BIBLIOMETRIC ANALYSIS: TRENDS IN STUDIES ON REALISTIC MATHEMATICS EDUCATION LEARNING TO ENHANCE MATHEMATICAL REASONING ABILITIES

Risantika[1], Effie Efrida Muchlis[2*], Anny Sovia[3], Edi Susanto[4], Ringki Agustinsa[5]

[1,2,4,5]Departement of Mathematics Education, Universitas Bengkulu, Bengkulu, Indonesia
[3]Departement of Mathematics Education, Universitas Negeri Jakarta, Jakarta, Indonesia
*Correspondence: effie_efrida@unib.ac.id

ABSTRACT

Mathematical reasoning is an important aspect of mathematics education that involves logical thinking, problem analysis, and drawing conclusions based on existing data. Realistic Mathematics Education (RME) connects mathematical concepts with real situations that train students' logical thinking so that reasoning skills tend to improve. Therefore, it is important to analyze the development of RME research on reasoning skills. This analysis presents a bibliometric analysis of the literature on RME-based learning to improve mathematical reasoning, using data from Google Scholar accessed through the Publish Or Perish software and analyzed with the help of VOSViewer software. Through keyword searches for "RME" and "Mathematical Reasoning", 167 relevant documents were analyzed based on performance analysis, citation metrics, co-words, and co-authorship networks. The analysis reveals that publications on RME-based learning to improve reasoning skills have increased recently, although from 2008 to 2016 it was less than 4 per year. Indonesia has made significant contributions to RME research, with many of its authors actively involved in this field. The analysis identifies recent trends in advancing reasoning skills, including exploring topics such as the use of technology, media integration, hybrid learning models, and various approaches in RME-based teaching. In addition, this analysis highlights the potential for further research on the use of student worksheets as a widely applied learning medium in RME-based education to improve mathematical reasoning.
Keywords: Bibliometric, RME-Based Learning, Reasoning Ability, VOSViewer

PRELIMINARY

Mathematics, as the study of numbers and the interconnected science of logic, is categorized into three primary domains: algebra, analysis, and geometry (Yolanda et al., 2019). Its objectives include developing the ability to understand mathematical concepts, explain the relationships between them, and apply these concepts or algorithms with flexibility, accuracy, efficiency, and precision in problem-solving contexts (Kholifah et al., 2021). Within mathematics education, the discipline includes the practice of teaching and learning mathematics, complemented by scientific research in the field. The main aim of mathematics education is to help students gain a solid understanding of mathematical

concepts, build critical thinking skills, and apply mathematical knowledge in everyday life (Yudha, 2019), mathematics makes to carry out various activities (Khalifah et al., 2023).

As technology and scientific advancements continue to evolve, mathematics education has incorporated innovative approaches such as Realistic Mathematics Education (RME) and Contextual Learning (Muah, 2022). RME, developed in the Netherlands during the 1970s by Hans Freudenthal and his team at the Freudenthal Institute, highlights the importance of connecting mathematical instruction to real-world contexts that are relevant to students' lives (Aini, 2017; Ardianingsih et al., 2020). This approach aims to make mathematics more engaging and meaningful, helping students recognize its practical uses in everyday scenarios (Ericko & Musdi, 2018).

The implementation of RME-based learning has shown significant positive effects on students' mathematical reasoning abilities. Research shows that students taught using the RME approach develop a deeper and more practical understanding of mathematical concepts compared to those taught using traditional methods (Ariati et al., 2022). For example, a study conducted at State Senior High School 1 Lahat found that integrating RME significantly improved student performance. Additionally, RME supports the development of critical and analytical thinking skills, as well as collaboration and problem-solving abilities (Desvita, 2020).

Further studies emphasize that RME improves students' critical thinking skills within interactive and collaborative learning environments (Maulia et al., 2023). A meta-analytical investigation confirms these findings, revealing that RME significantly enhances mathematical reasoning, with an effect size (ES) of 0.736, equating to a 74% improvement (Sari et al., 2024). These outcomes show that RME not only helps students understand mathematical concepts more effectively but also strengthens their reasoning and problem-solving abilities.

Recent bibliometric analyses indicate an increasing adoption of RME across various educational levels. These studies suggest that RME has a moderate yet significant impact on improving students' mathematical problem-solving skills (Widana, 2021). In Indonesia, a bibliometric review of RME research highlights its substantial contributions to improving the quality of mathematics education. This analysis also identifies emerging trends in RME-related research, reflecting its growing acceptance among educators worldwide (Fitriyah & Dasari, 2023).

The range of RME research has expanded beyond single aspects, demonstrating its potential to improve the overall quality of mathematics education. These findings align with

broader studies that highlight RME's key role in preparing students for 21st-century challenges, particularly through the development of real-world problem-solving skills (Widana, 2021).

