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Exploring Mathematical Literacy in 5th-Grade Elementary Students: A Case Study of Diverse Ability Levels

Ulfiyani[1*], Wahyudin[2], Dede Mardiah[3], Dewi Mayang Salshabylla[4], Yasmin Gehan Putri[5]

[1,2,3,4,5] Elementary Education, Universitas Pendidikan Indonesia, Bandung, Indonesia

* ulfiyani@upi.edu

Abstract. This study aims to understand the mathematical literacy skills of elementary school students. The case study method is involved in this study. The population of 5th-grade students was sampled using purposive with students who have varying mathematical abilities (high, moderate, and low). The instrument relies on a written test containing seven mathematical literacy questions adapted from Wigati's thesis (2020). The analysis highlights the relationship between cumulative mathematical ability scores and mathematical literacy. Students with high scores (SN) exhibit a good understanding of mathematics, while those with low scores (NT) require a greater grasp of fundamental concepts. Another student (AAA) shows higher mathematical literacy scores compared to cumulative mathematical scores, indicating a potentially stronger theoretical understanding than practical application. Individual interviews indicate that the material in the test questions had been previously studied by the research subjects. The participants felt these questions were related to daily life. The three students used different arithmetic operations to solve the questions and had a preference for questions using direct mathematical symbols. This research attempts to identify factors influencing mathematical literacy among 5th-grade students with the hope of contributing to the development of a more adaptive and inclusive mathematics education. However, further research is needed for a broader generalization.

Keywords: case study, decimal, mathematical literacy, fraction, percent.

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INTRODUCTION

Mathematical proficiency among students in Indonesia remains below the global average, as reflected in the PISA assessments (Schleicher, 2023). Furthermore, Indonesia ranked 36th out of 38 countries in the TIMSS results (Yuniar Ardiniawan et al., 2022), highlighting the need for efforts to enhance students' mathematical competencies. One critical aspect of mathematical ability is mathematical literacy, which plays a pivotal role at the elementary school level in shaping students' intellectual foundations (Maghfiroh et al., 2021; Manurung et al., 2020) This literacy extends beyond basic calculation skills and includes problem-solving abilities and critical thinking related to mathematical concepts (Gabriel et al., 2020; Prabawati et al., 2019; Tarim & Tarku, 2022).

As a 21st-century skill, mathematical literacy entails a deep understanding of mathematical concepts, along with the capacity to apply, analyze, and solve problems using mathematical language (Kohar et al., 2014; Prabawati et al., 2019; Rizki & Priatna, 2019; Tarim & Tarku, 2022). It goes beyond mere arithmetic proficiency, encompassing the ability to interpret data, draw inferences, and construct strong mathematical arguments (Ojose, 2011; Oktiningrum et al., 2016). Mathematical literacy also involves understanding the connections between mathematical concepts and real-world situations. It enables individuals to recognize patterns, formulate models, and make decisions based on mathematical analysis (Hadiyanti et al., 2021;

Hapsari, 2019; Maghfiroh et al., 2021). This includes the ability to use various mathematical tools, including technology, to solve complex problems (Cahyani & Susanah, 2022; Kurniawati & Mahmudi, 2019; Maryani & Widjajanti, 2020). A person with strong mathematical literacy is capable of thinking critically and creatively when solving mathematical problems. They can connect different mathematical concepts and use logical reasoning to solve complex problems in various contexts (Maslihah et al., 2020).

Additionally, mathematical literacy as a 21st-century skill also involves the ability to communicate effectively using mathematical language (Rizki & Priatna, 2019). This includes explaining mathematical problem-solving processes, presenting solutions clearly, and participating in discussions that consider different mathematical approaches (Julie et al., 2017). Mathematical literacy is not merely about mastering formulas and techniques, but also about understanding the rationale behind those concepts (Afni & Hartono, 2020). The ability to relate mathematics to real life, make data-driven decisions, and solve complex problems is at the core of mathematical literacy as a crucial 21st-century skill (Turner, 2014).

In the midst of curriculum changes and the diversity of teaching methods, understanding the factors that influence students' mathematical literacy has become essential (Putrawangsa & Hasanah, 2022; Swaratifani & Budiharti, 2022). Although numerous studies have discussed the role of curriculum, teaching methods, learning environments, and psychological aspects, there remains a gap in understanding that needs to be addressed (Ekawati et al., 2020). This research gap highlights the need for a more comprehensive approach to understanding how various factors influence the mathematical literacy of elementary students. A lack of understanding regarding the impact of the new curriculum on mathematical literacy, the most effective teaching methods, the role of the home learning environment, parental influence, and the relationship between psychological factors and students' mathematical literacy skills are knowledge gaps that must be filled (Genc & Erbas, 2019; Jablonka, 2003; Kilpatrick, 2002; Wijaya, 2016).

