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NUMERACY SKILLS AND SELF-CONFIDENCE FROM THE PERSPECTIVE OF INDONESIAN STUDENTS: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT The numeracy skills and self-confidence of students are two important and interrelated aspects in the mathematics learning process. This study aims to examine numeracy skills and self-confidence from the perspective of students. The method used is a systematic literature review (SLR), analyzing and selecting articles related to numeracy skills and self-confidence in mathematics education over the past five years (2019–2023) from the Google Scholar database. The review process followed the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) principles, with the aid of Publish or Perish (PoP) software. The results of this systematic literature review are: 1) There has been a positive trend in article publications over the last five years, with the highest number of publications in 2023, totaling 13 articles; 2) Numeracy skills, particularly from the perspective of initial abilities, were the most frequently discussed topic, found in 7 articles; 3) Self-confidence, from the perspective of student participation in the learning process, was the most common finding in 5 articles. Based on these results, it can be concluded that numeracy skills are crucial for the 21st century, and self-confidence is an essential skill needed by students to support their learning process.

Keywords: numeracy skills, self-confidence, systematic literature review, mathematics education.

ABSTRAK Kemampuan numerasi dan kepercayaan diri (self-confidence) siswa merupakan dua aspek penting yang saling berkaitan dalam pembelajaran matematika. Penelitian ini bertujuan untuk mengkaji kemampuan numerasi dan self-confidence dari perspektif siswa. Metode yang digunakan adalah systematic literature review (SLR) dengan analisis dan seleksi artikel yang berhubungan dengan kemampuan numerasi dan self-confidence dalam pembelajaran matematika selama lima tahun terakhir (2019–2023), yang diakses melalui database Google Scholar. Prinsip Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) digunakan dalam proses seleksi artikel, dengan bantuan perangkat lunak Publish or Perish (PoP). Hasil dari systematic literature review ini menunjukkan: 1) Tren publikasi artikel terkait meningkat secara signifikan selama lima tahun terakhir, dengan

jumlah publikasi terbanyak pada tahun 2023 (13 artikel); 2) Kemampuan numerasi siswa, terutama dilihat dari kemampuan awal, menjadi temuan terbanyak dengan 7 artikel; 3) Self-confidence dari perspektif siswa, terutama dalam hal partisipasi aktif dalam proses pembelajaran, menjadi temuan dominan dengan 5 artikel. Berdasarkan hasil kajian ini, disimpulkan bahwa kemampuan numerasi merupakan kompetensi esensial di abad ke-21, sedangkan self-confidence menjadi keterampilan yang krusial bagi siswa dalam mendukung proses pembelajaran.

Keywords: kemampuan numerasi, kepercayaan diri, SLR, pendidikan matematika.

INTRODUCTION

Learning mathematics is essential for students in today's digital era for several reasons, including the following: (1) problem-solving (mathematics trains critical and logical thinking skills, which are important for solving problems in various fields, including technology and computer science); (2) data understanding (mathematics helps students understand and analyze data more effectively, which is a highly valued skill in various industries); (3) development of technological skills (Many technologies such as big data analytics and computer programming are based on mathematical principles). Mathematics education is conducted in many countries to familiarize students with systematic, logical, and critical thinking (Isnaintri & Novaliyosi, 2024). This approach is very important because mathematics is not only focused on calculations but also on structured and analytical thinking. Some reasons why learning mathematics supports the development of these skills include: (1) systematic thinking (mathematics teaches students to follow orderly and logical steps in solving problems. This process helps students learn to organize their thoughts and apply effective methods to solve various types of problems); (2) logical reasoning (mathematics involves deductive reasoning, where students are taught to draw conclusions based on known premises. This teaches students to make logical arguments and support their conclusions with strong evidence); (3) critical thinking (through mathematics, students are confronted with various types of problems that require deep analysis and critical thinking. They must evaluate the information provided, recognize patterns, and decide on the best approach to solve the problems); (4) increased independence (as students learn to solve mathematical problems, they also learn to work independently and take responsibility for their thinking process). This helps them become more independent in problem-solving in various aspects of daily life.