Mathematical reasoning is a fundamental component of mathematics education, encompassing the ability to think logically, analyze problems, and draw conclusions from available data. It is often considered an essential indicator of success in understanding and solving mathematical problems (Marfu'ah et al., 2022). Consequently, there is a strong relationship between Realistic Mathematics Education (RME) and mathematical reasoning. However, research focusing on how RME enhances reasoning skills remains relatively underexplored. A study by Risma Yanti Anggani highlighted that the application of RME to improve reasoning skills has received limited attention in Indonesia's mathematics education literature (Yanti Anggani et al., 2019). This gap presents an opportunity for new studies that examine RME's impact on reasoning, while also considering insights from existing research. Literature reviews serve as an effective tool for researchers to identify trends, recognize knowledge gaps, and ensure that new investigations contribute original insights rather than duplicating prior work (Yam, 2024). To this end, bibliometric analysis is a critical method for producing research that is both innovative and impactful.

Bibliometric analysis is a quantitative research method that utilizes bibliographic data to evaluate and analyze scientific publications, citations, and research patterns in a particular field. This approach involves collecting and processing data from diverse sources to uncover research trends, collaboration networks, and the influence of publications (Donthu et al., 2021). It is widely applied to study the characteristics of academic outputs, including journal articles and conference proceedings. Beyond the natural sciences, bibliometric methods have been applied to social sciences, health sciences, management and business, as well as environmental and earth sciences (Angraini & Muhammad, 2023).

In the context of RME, bibliometric analyses have offered valuable insights into research trends within mathematics education. For example, a study by Lilis Angraini and Ilham Muhammad (2023) found that RME's focus on realistic problem contexts was particularly effective for online learning during the pandemic. Their analysis also identified a growing integration of RME with digital technologies to enhance student outcomes (Angraini & Muhammad, 2023). Another bibliometric study, examining RME research in Indonesia from 2012 to 2023, revealed a significant increase in related publications, collaborations among researchers, and three primary research clusters: RME, learning outcomes, and mathematics. Key research topics included conceptual understanding,
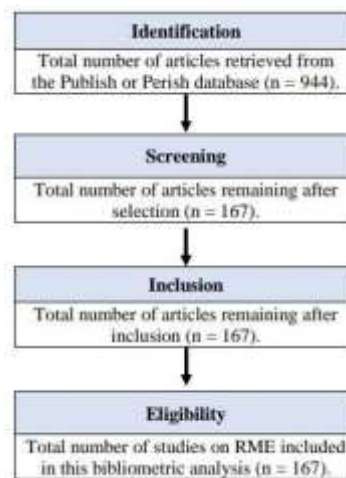
problem-solving, communication, critical thinking, and reasoning. The study also noted that most research activity occurred in Sumatra and Java, with the journal *Aksioma* recognized as the most influential publication outlet in this area (Fitriyah & Dasari, 2023).

This bibliometric analysis focuses specifically on examining the development of RME research aimed at improving mathematical reasoning skills. In addition, it also presents new research opportunities along with reference sources that can be used in the research to be carried out. By concentrating on this particular aspect, this study seeks to provide a clearer understanding of RME's contribution to developing reasoning skills which are essential in mathematics education.

METHODS

This study utilizes a bibliometric analysis to examine reference data from articles across various journals, employing a quantitative approach. Bibliometric analysis serves as a valuable tool for measuring and evaluating different facets of scientific literature, such as author productivity, journal impact, and citation patterns (Jalinur, 2024). This method enables researchers to identify research trends, evaluate the productivity and impact of scholarly works, and track metrics such as publication counts, citation frequencies, and h-index scores (Herawati et al., 2022). Conducting bibliometric research involves a systematic process of collecting, analyzing, and interpreting bibliographic data (Eck & Waltman, 2014). The bibliometric analysis in this study was conducted through a series of structured procedures. The initial stage involved gathering documents and publications pertinent to the research topic. This process aimed to capture relevant publications through the use of comprehensive keywords to ensure precise results. he data used in this analyze was taken from publications on Google Scholar as a database with a wide scope and supports cross-disciplinary research (Umami et al., 2024). Data were collected from Google Schoolar database via the Publish or Perish software, using the keywords "RME" and "Reasoning Ability" concurrently. Only documents published between 2000 and 2023 were included in the search, because research related to RME has grown rapidly since the beginning of 2000 (Prahmana et al., 2020). In addition, the 2000 to 2023 range provides sufficient data to analyze trends and understand how RME is adapting to curriculum changes. From the search, 944 publications were obtained, covering national and international sources. Subsequently, a selection process was implemented to identify documents aligning with the research objectives: publications that address both RME and reasoning ability within a single document, without imposing restrictions on study subjects within the selected documents.

This selection resulted in 167 relevant documents, encompassing both Indonesian and international sources. The figure below illustrates the stages involved in acquiring the relevant documents for this research.

Identification
Total number of articles retrieved from the Publish or Perish database (n = 944).

Screening
Total number of articles remaining after selection (n = 167).

Inclusion
Total number of articles remaining after inclusion (n = 167).

Eligibility
Total number of studies on RME included in this bibliometric analysis (n = 167).

