://doi.org/10.53378/352980

Domu, I., Manangin, S. A., & Pinontoan, K. F. (2022). Pengembangan soal pemecahan masalah untuk siswa sekolah menengah pertama menggunakan pendekatan pendidikan matematika realistik Indonesia. *Journal Focus Action of Research Mathematic (Factor M)*, *5*(1), 1–13. https://doi.org/10.30762/f_m.v5i1.605

Drijvers, P. (2020). Digital tools in Dutch mathematics education: A dialectic relationship. In M. van den Heuvel-Panhuizen (Ed.), *International reflections on the Netherlands didactics of mathematics* (pp. 177–195). Springer. https://doi.org/10.1007/978-3-030-33824-4_10

Engelbrecht, J., & Borba, M. C. (2024). Recent developments in using digital technology in mathematics education. *ZDM – Mathematics Education*, *56*(2), 281–292. https://doi.org/10.1007/s11858-023-01530-2

Faizien, M. I., Fuad, Y., & Sofro, A. (2023). Analisis kreativitas siswa terhadap kemampuan siswa dalam menyelesaikan soal tipe HOTS. *Journal Focus Action of Research Mathematic (Factor M)*, *6*(2), 59–72. https://doi.org/10.30762/f_m.v6i2.1365

Fessakis, G., Karta, P., & Kozas, K. (2018). Designing math trails for enhanced by mobile learning realistic mathematics education in primary education. *International Journal of Engineering Pedagogy*, *8*(2), 49–63. https://doi.org/10.3991/ijep.v8i2.8131

Freudenthal, H. (2002). Revisiting mathematics education: China lectures. In *Revisiting mathematics education* (pp. 9–147). Springer. https://doi.org/10.1007/0-306-47202-3_2

Handayani, U. F., & Anggraini, L. (2024). Students' errors in solving linear program problems according to Newman's Theory in terms of gender. *Journal Focus Action of Research Mathematic (Factor M)*, *7*(1), 139–155. https://doi.org/10.30762/f_m.v7i1.1981

Hardiyanto, D., Nursyahidah, F., & Albab, I. U. (2024). Hypothetical learning trajectory on dilation material using realistic mathematics education and GeoGebra media. *Jurnal Matematika dan Pendidikan Matematika*, *9*(2), 417–432. https://doi.org/10.31943/mathline.v9i2.591

Higgins, J. P. T., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. J., & Welch, V. A. (2019). *Cochrane handbook for systematic reviews of interventions* (2nd ed.). John Wiley & Sons.

Iffah, R. D. L., Subanti, S., Usodo, B., & Nurhasanah, F. (2025). Systematic literature review: Ethnomathematics research in Indonesia. *JRAMathEdu (Journal of Research and Advances in Mathematics Education)*, *10*(1), 15–27. https://doi.org/10.23917/jramathedu.v10i1.5621

Johar, R., Annisa, D., Mailizar, Zubainur, C. M., Zubaidah, T., Usman, Indriyani, L., & Musa, M. (2025). Development of algebraic expressions e-modules through realistic mathematics education approach. *Infinity Journal*, *14*(4), 973–994. https://doi.org/10.22460/infinity.v14i4.p973-994

Johar, R., Fauzan, A., Sugiman, S., Anwar, L., Sa'dijah, C., & Khairunnisak, C. (2025). Developing local instruction theory through ethnomathematics and technological-based realistic mathematics education to support students' spatial ability. *Asian Journal for Mathematics Education*, *4*(4), 553–587. https://doi.org/10.1177/27527263251383572

Lady, A., Utomo, B. T., & Chikita, L. (2018). Improving mathematical ability and student learning outcomes through realistic mathematic education (RME) approach. *International Journal of Engineering & Technology*, *7*(2.10), 55–59. https://doi.org/10.14419/ijet.v7i2.10.10954

Li, M., & Li, B. (2024). Unravelling the dynamics of technology integration in mathematics education: A structural equation modelling analysis of TPACK components. *Education and Information Technologies*, *29*(17), 23687–23715. https://doi.org/10.1007/s10639-024-12805-w

Mahmudi, A., Sugiman, S., Hernawati, K., & Lestari, H. P. (2022). Pengembangan bahan ajar matematika berbasis kontekstual. *Pythagoras: Jurnal Matematika dan Pendidikan Matematika*, *17*(2), 368–376. https://doi.org/10.21831/pythagoras.v17i2.26986

Meryansumayeka, Zulkardi, Putri, R. I. I., & Hiltrimartin, C. (2022). Designing geometrical learning activities assisted with ICT media for supporting students' higher order thinking skills. *Journal on Mathematics Education*, *13*(1), 135–148. https://doi.org/10.22342/jme.v13i1.pp135-148

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*.