The process of mathematics learning conducted by teachers for students aims for students to have mathematical skills in their future lives (Cynthia & Sihotang, 2023). One of the mathematical abilities is numeracy skills. Numeracy skills require logical intelligence. Mathematical logical intelligence has a positive influence on numeracy skills; the higher the level of mathematical logical intelligence, the higher the numeracy skills will be (Milati et al., 2023). The Program for International Student Assessment (PISA) is an international study conducted by the Organisation for

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Economic Co-operation and Development (OECD) to measure the abilities of 15-year-old students in various countries. One important aspect measured in PISA is numeracy and computation skills. Computation in the PISA (Program for International Student Assessment) refers to the ability to construct, solve, interpret mathematical problems, analyze, reason, and effectively communicate ideas, which can be developed through learning models. The Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) released the results of the PISA 2022.

The results of PISA 2022 show that Indonesia's literacy achievement ranking has risen by 5 to 6 positions compared to PISA 2018. This improvement is the highest ranking achievement (percentile) in the history of Indonesia's participation in PISA. The research conducted by Boangmanalu et al (2023) by using the Problem-Based Learning (PBL) model, the numeracy skills of seventh-grade students at Muhammadiyah 51 Sidikalang have improved. This is in line with the opinion of Andri Nurcahyono (2023) The learning models, namely (Problem-Based Learning, Discovery Learning, Project Based Learning, Inquiry Based Learning, Teams Games Tournament, Realistic Mathematics Education, Blended Learning), which involve problems that arise in everyday life, can be resolved, allowing that knowledge to be ingrained, thus creating meaningful learning.

The low numeracy skills of students in understanding mathematical problems may be caused by a lack of self-confidence, as self-confidence is an important trait that students must possess so they do not feel overwhelmed and are not afraid to solve mathematical problems (Setiawan et al., 2022). The self-confidence of students, whether low, moderate, or high, will affect their mathematical abilities. According to the research findings of Nugraha & Widiati (2023), Students with high self-confidence have a sufficient ability to think critically, where they can formulate the main issues and analyze algorithms. Students with self-confidence can lead them to increase participation, enjoy learning, reduce test anxiety, enhance interest in pursuing goals, grow comfortable with their teachers and classmates, and ultimately help them share their experiences and opinions in class (Akbari & Sahibzada, 2020). This is reinforced by Pratama's statement (2020) That the high numeracy skills of students in solving mathematical problems in everyday life are closely related to students' high and moderate self-confidence.

A student's perspective on mathematics will influence technical skills, but it is crucial for success in the workplace and in various aspects of life. This aligns with the statement that understanding students by listening to them express mathematical ideas will enhance their ability to develop creative ideas, enabling them to socialize within their communities (Ikashaum et al., 2020). According to Darmawan et al (2023) Numeracy training for students in analyzing numerical stimuli aims to enable students to draw conclusions about solutions to mathematical problems in everyday life. In addition, students' perspectives on learning mathematics, viewing difficulties as challenges and utilizing relevant resources, are part of students' independence in

learning mathematics (Aprillia et al., 2022). This is in line with the statement by Ginanjar & Fitriah (2022) Stating students' success in solving mathematical problems will evoke a sense of pride, which is a part of students' self-esteem. When they succeed in mathematics, it will encourage them to learn math out of their own desire.

Based on the explanation above, the author will conduct a systematic literature review regarding (1) How is the distribution of articles on numeracy skills and self-confidence in mathematics learning each year? (2) What are the perspectives of Indonesian students regarding numeracy skills in mathematics learning? (3) What are the perspectives of Indonesian students regarding self-confidence in mathematics learning? The perspectives of Indonesian students on numeracy skills include gender, methods/models, software (games/videos), teaching materials, and initial abilities in the mathematics learning process. Meanwhile, the perspectives of Indonesian students on self-confidence include increased student participation in the learning process, students becoming active in proposing ideas, and students becoming confident in their answers.

METHODS

The method used in this research is a systematic literature review. According to Synder (2019), a systematic literature review is a method and research process that involves identifying, critically assessing, collecting, and analyzing data from relevant studies to gather empirical evidence aimed at answering specific research questions or hypotheses. The initial step in this process involved searching for articles on numeracy skills and self-confidence, published between 2019 and 2023, in both English and Indonesian languages. These articles needed to be available in full-text format and specifically address numeracy skills and self-confidence from the students' perspective. The search for articles was conducted using the Publish or Perish (POP) software from May 26 to May 31, 2024.

This systematic literature review aimed to investigate numeracy skills and self-confidence from the perspective of students. The articles for the review were sourced from the Google Scholar database, and the keywords used were "mathematical numeracy skills" and "self-confidence." The selection process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Xu & Ouyang, 2022).