(Fitriyah & Dasari, 2023)

Figure 1. Document Selection Process

Once relevant publications have been identified, the selected documents undergo data analysis and interpretation through various methods, including performance analysis, co-word analysis, citation analysis, and author network analysis. The findings are then visualized as tables, graphs, or figures using specialized software to enhance readability and facilitate comprehension. For metadata analysis and visualization, this study utilizes VosViewer, a tool that assesses documents based on bibliographic associations—such as geographical location, journal, institution, author, and the co-occurrence of keywords—presented through network visualizations (Herawati et al., 2022). Additionally, narrative interpretations accompany these visualizations to elucidate key trends and insights from the VosViewer analysis, highlighting significant findings (Fitriyah & Dasari, 2023).

As previously described, this study's data analysis and interpretation encompass several distinct types of analyses. Performance analysis examines the annual publication trends on the topic, assessing the pace of its development. Citation analysis measures how frequently articles within the selected documents are cited as references in other works (Muhammad & Triansyah, 2023). Co-authorship analysis maps relationships among authors, identifying collaborative networks and influential groups within the field. Co-word analysis, on the other hand, explores associations between terms found in the titles, abstracts, and keywords of the selected documents (Farida, 2020). Both co-authorship and co-word analyses are conducted using VosViewer, which generates network, overlay, and density visualizations to represent the analysis results.

RESULTS AND DISCUSSION

The collection of publications on Realistic Mathematics Education (RME) with a focus on enhancing reasoning skills, both in Indonesia and internationally, resulted in 167 relevant publications from the period 2000 to 2023. These publications were sourced from the Publish or Perish database and subsequently selected for further analysis using the VosViewer software. Additionally, Microsoft Excel was utilized to facilitate the extraction of supplementary information required for this study.

1. Performance Analysis

The performance analysis assesses the evolution of publications and citations related to RME's role in improving reasoning skills. Although the initial search in the Publish or Perish database encompassed publications from 2000 to 2023, screening and selection revealed that the earliest relevant study on RME's impact on reasoning skills appeared in 2010. This study, conducted by Yumiati and Tarhadi, is titled "The Impact of Implementing a Realistic Mathematics Model on Enhancing Deductive Reasoning Skills of Middle School Students in Parung, Bogor District."

This observation is consistent with prior research, which indicates that studies on RME from 2000 to 2010 were primarily concerned with other skill areas, such as problem-solving, mathematical connections, critical and creative thinking, and collaboration (Son et al., 2020).

Table 1. Number and Percentage of Publications on RME Aimed at Improving Reasoning Skills (2008–2023)

No	Year of Publication	Number of Publications	Percentage
1	2008	2	1,2%
2	2009	1	0,6%
3	2010	1	0,6%
4	2011	1	0,6%
5	2012	0	0,0%
6	2013	3	1,8%
7	2014	0	0,0%
8	2015	3	1,8%
9	2016	0	0,0%
10	2017	7	4,2%
11	2018	9	5,4%
12	2019	19	11,4%
13	2020	23	13,8%
14	2021	56	33,5%
15	2022	14	8,4%
16	2023	28	16,8%
	Total	167	100,0%

Between 2010 and 2016, research on Realistic Mathematics Education (RME) with a focus on improving reasoning skills was sparse, with no publications on this topic appearing in 2012, 2014, or 2016. From 2017 to 2021, however, publications on RME's role in enhancing mathematical reasoning began to increase markedly, reaching a peak of 56 documents in 2021. In 2022, the number of publications declined sharply by 75%, with only 14 publications, but this number rebounded to 28 in 2023.

This trend corresponds with broader analyses of RME research in mathematics education, which indicate an increase in RME studies during the pandemic, particularly those focused on adapting instructional methods for online learning (Angraini & Muhammad, 2023). The growth trajectory of RME publications aimed at enhancing reasoning skills from 2008 to 2023 is depicted in the line graph below.
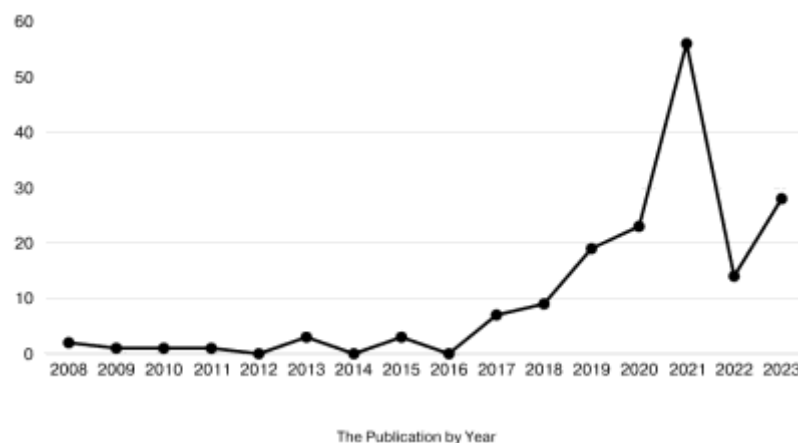

The Publication by Year

Figure 2. Growth of RME Research Publications Aimed at Enhancing Reasoning Skills

2. Citation Analysis

This analysis aims to identify key documents that have significantly contributed to the field of RME, particularly in enhancing mathematical reasoning skills. One such influential document is titled "Improving the Reasoning Ability of Elementary School Students through the Indonesian Realistic Mathematics Education," authored by Muhamad Saleh, Rully Charitas Indra Prahmana, Muhammad Isa, and Murni. This paper has an H-index and has been cited 202 times since its publication in 2018.