Newman, M., & Gough, D. (2019). Systematic reviews in educational research: Methodology, perspectives and application. In O. Zawacki-Richter, M. Kerres, S. Bedenlier, M. Bond, & K. Buntins (Eds.), *Systematic reviews in educational research: Methodology, perspectives and application* (pp. 3–22). Springer. https://doi.org/10.1007/978-3-658-27602-7_1

Novita, R., & Herman, T. (2021). Using technology in young children mathematical learning: A didactic perspective. *Journal of Physics: Conference Series*, *1957*(1), Article 012013. https://doi.org/10.1088/1742-6596/1957/1/012013

Nursyahidah, F., Anindya, F. M., Yulianti, M. A., Prisanto, Z. I., & Rosario, M. A. R. (2025). Integrating local wisdom with technology: Designing learning trajectory of cylinder through realistic mathematics education approach. *Jurnal Pendidikan Matematika*, *19*(1), 81–98. https://doi.org/10.22342/jpm.v19i1.pp81-98

Nursyahidah, F., Wardono, Mariani, S., & Wijayanti, K. (2025a). Integrating technology, ethnomathematics, and realistic mathematics education in learning statistics: A learning trajectory. *Infinity Journal*, *14*(3), 633–654. https://doi.org/10.22460/infinity.v14i3.p633-654

Nursyahidah, F., Wardono, Mariani, S., & Wijayanti, K. (2025b). Integrating technology, Javanese ethnomathematics, and realistic mathematics education in supporting prospective mathematics teachers' numeracy skills: A learning trajectory. *Journal on Mathematics Education*, *16*(2), 671–688. https://doi.org/10.22342/jme.v16i2.pp671-688

Octaria, D., Zulkardi, Putri, R. I. I., & Hiltrimartin, C. (2025). Reimagining space: Developing a museum-based local instructional theory for spatial literacy in elementary geometry. *Mathematics Education Journal*, *20*(1), 1–26. https://doi.org/10.22342/mej.v20i1.pp1-26

OECD. (2023). *PISA 2022 results (Volume I): The state of learning and equity in education*. OECD Publishing. https://doi.org/10.1787/53F23881-EN

Palinussa, A. L., Tupamahu, P. Z., Sabandar, V. P., Makaruku, Y. H., & Sabandar, J. (2024). Realistic mathematics education: Mathematics e-modules in improving student learning outcomes. *Infinity Journal*, *14*(1), 45–64. https://doi.org/10.22460/infinity.v14i1.p45-64

Payadnya, P. A. A., Puspadewi, K. R., & Noviana, L. P. R. (2026). AI-assisted adaptive geometry e-Learning: Integrating ethno-realistic mathematics education to boost students' numeracy abilities. *STEM Education*, *6*(3), 392–417. https://doi.org/10.3934/steme.2026017

Prahmana, R. C. I., Sagita, L., Hidayat, W., & Utami, N. W. (2020). Two decades of realistic mathematics education research in Indonesia: A survey. *Infinity Journal*, *9*(2), 223–246. https://doi.org/10.22460/infinity.v9i2.p223-246

Purnomo, Y. W., Nabillah, R., Aziz, T. A., & Widodo, S. A. (2024). Fostering mathematical connections and habits of mind: A problem-based learning module for elementary education. *Infinity Journal*, *13*(2), 333–348. https://doi.org/10.22460/infinity.v13i2.p333-348

Putra, R. W. Y., Sunyono, Haenilah, E. Y., Hariri, H., Sutiarso, S., Nurhanurawati, & Supriadi, N. (2023). Systematic literature review on the recent three-year trend mathematical representation ability in Scopus database. *Infinity Journal*, *12*(2), 243–260. https://doi.org/10.22460/infinity.v12i2.p243-260

Putri, L. I., Retnawati, H., Jaedun, A., Murfi, A., & Atymtaevna, G. B. (2025). Enhancing mathematical skills through multicontextual approaches: A meta-analysis of realistic mathematics, ethnomathematics, and technology integration. *Cogent Education*, *12*(1), Article 2548648. https://doi.org/10.1080/2331186X.2025.2548648

Seloane, M. P., Ramaila, S., & Ndlovu, M. (2025). Harnessing GeoGebra as a modelling tool to mitigate undergraduate engineering mathematics students' misconceptions and errors associated with complex numbers. *Pythagoras*, *46*(1), Article 825. https://doi.org/10.4102/pythagoras.v46i1.825

Septianisha, N. I., Azizah, D., & Asamoah, D. B. (2024). Application of the RME approach on concept understanding ability and students' mathematics problem solving. *Journal*