The article selection process can be summarized as follows:

- The first stage was identification, where a keyword search using POP software with the Google Scholar database yielded 200 results, from which 150 relevant articles were identified. From these, 100 articles were further filtered based on relevance to the research topic.

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- The second stage was screening, which involved limiting the selection to articles published between 2019 and 2023, resulting in 98 articles. Of these, 52 articles matched the keyword criteria.
- The third stage was eligibility, where 54 articles were available for full-text access.
- The final stage, inclusion, resulted in 24 articles being selected for analysis in the systematic literature review. The complete process of selecting articles is illustrated in Figure 1.

This method ensures that the selected literature is relevant, up-to-date, and provides valuable insights into numeracy skills and self-confidence from the perspective of students.

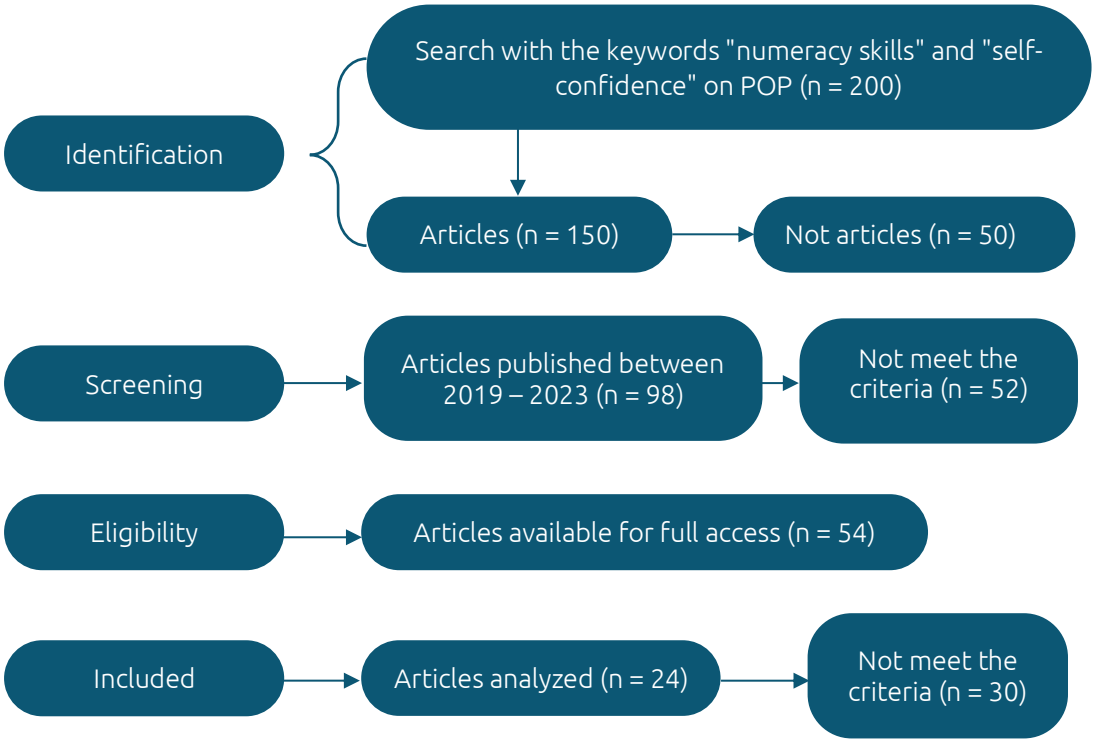

Figure 1. Determination and Selection of Selected Articles with the PRISMA Principle

FINDING AND DISCUSSION

Based on the article selection process following the PRISMA principles, as shown in Figure 1, from the 200 articles obtained via Publish or Perish (POP) using the keywords "numeracy skills" and "self-confidence," a total of 24 articles met the criteria for analysis according to the research objectives.

In response to Research Question 1 (RQ1), "What is the distribution of articles on numeracy skills and self-confidence in mathematics learning each year?", the distribution of articles by year of publication is presented in Figure 2.