Prof. Dr. Muhamad Saleh, a leading figure in mathematics education, is well-known for his contributions to the development of Realistic Mathematics Education (RME) in Indonesia (Saleh et al., 2017). Dr. Muhammad Isa, an academic and researcher in mathematics education, also contributed to this field. Prof. Dr. Rully Charitas Indra Prahmana, S.Si., M.Pd., a professor at the Department of Mathematics Education at

Universitas Ahmad Dahlan (UAD), Yogyakarta, has research interests in Ethnomathematics, Design Research, and Realistic Mathematics Education.

The paper was published in the Journal on Mathematics Education (IndoMS-JME), a journal co-published by Universitas Sriwijaya and the Indonesian Mathematical Society (IndoMS). This journal is indexed in Scopus (Q1) and had a CiteScore of 4,700 in 2022. Bibliometric analysis and various studies highlight Indonesia as the leading country in RME research, evidenced by the substantial number of articles published in Indonesian mathematics education journals, such as Journal on Mathematics Education (IndoMS-JME), as well as national seminar proceedings (Tamur et al., 2020).

Of the 167 documents analyzed, these publications were dispersed across a variety of journals. The following table lists the top 10 journals that published the most RME-related documents.

Table 2. Journals with the Highest Number of Publications from the 167 Analyzed Documents

No	Journal Name	Number of Documents
1	Jurnal Pendidikan Matematika Universitas Sriwijaya	6
2	Journal on Mathematics Education UNESA	6
3	Mosharafa: Jurnal Pendidikan Matematika	5
4	AKSIOMA: Jurnal Program Studi Pendidikan Matematika	5
5	Jurnal Riset Pendidikan Matematika UNY	5
6	Journal of Mathematics Education UNNES	5
7	Jurnal MathEdu (Mathematic Education Journal)	4
8	ZERO: Jurnal Sains, Matematika Dan Terapan	4
9	UNNES Journal of Mathematics Education Research	4
10	Jurnal Pendidikan Guru	3

The data indicates that Jurnal Pendidikan Matematika and Journal on Mathematics Education are the most frequent publishers, each with six documents. Jurnal Pendidikan Matematika (JPM) is published by Universitas Sriwijaya in collaboration with the Indonesian Mathematical Society (IndoMS). JPM has been indexed in Scopus since June 2024 and holds a Sinta 2 accreditation. On the other hand, Journal on Mathematics Education (JME) is a peer-reviewed journal focusing on mathematics education research, published by Universitas Negeri Surabaya in collaboration with IndoMS. JME has been indexed in Scopus since 2020 and holds a Sinta 1 accreditation. In 2020, JME achieved a CiteScore of 4.300 and has accumulated 12,402 citations over the past five years.

3. Co-Authorship Analysis

The third analysis aims to explore the social interactions among authors involved in research on RME (Realistic Mathematics Education) focused on enhancing reasoning skills. To conduct this analysis, we selected authors who had published at least two documents. This resulted in the identification of 29 authors, some of whom are interconnected, while others are not (see Figure 3).

Figure 3. Co-authorship Network Visualization

As depicted in Figure 3, the 29 authors are grouped into several clusters. The red cluster consists of Fauzan, A., Arwana, I., Ulfah, A. S., Yerizon, Y., and Permana, D., whose research examines the impact of the RME approach on mathematical problem-solving skills and compares its effectiveness to other approaches. The blue cluster includes Prahamana, R. C. I., Isa, M., and Saleh, M., who focus on the effectiveness of RME in enhancing students' mathematical understanding and skills, as well as how RME can foster better mathematical abilities through a realistic and contextual approach. The green cluster includes Pratiwi, D. D., Mujib, M., and Apriani, D., whose work investigates the application of RME to improve students' learning outcomes in mathematics and how it facilitates a deeper understanding of mathematical concepts, ultimately enhancing critical thinking skills. In the fluorescent blue cluster, Juandi, D., and Ariati, C. conduct meta-analyses to review various studies, particularly those addressing the improvement of problem-solving abilities. The orange cluster comprises Putri, R. I. I., and Zulkardi, Z., who explore the influence of RME on conceptual understanding. The yellow cluster consists of Tong, D. H., Ngan, L. K., and Uyen, B. P., who focus on the development of e-modules related to RME. The purple cluster includes Subiyantoro, S., and Ardiniyawan, D. Y., while the