Focus Action of Research Mathematic (Factor M), *6*(2), 92–111. https://doi.org/10.30762/f m.v6i2.1394

Sinurat, S. W., Napitupulu, E. E., & Mulyono, N. (2021). Meta-analysis of the influence of problem-based learning model on mathematic problem solving ability. *American Journal of Educational Research*, *9*(9), 566–570. https://doi.org/10.12691/education-9-9-2

Siswantari, Sabon, S. S., Listiawati, N., Wirda, Y., Zulkardi, & Riyanto, B. (2025). Bridging mathematics and communication: Implementing realistic mathematics education principles for skill development. *Journal on Mathematics Education*, *16*(2), 729–752. https://doi.org/10.22342/jme.v16i2.pp729-752

Siswanto, R. D., Kusumah, Y. S., Dasari, D., Juandi, D., Hendriyanto, A., & Bayuaji, L. (2025). Integrating realistic mathematics education (RME) in e-comic media: A novel approach to foster mathematical creativity. *Journal of Educational Technology and Learning Creativity*, *3*(2), 367–380. https://doi.org/10.37251/jetlc.v3i2.2492

Suparatulatorn, R., Jun-On, N., Hong, Y. Y., Intaros, P., & Suwannaut, S. (2023). Exploring problem-solving through the intervention of technology and realistic mathematics education in the calculus content course. *Journal on Mathematics Education*, *14*(1), 103–128. https://doi.org/10.22342/JME.V14I1.PP103-128

Susilawati, W., Sharov, S., Pasqa, M., & Malik, H. (2025). Integrating realistic mathematics education, AI, and gamification to enhance students' learning motivation and problem-solving skills. *Journal on Mathematics Education*, *16*(4), 1257–1282. https://doi.org/10.22342/jme.v16i4.pp1257-1282

Tong, D. H., Nguyen, T. T., Uyen, B. P., Ngan, L. K., Khanh, L. T., & Tinh, P. T. (2022). Realistic mathematics education's effect on students' performance and attitudes: A case of ellipse topics learning. *European Journal of Educational Research*, *11*(1), 403–421. https://doi.org/10.12973/EU-JER.11.1.403

Trung, N. T., Thao, T. P., Trung, T., Rifandi, R., Mulyati, A., Rani, M. M., & Al Aziz, S. (2021). Pre-service mathematics teachers' perception on realistic mathematics education. *Journal of Physics: Conference Series*, *1940*(1), Article 012101. https://doi.org/10.1088/1742-6596/1940/1/012101

Turgut, M., Smith, J. L., & Andrews-Larson, C. (2022). Symbolizing lines and planes as linear combinations in a dynamic geometry environment. *Journal of Mathematical Behavior*, *66*, Article 100948. https://doi.org/10.1016/j.jmathb.2022.100948

Van den Heuvel-Panhuizen, M., & Drijvers, P. (2020). Realistic mathematics education. In *Encyclopedia of mathematics education* (pp. 713–717). Springer. https://doi.org/10.1007/978-3-030-15789-0_170

Vrasetya, A., & Noperta. (2026). Integrating mathematics with culture: Implementation of a hypothetical learning trajectory using traditional lapik pandan from Koto Dian. *Journal Focus Action of Research Mathematic (Factor M)*, *9*(1), 20–42. https://doi.org/10.30762/f m.v9i1.6598

Wanabuliandari, S., Sumaji, S., Ulya, F. F., Ardianti, S. D., & Ghozali, M. I. (2025). Increasing mathematical logical intelligence through RME model assisted by DIMSMOVE based on local excellence on the north coast of Java, Indonesia for students with intellectual disabilities. *Journal of Curriculum and Teaching*, *14*(3), 229–236. https://doi.org/10.5430/jct.v14n3p229

Wardono, Mariani, S., & Kurniati, C. N. (2021). Mathematics literacy abilities and responsibility with realistic mathematics education learning based ethnomathematics. *Journal of Physics: Conference Series*, *1918*(4), Article 042059. https://doi.org/10.1088/1742-6596/1918/4/042059

Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research*, *39*(1), 93–112. https://doi.org/10.1177/0739456X17723971

Zulkardi, Putri, R. I. I., & Wijaya, A. (2020). Two decades of realistic mathematics education in Indonesia. In M. van den Heuvel-Panhuizen (Ed.), *International reflections on the Netherlands didactics of mathematics* (pp. 325–340). Springer. https://doi.org/10.1007/978-3-030-20223-1_18

Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2026 Nanang Nabhar Fakhri Auliya, Scolastika Mariani, Bambang Eko Susilo. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution, or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution, or reproduction is permitted that does not comply with these terms.