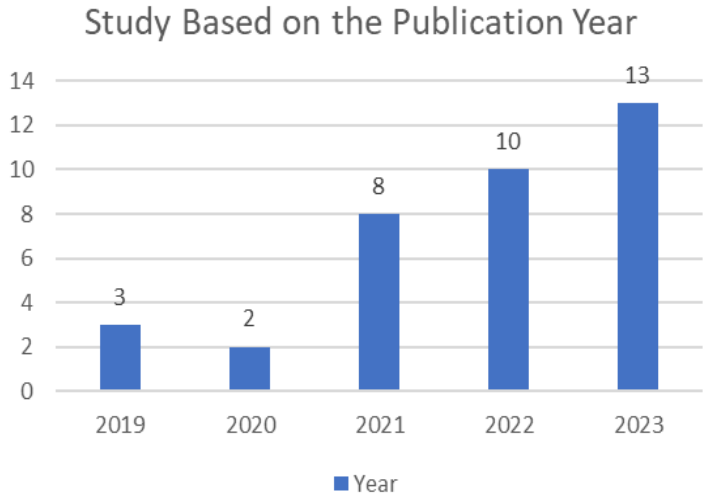

Figure 2. Selection of articles by publication year

Based on Figure 2, the publication of articles has shown a positive trend from 2021 to 2023. In 2021, there were 8 articles published, and by 2023, the number of research articles discussing numeracy skills and self-confidence from the students' perspective has increased to 13 articles. This is due to the elimination of the National Examination at the end of 2020, which was replaced by the Minimum Competency Assessment and Character Survey in 2021, resulting in a significant number of studies examining students' numeracy skills and self-confidence. Numeracy skills are one of the competencies needed by students and must be developed so that they are adaptive and ready for the changes of the times. This aligns with the statement that the Minimum Competency Assessment (AKM) to be established by the government should be part of the government's target in preparing students for the 21st century with various skills that need to be achieved (Asrijanty, 2020). In addition, according to Fajriyah (2022) It states that 21st-century mathematics learning emphasizes the importance of developing the 4C aspects, which include critical thinking, communication, collaboration, and creativity. Among the prerequisites for students to explore 21st-century skills is numeracy ability. Numeracy skills are considered important to make mathematics learning more meaningful for students in a contextual way (Fajriyah, 2022). The increase in article publications from 2021 to 2023 indicates that numeracy skills have become one of the mathematical abilities that are a focus in the mathematics learning process conducted in schools.

Based on (RQ 2) What are the perspectives of Indonesian students (gender, methods/models, software (games/videos), teaching materials, and prior abilities) in terms of numeracy skills in mathematics learning? The numeracy skills in mathematics learning from the students' perspective in the research conducted by Mariamah et al (2021) It states that the numeracy skills of female students are better compared to male students, as this is due to the factors of maturity and readiness being superior in female students compared to male students. However, based on the research by Mellyzar et al (2022) Based on the data analysis, it shows that the

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numeracy skills of students have a significance value of 0.652, which is greater than 0.05. This means there is no significant difference between the numeracy skills of male and female students. The findings from two articles indicate the numeracy skills of students by gender.

In the research conducted by Arahmah et al (2021) It shows that the student facilitator and explaining method can enhance numeracy skills, as it trains students to actively develop their potential and encourages them to be independent in facing every problem. Meanwhile, based on the research findings of Widiastuti & Kurniasih (2021) It shows that the problem-based learning model assisted by Cabri 3D V2 software can enhance numeracy skills in discovering the origins of the formulas for the surface area and volume of cubes and rectangular prisms. The results of the research by Boangmanalu et al (2023) It also shows that the implementation of problem-based learning models has a positive impact on mathematical numeracy skills and has resulted in positive changes in learning interest and motivation. Based on the findings of the three articles, it shows the students' numeracy skills as viewed from the learning methods/ models.

In the research conducted by Ambarwati & Kurniasih (2021) It shows that the use of Problem Based Learning assisted by YouTube media has a significant and positive impact on numeracy skills. This is because the learning process involves students discussing in their groups while exploring information through YouTube to solve and address the contextual problems presented. Then the research conducted by Muhtarom et al (2022) It shows that student learning using Android-based educational math games is valid, effective, and practical for improving the numeracy skills of junior high school students on the topic of systems of linear equations in two variables. In addition, the research conducted by Winarni et al (2021) It shows that the use of instructional videos in classroom learning is effective in terms of numeracy skills. Based on the findings of the three articles, it shows students' numeracy skills as viewed through learning software (game, video).