brown cluster is made up of Pramusinta, N., and Rejeki, S. Other authors, such as Palinussa, A. L., Purwadi, I. M. A., Sulianto, J., Armiati, A., Urrohmah, A., Ndiung, S., and Andresen, M., are placed in separate clusters, indicating they are solo authors in their respective RME publications. Specifically, Palinussa, A. L. investigates the impact of RME on critical thinking and mathematical communication skills, Purwadi, I. M. A. links RME with the Concrete-Pictorial-Abstract (CPA) strategy, Armiati, A. studies RME's effect on problem-solving, Urrohmah, A. examines RME's influence on reasoning skills, and Ndiung, S. explores how RME principles relate to the Treffinger learning mode.
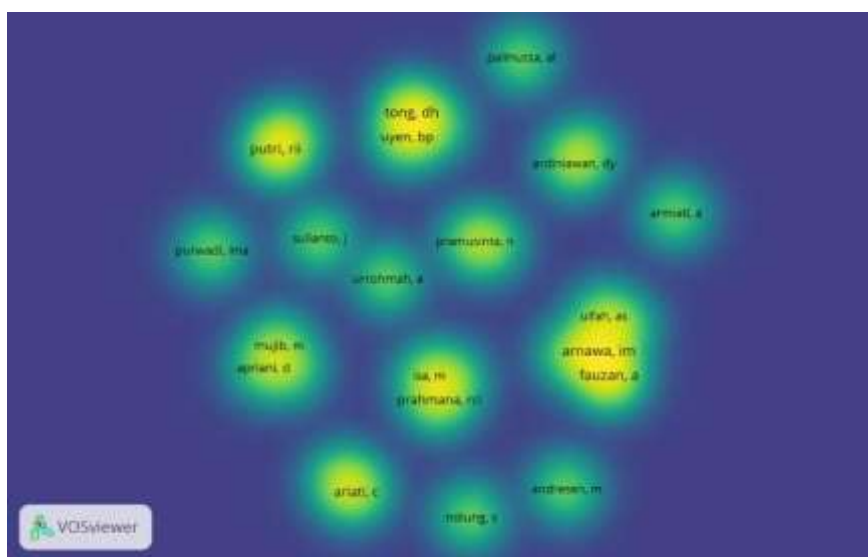

Figure 4. Density Visualization of Co-Authorship Analysis at the Author Level

A review of the most productive researchers based on reference manager data, with a minimum threshold of two publications per author, reveals that authors in the red cluster are among the most prolific in disseminating research findings. According to Google Scholar data, Ahmad Fauzan, a prominent researcher in mathematics education at Universitas Negeri Padang, has published over 100 scholarly works on Realistic Mathematics Education (RME). Many of Fauzan's publications in RME are collaborative efforts with researchers both within Indonesia and internationally, including notable scholars like Tjeerd Plomp and Koeno Gravemeijer.

I Made Arwana, a mathematics professor at Universitas Andalas Padang, has published over 40 works, with 15 specifically focused on RME. Atikah Suryani Ulfah has produced approximately 5-10 publications related to RME, while Yerizon Y, also affiliated with Universitas Negeri Padang (UNP), has contributed more than 20 articles on RME. Yerizon Y, a professor of mathematics education with both a Ph.D. and M.Si. in mathematics

education, is recognized for his significant contributions to RME-centered mathematics instruction and research**.**

4. Co-Word Analysis

This analysis highlights and explores frequently occurring keywords associated with Realistic Mathematics Education (RME) research, specifically in studies aimed at enhancing mathematical reasoning skills. It provides a comprehensive view of keyword trends from 2008 to 2023. Keywords with a minimum occurrence threshold of three were selected, resulting in 67 interconnected terms that reveal common themes and areas of focus in the field.
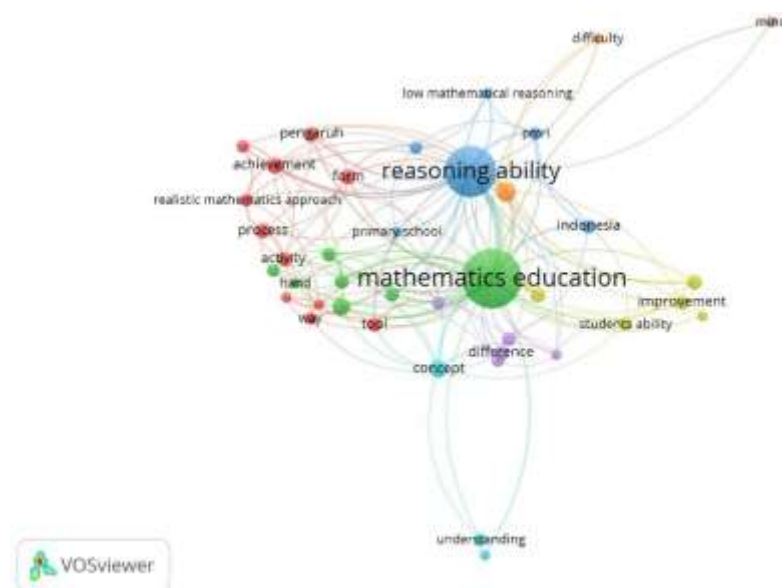

Figure 5. Network Visualization of the Most Frequent Co-Words in RME Research on Enhancing Mathematical Reasoning Skills

Figure 5 highlights several key topics that could serve as valuable focal points for writing or conducting research related to Realistic Mathematics Education (RME). When a network visualization with "mathematics education" as the central term, this analysis reveals direct connections between mathematics education and terms such as RME, mathematical problems, mathematical concepts, reasoning skills, low reasoning ability, influence, PMRI, mathematical reasoning skills, challenges, thinking, communication skills, improvement, application, effectiveness, implementation, testing, issues, and Indonesia. Then the focus shifts to "reasoning ability" as the central node, reasoning ability is closely linked to terms including mathematical reasoning ability, RME, processes, influence, low reasoning ability, mathematics education, impact, challenges, effectiveness, application, testing, elementary education, PMRI, and Indonesia. Next "Realistic