According to research by Kohar et al. (2014), students' mathematical literacy must be enhanced to improve their performance in PISA assessments. This can be achieved through activities that stimulate communication, reasoning, argumentation, representation, problem-solving, mathematization, and the use of formal mathematical language with symbols (Kohar et al., 2014). Meanwhile, research by Manurung et al. (2020) revealed that mathematics instruction remains teacher-centered. Thus, the researchers advocate for a mathematical literacy program aimed at promoting student-centered learning and improving students' mathematical literacy (Manurung et al., 2020). Rizki & Priatna (2019) stated that life in the 21st century is increasingly complex, underscoring the need for education to equip students with

an understanding of mathematics' role in daily life and to impart the realization that mathematics is integral to real-world scenarios (Rizki & Priatna, 2019). In response to Indonesia's below-average PISA scores, a case study (Ekawati et al., 2020) emphasized the need for a learning design incorporating mathematical literacy content, offering students opportunities to develop their mathematical literacy. In the context of fraction operations, Hidayah et al. (2020) noted that students continue to face challenges in solving word problems, which may be influenced by internal and external factors (Hidayah et al., 2020). Similarly, research by Swaratifani & Budiharti (2022) found that students still struggle to translate word problems into mathematical solutions.

Thus, this study aims to explore the issues surrounding elementary students' mathematical literacy in the context of fraction, decimal, and percentage operations. Through this research, it is hoped to provide preliminary information to serve as a reference for addressing problems related to elementary students' mathematical literacy.

METHODOLOGY

This study aims to explore the mathematical literacy skills of 5th-grade elementary school students through a case study approach, employing qualitative data analysis (Cohen, 2016; Gall et al., 2010; Setyosati, 2020; Sugiyono, 2019). The primary focus is on the processes and understanding involved in solving mathematical problems. The research population consists of 5th-grade elementary school students. Using a purposive sampling method, three students were carefully selected to represent varying levels of mathematical ability. One student with high ability (score of 100), one with medium ability (score of 80), and one with low ability (score of 65) were chosen based on their mathematics achievement in class.

The instrument used was a written test comprising seven objective questions focused on mathematical literacy. Here are three out of the seven questions:

1. Today is Dhini's birthday! She has invited 12 of her close friends to celebrate at her home. During the party, Dhini slices a round cake into equal parts to share with her friends. How big is each piece of cake that her friends receive?
2. On Sunday, Dhika visits a toy store and notices 3 balls, 5 dolls, and 4 airplanes on the first shelf. What fraction of the total toys on the shelf are balls?
3. The 5th-grade class has 40 students. Today, 5 students are absent due to illness. What percentage of the students are absent?

These questions were adopted from a thesis by Wigati (2020) and have undergone validation and reliability testing to ensure accuracy and precision in measuring students' mathematical

literacy skills. After the sample selection, the written test was administered to the three students to assess their mathematical literacy. The data collected from the test will be analyzed in detail to uncover patterns, differences, and levels of understanding of the mathematical material from the three sample students.

The test data will be processed and analyzed to explore the differences in mathematical literacy levels among the three sample students. The findings from this analysis are expected to provide a deeper understanding of the factors influencing mathematical literacy skills in 5th-grade students with varying abilities. By considering the variation in mathematical ability among the three 5th-grade student samples, this study aims to contribute to the understanding of students' mathematical literacy and provide implications for the development of more adaptive and inclusive mathematics education.

RESULTS AND DISCUSSION

The research was conducted at an elementary school in Bandung. Using objective questions as the instrument for data collection, the research results are presented in Table 1.

Table 1

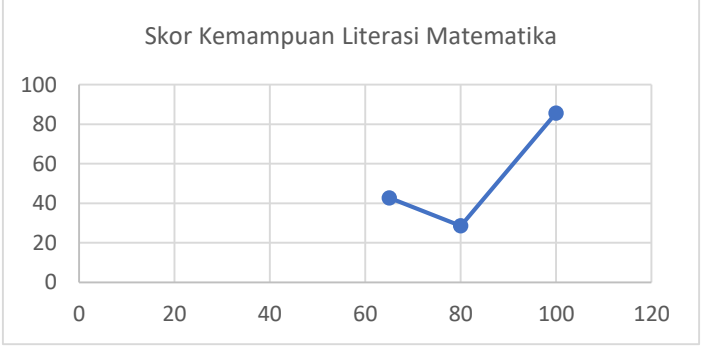
Cumulative Mathematics Ability Scores and Mathematical Literacy Ability

Student Initials	Cumulative Math Ability Score	Number of Correct Answers	Mathematical Literacy Score (%)
SN	100	6	85.7
NT	80	2	28.6
AAA	65	3	42.8

To further illustrate the relationship between cumulative mathematics ability scores and mathematical literacy scores, refer to Figure 1.

Picture 1

Scatter Diagram of Cumulative Mathematics Proficiency and Student Literacy Skills Scores



From the data obtained, there is a relationship between cumulative math ability scores and mathematical literacy scores. The scatterplot reveals a pattern or correlation between these two metrics. Student SN achieved high scores in both cumulative math ability and mathematical literacy, indicating a strong overall understanding of mathematics, including both theory and its application. On the other hand, student NT scored low in both areas, suggesting that this student requires more attention in grasping fundamental math concepts and applying them.