In the research conducted by Nasoha et al (2022) t shows that students' numeracy skills after the implementation of Problem Based Learning (PBL) based mathematics teaching materials are considered good, and students' responses to the learning process through the implementation of PBL-based mathematics teaching materials are also positive. In addition, the research conducted by Mutmainah et al (2023) It shows that students' mathematical numeracy skills in solving story problems related to linear programming are still low due to misconceptions in interpreting the story problems. Based on the findings from the three articles, students' numeracy skills are assessed from the learning materials.

Other research findings also indicate that students face difficulties in implementing reading problems in the form of algebra or geometry, struggle to interpret concepts and symbols in mathematical ideas effectively, and are not accustomed to understanding numerical problems due to their initial abilities in a growth mindset for comprehending basic numeracy being still low (Indra & Rahadyan, 2021;

Khomariah dkk., 2022; Megawati & Sutarto, 2021; Milati dkk., 2023; Nasrullah & Ainol, 2022; Susetyawati, 2022; Trigita dkk., 2023). Based on the findings from the three articles, it shows students' numeracy skills in relation to their initial abilities.
The perspective of students based on their numeracy skills for frequency distribution can be seen in Figure 3.

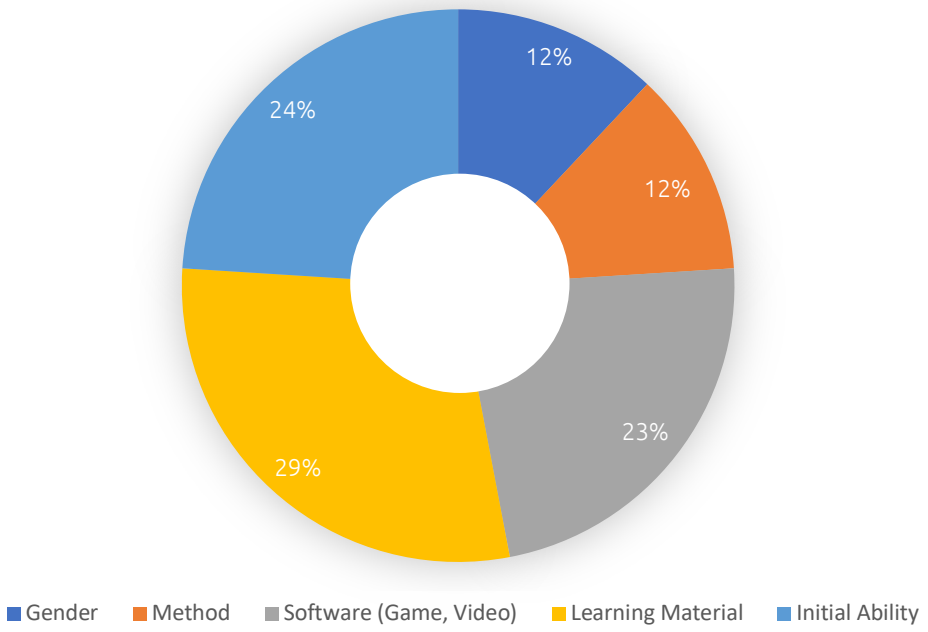

Figure 3. Student Perspectives Based on Numeracy Skills

Based on Figure 3, the research related to numeracy from the perspective of students in mathematics learning shows that the highest percentage is 29%, which reflects students' numeracy skills as seen from their initial abilities. Students' initial abilities will positively influence their mathematical numeracy skills because the problem-solving procedures that lead to a mathematical concept and systematic working procedures can be achieved if students possess moderate to good initial mathematical skills (Sanvi & Diana, 2022). This also adds that understanding in examining the issue of mathematical numeracy skills is important if the students' initial math abilities are well-structured in the problem-solving process (Takaria et al., 2022).
Based on (RQ 3) What are the perspectives of Indonesian students (increased student participation in the learning process, students actively proposing ideas, and students becoming confident in their answers) in terms of self-confidence in mathematics learning? The perspective of students regarding self-confidence from the literature review indicates that the realistic mathematics learning approach positively impacts students' self-confidence in the topic of sequences and series, where students become more confident in their answers to the problems presented by the teacher (Kosim et al., 2020). This shows that the students' perspective, viewed from self-confidence, is that they become certain about their answers.

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Meanwhile, in the research conducted by Zamnah & Ruswana (2019) It shows that the increase in students' self-confidence through direct learning results in students becoming active in proposing ideas related to the mathematical problems they encounter. This indicates that from the perspective of self-confidence, students become actively engaged in suggesting ideas.