Mathematics Education" (RME) is the central focus, the key terms associated with RME include importance, achievement, effectiveness, practical application, case studies, reasoning ability, mathematics education, mathematical reasoning ability, and concepts. This network provides insight into the themes and connections that are central to RME research. Last, when centers on "mathematical reasoning ability" and illustrates its direct connections to mathematics education, reasoning skills, testing, Realistic Mathematics Education (RME), concepts, and applications.

This data suggests that, while RME has engaged with mathematical reasoning in at least three related documents, the specific media or innovations applied within RME to enhance mathematical reasoning, particularly in the context of mathematical reasoning ability, remain largely unexplored. Furthermore, studies on RME and reasoning development have not yet established direct connections with the use of LKPD (Student Worksheets) and educational technologies—recent innovations in contemporary education. This observation aligns with the findings of Lilis Marina Angraini and Ilham Muhammad (2023), who reported that while RME frequently appears in mathematics education research, its connections to other key concepts, such as LKPD, are underrepresented (Angraini & Muhammad, 2023).
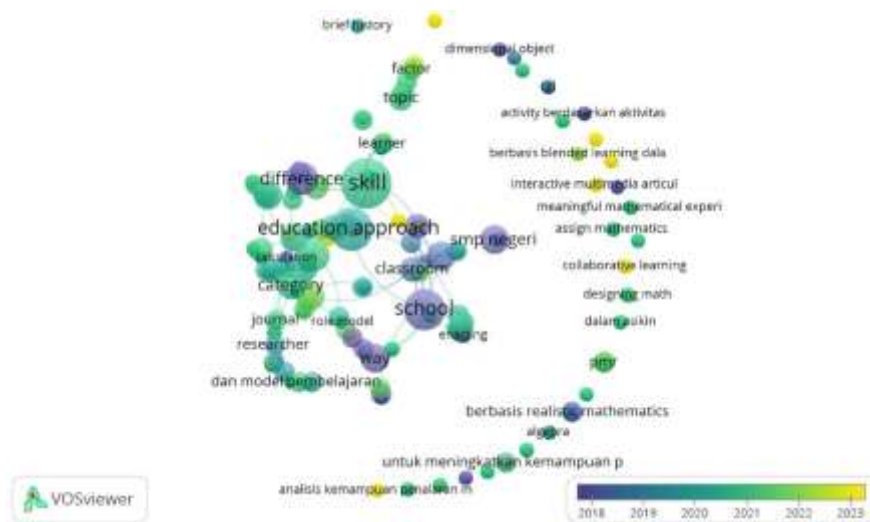

Figure 6. Overlay Visualization of the Most Common Co-Word Analysis for RME in Reasoning Skill Development

Further analysis using overlay visualization identified recently emerging keywords, as depicted in Figure 6, with a minimum occurrence of one per keyword. This analysis reveals several new terms in RME research related to reasoning enhancement, including "mathematics animation video," "collaborative learning," "blended learning,"

"development research," "design research," "interactive multimedia," "Freudenthal," "creation," "brain," "religious values," "Aliyah student," "five fundamental principles," "quadrilateral material," and "calculator." These keywords can be organized into broader categories for further examination.

The reference to "Freudenthal" pertains to Hans Freudenthal, a Dutch mathematician who pioneered the RME theory, which later led to PMRI (Indonesian Realistic Mathematics Education), a culturally adapted version developed by Professor Dr. Suyanto. This focus in recent years on PMRI is evident in research on RME. For instance, a chapter in Two Decades of Realistic Mathematics Education in Indonesia by Zulkardi, Ratu Ilma Indra Putri, and Aryadi Wijaya details the adaptation of RME within the Indonesian context, including various PMRI implementation strategies. Moreover, concerning instructional media, "mathematics animation video," "interactive multimedia," "quadrilateral material," and "calculator" represent technology-integrated resources. The application of technology in learning has demonstrated positive impacts, including improved conceptual understanding, personalized learning experiences, enhanced motivation and engagement, and opportunities for collaborative learning (Hattie, 2022). Research from the past five years also indicates that integrating technology within RME not only increases student engagement but also facilitates a deeper comprehension of mathematical concepts (Gusteti et al., 2023). As Gravemeijer notes in Developing Realistic Mathematics Education, technology can support discovery-based learning—a key RME principle (Romo Vázquez, 2015). Additionally, recent studies increasingly utilize blended learning and collaborative learning models within RME. Design and development research methodologies have also emerged as significant approaches in RME studies over the last two years.

CONCLUSION

An analysis of 167 relevant documents on RME with the aim of enhancing mathematical reasoning skills, conducted via bibliometric analysis, indicates the development of publications in this field from 2008 to 2016 less than 4 publications per year, followed by an increase from 2017 to 2021, though a decrease in publication rates occurred in 2022. Indonesia has been a major contributor to RME research from 2008 to 2023, particularly in advancing RME through PMRI, which integrates cultural elements. Indonesian authors have been notably influential in RME research output. Recent studies reveal that technology-based media, as well as blended and collaborative learning models, have been applied to support reasoning skill development in RME. Design and development

research methodologies have similarly supported RME-based learning. This study suggests that future research should further explore emerging RME topics, such as technology, media, instructional models, and alternative learning approaches. Additionally, investigating the role of LKPD a widely used educational medium in enhancing mathematical reasoning within RME would align with the recommendations of prior research.

REFERENCES

Aini, N. N. (2017). Model Realistic Mathematics Education Dalam Pembelajaran Matematika Di Sekolah Dasar. *Jurnal Educatio FKIP UNMA*, *3*(2), 72–78. https://doi.org/10.17509/jpp.v24i1.69278

Angraini, L. M., & Muhammad, I. (2023). Analisis Bibliometrik: Tren Penelitian RME dalam Pembelajaran Matematika selama Pandemi. *JNPM (Jurnal Nasional Pendidikan Matematika)*, *7*(2), 224. https://doi.org/10.33603/jnpm.v7i2.7817

Ardianingsih, A., Lusiyana, D., & Rahmatudin, J. (2020). Penerapan Pembelajaran Realistic Mathematic Education Berbasis Etnomatematika Untuk Meningkatkan Hots Matematik Siswa. *MATHLINE Jurnal Matematika Dan Pendidikan Matematika*, *4*(2), 148–161. https://doi.org/10.31943/mathline.v4i2.117

Ariati, C., Anzani, V., Juandi, D., & Hasanah, A. (2022). Meta-Analysis Study: Effect of Realistic Mathematics Education Approach on Student'S Mathematical Literacy Ability. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *11*(4), 2953. https://doi.org/10.24127/ajpm.v11i4.6182

Desvita, N. A. (2020). Penerapan Model Pembelajaran Realistic Mathematical Education (RME) untuk Meningkatkan Kerjasama dan Prestasi Belajar Siswa. *DIADIK: Jurnal Ilmiah Teknologi Pendidikan*, *10*(1). https://doi.org/10.31949/diadik.v5i2.622

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*(May), 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Eck, N. J. Van, & Waltman, L. (2014). Measuring Scholarly Impact. In *Measuring Scholarly Impact*. https://doi.org/10.1007/978-3-319-10377-8

Ericko, R., & Musdi, E. (2018). Pengaruh Pendekatan Realistic Mathematics Education (RME) Terhadap Kemampuan Pemahaman Konsep Matematika Peserta Didik. *Jurnal Edukasi Dan Penelitian Matematika*, *7*(4), 134–139. https://doi.org/10.35480/jepmat.v7i4.5581

Farida, N. (2020). Analisis bibliometrik berdasarkan pendekatan Co-word : Kecenderungan penelitian bidang kearsipan pada Jurnal Khazanah dan Journal of Archive and Record tahun 2016 – 2019. *Khazanah: Jurnal Pengembangan Kearsipan*, *13*(2), 91. https://doi.org/10.22146/khazanah.55690

Fitriyah, Y., & Dasari, D. (2023). Analisis Bibliometrik: Tren Realistic Mathematics Education dalam Pembelajaran Matematika di Indonesia (2012-2023). *Sustainable Jurnal Kajian Mutu Pendidikan*, *6*(2), 469–481. https://doi.org/10.32923/kjmp.v6i2.3914

Gusteti, M. U., Rahmalina, W., Azmi, K., Wulandari, S., Mulyati, A., Hayati, R., Wahyuni, Z., Alfath, M. R., & Azizah, N. (2023). Geogebra: Transformasi Teknologi yang Menyulap Pembelajaran Matematika menjadi Lebih Menyenangkan. *Jurnal Pengabdian Kepada Masyarakat Nusantara (JPkMN)*, *4*(4), 3695–3704. https://doi.org/10.55338/jpkmn.v4i4.1866

Hattie, J. (2022). *Visible Learning A Synthesis Of Over 800 Meta-Analysis Relating To Achievement* (Vol. 16, Issue 1). Routledge.

Herawati, P., Utami, S. B., & Karlina, N. (2022). Analisis Bibliometrik: Perkembangan Penelitian Dan Publikasi Mengenai Koordinasi Program Menggunakan Vosviewer. *Jurnal Pustaka Budaya*, *9*(1), 1–8. https://doi.org/10.31849/pb.v9i1.8599

Jalinur. (2024). Arsiparis dalam Era Digital : Analisis Bibliografi Tentang Perkembangan Arsiparis dalam Database Internasional Menggunakan Vosviewer. *Al-Kuttab: Jurnal Kajian Perpustakaan, Informasi Dan Kearsipan*, 17–28. https://doi.org/10.24952/ktb.v6i1.10377

Khalifah, S. M., Susanta, A., Sumardi, H., & Susanto, E. (2023). The influence of the problem-based learning model on the learning outcomes of seventh-grade students junior high school. *MATHLINE*, *10*(3), 771–784. https://doi.org/10.31943/mathline.v8i3.339