Other research findings indicate that students' self-confidence affects their learning in terms of student participation, specifically in achieving goals, developing interest in subjects, reducing student anxiety, feeling comfortable with their teacher and classmates, and also in expressing their opinions regarding classroom learning (Akbari & Sahibzada, 2020; Peciuliauskiene & Kaminskiene, 2022; Pratama, 2020; Pratiwi, 2020; Setiawan dkk., 2022). This indicates that student participation has increased in the learning process.

Based on the description above, the perspective of students in terms of self-confidence consists of 1) students becoming confident in their answers; 2) students actively proposing ideas; 3) student participation increases in the learning process. The perspective of students in terms of numeracy skills and their frequency distribution can be seen in Figure 4.

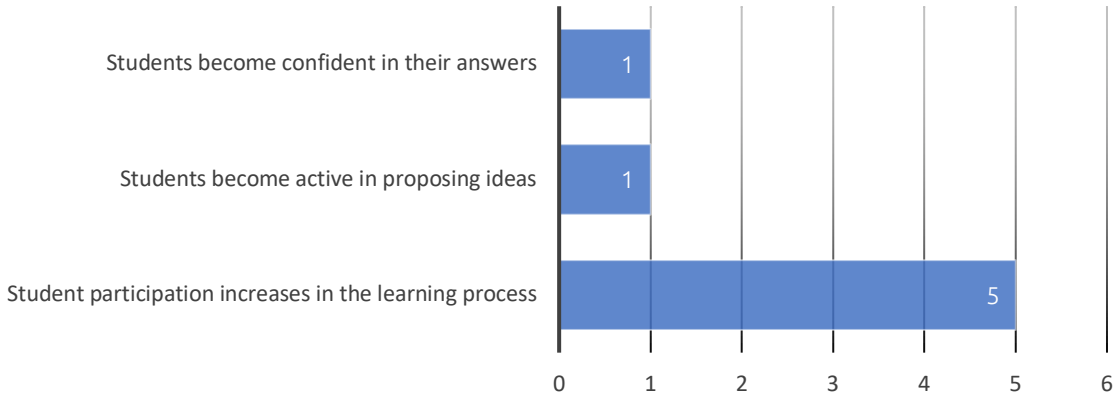

Figure 4. Student Perspectives Based on Self-Confidence

Based on Figure 4, the literature review results show that in studies related to self-confidence in mathematics learning from the student's perspective, the most common finding is that student participation increases in the learning process, with a total of 5 articles. This is because learning mathematics has a positive impact on students' self-confidence. Student's participation in the goal of developing interest in the subject, reducing their anxiety, feeling comfortable with their teachers and classmates, and also expressing their opinions regarding classroom learning is influenced by the changes in students' self-confidence during the learning process (Akbari & Sahibzada, 2020).

Self-confidence is an important trait that students must possess. Students with high and adequate self-confidence will be able to confidently tackle the problems presented by their teachers and develop ideas to solve issues. Without self-

confidence, students may feel hesitant in completing the tasks given, resulting in less optimal solutions to the problems they face (Zamnah & Ruswana, 2019). This is in line with the statement that students with self-confidence are able to solve mathematical problems in everyday life because of their strong belief in their ability to approach a problem (Pratama, 2020). Therefore, self-confidence in students when learning mathematics will play an important role in their learning and success in mathematics education.

CONCLUSIONS AND RECOMMENDATIONS

Research and publications on mathematics learning concerning students' numeracy skills and self-confidence have been conducted extensively. This literature review found that from 2019 to 2023, the highest number of publications occurred in 2023, with a total of 13 articles.

The students' numeracy skills, assessed from their initial abilities, emerged as the most common finding in the literature review with a total of 7 articles. Additionally, self-confidence from the students' perspective, specifically the increase in student participation during the learning process, was the most frequently noted finding in the literature review with 5 articles. Research related to numeracy skills and self-confidence has been extensively conducted, as numeracy skills are essential in the 21st century, and self-confidence is necessary for students in the mathematics learning process.

Therefore, through this systematic literature review, we can examine matters related to the perspectives of Indonesian students on numeracy skills and self-confidence in mathematics learning during the teaching and learning process. Additionally, for future researchers, they can conduct systematic literature reviews from the perspectives of students in other countries.

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