Kholifah, U., Hanifah, H., Siagian, T. A., & Utari, T. (2021). Analisis Soal Matematika Ujian Akhir Semester Ganjilditinjau Dari Aspek Kognitif Pada Siswa Kelas Vii Smp Ngeri 13 Mukomuko Tahun Ajaran 2019/2020. *Jurnal Penelitian Pembelajaran Matematika Sekolah (JP2MS)*, *5*(1), 99–110. https://doi.org/10.33369/jp2ms.5.1.99-110

Marfu'ah, S., Zaenuri, Masrukan, & Walid. (2022). Model Pembelajaran Matematika untuk Meningkatkan Kemampuan Penalaran Matematis Siswa. *PRISMA : Prosiding Seminar Nasional Matematika*, *5*, 50–54. https://doi.org/10.24114/prisma.v5i1.54339

Maulia, R. A., Chung, M.-L., & Okon, C. (2023). The Effect of Quiz Team Type Active Learning Methods on Student Learning Motivation. *Indonesian Journal of Education Research (IJoER)*, *4*(4), 75–79. https://doi.org/10.37251/ijoer.v4i4.703

Muah, T. (2022). Penerapan Pendekatan Pembelajaran Realistic Mathematics Education (RME) untuk Meningkatkan Hasil Belajar Matematika Materi Segiempat. *PAEDAGOGIA : Jurnal Penelitian Pendidikan*, *25*(2), 132. https://doi.org/10.20961/paedagogia.v25i2.64545

Muhammad, I., & Triansyah, F. A. (2023). *Panduan Lengkap Analisis Bibliometrik dengan VOSviewer: Memahami Perkembangan dan Tren Penelitian di Era Digital* (Kodri (ed.); 1st ed.). Penerbit Adab. https://www.google.co.id/books

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

Romo Vázquez, A. (2015). Enclyclopedia of Mathematics Education. In *Journal of Research in Mathematics Education* (Vol. 4, Issue 3). https://doi.org/10.17583/redimat.2015.1786

Saleh, M., Prahmana, R. C. I., Isa, M., & Murni, M. (2017). Improving the Reasoning Ability of Elementary School Student through the Indonesian Realistic Mathematics Education. *Journal on Mathematics Education*, *9*(1), 41–54. https://doi.org/10.22342/jme.9.1.5049.41-54

Sari, D. P., Fadiana, M., & Sumadi. (2024). Pembelajaran Realistic Mathematics Education (RME) Terhadap Pemahaman Konsep Matematika Siswa. *Jurnal Pendidikan Matematika*, *6*(1), 1151–1160. https://proceeding.unikal.ac.id/index.php/sandika/article/view/1757%0Ahttps://procee ding.unikal.ac.id/index.php/sandika/article/download/1757/1279

Son, A. L., Darhim, & Fatimah, S. (2020). Students' mathematical problem-solving ability based on teaching models intervention and cognitive style. *Journal on Mathematics Education*, *11*(2), 209–222. https://doi.org/10.22342/jme.11.2.10744.209-222

Tamur, M., Juandi, D., & Adem, A. M. G. (2020). Realistic Mathematics Education in Indonesia and Recommendations for Future Implementation: A Meta-Analysis Study. *JTAM / Jurnal Teori Dan Aplikasi Matematika*, *4*(1), 17. https://doi.org/10.31764/jtam.v4i1.1786

Umami, R., Asfiah, N., Nurhasanah, S., Mu'ammal, I., & Ramadhina, A. S. (2024). Bibliometric analysis: Creative behavior using the Google Scholar database. *International Journal of Business, Economics & Management*, *7*(1), 7–17. https://doi.org/10.21744/ijbem.v7n1.2240

Widana, I. W. (2021). Realistic Mathematics Education (RME) untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Siswa di Indonesia. *Jurnal Elemen*, *7*(2), 450–462. https://doi.org/10.29408/jel.v7i2.3744

Yam, J. H. (2024). Kajian Penelitian: Tinjauan Literatur Sebagai Metode Penelitian. *Jurnal Empire*, *4*(1), 61–70. https://doi.org/10.22342/jme.v4i1.10932

Yanti Anggani, R., Syaripudin, T., & Dyas Fitriani, A. (2019). Penerapan Model Pembelajaran Rme Untuk Meningkatkan Kemampuan Penalaran Matematis Siswa Kelas III Sd. *Jurnal Pendidikan Guru Sekolah Dasar*, *4*(3), 318–328. https://doi.org/10.22342/jpgsd.v4i3.10932

Yolanda, M., Yensy B, N. A., & Siagian, T. (2019). Efektivitas Lembar Kerja Siswa Dengan Pendekatan Kontekstual Di Smp Negeri 13 Bengkulu. *Jurnal Penelitian Pembelajaran Matematika Sekolah (JP2MS)*, *3*(3), 353–361.

Yudha, F. (2019). Peran Pendidikan Matematika Dalam Meningkatkan Sumber Daya Manusia Guna Membangun Masyarakat Islam Modern. *JPM: Jurnal Pendidikan Matematika*, *5*(2), 87.