Student AAA has a lower cumulative math score than their mathematical literacy score. Although AAA's mathematical literacy score is higher than their cumulative math score, both scores remain relatively low. This could indicate that the student may have a better theoretical understanding of math than the practical ability to apply it.

Overall, there is a relationship between cumulative math ability and mathematical literacy, but it is important to note that the analysis is based on just three data points and may not represent broader patterns among all students. To obtain more comprehensive results, the subjects were asked to explain why they selected options A/B/C/D. Question one and the subjects' reasoning for their answers can be seen in Figures 2, 3, 4, and 5.

Figure 2

1st question

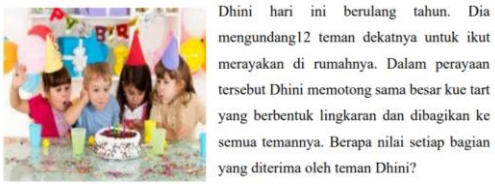


Figure 3

SN's answer

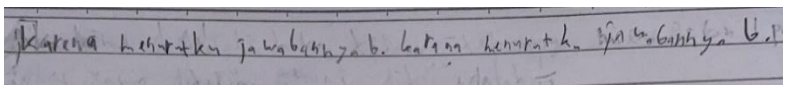


Figure 4

NT's answer

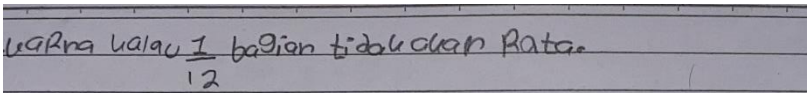
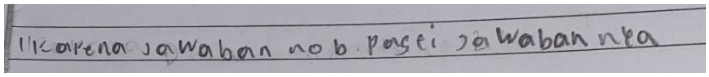


Figure 5

AAA's answer



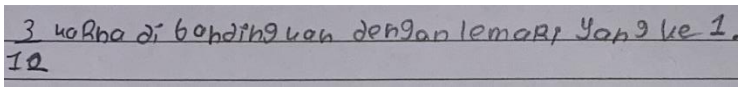
In the first question, SN and NT selected the correct answer, while AAA did not. However, as seen in Figures 3, 4, and 5, only NT provided a mathematically sound explanation, stating,

"Because if you divide it into 1/12, it won't be even." From NT's explanation, it can be concluded that giving one cake to one person would result in an uneven distribution. If the cake is divided into 12 parts, each person would receive 1/12 of the cake.

For the second question: "On Sunday, Dhika visits a toy store and sees 3 balls, 5 dolls, and 4 airplanes on the first shelf. How many balls are there compared to the total toys on the first shelf?" In response to this question, only NT selected and gave the correct answer, while SN and AAA did not. NT explained that this question could be solved using the concept of ratios. NT's reasoning can be seen in Figure 6.

Figure 6

NT's answer



The third question was answered correctly by all three research subjects; however, none of the subjects provided a mathematically sound explanation for their answers. The third question can be seen in Figure 7, while the reasoning behind the subjects' answers can be viewed in Figures 8, 9, and 10.

Figure 7

3rd answer

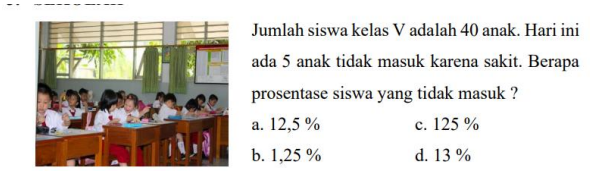


Figure 8

SN's answer

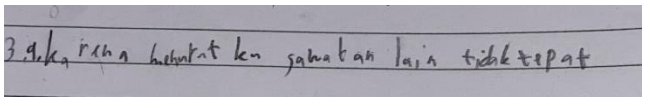


Figure 9

NT's answer

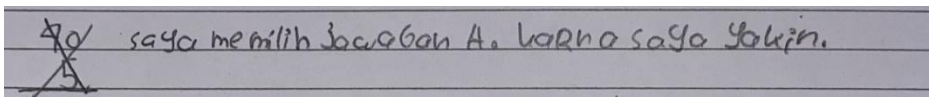
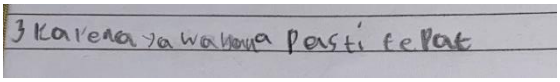


Figure 10

AAA's answer



The answers to the fourth question showed that only SN selected the correct option, while NT and AAA did not. However, the reason SN chose the correct option was not mathematically based, as seen in Figure 8. For the fifth question, both SN and AAA answered correctly, but they did not provide mathematical reasoning for their answers, as depicted in Figures 8 and 10. For questions 5, 6, and 7, only SN provided the correct answers, while NT and AAA did not. However, NT once again did not give a mathematical explanation for choosing the correct option, as seen in Figure 8. It can be concluded that only NT was able to provide some mathematical reasoning for their answers, while SN and AAA were unable to explain why they selected the circled options on the worksheet. Interestingly, the student who could provide reasoning for their answers was the one with intermediate mathematical ability.

The research process continued with individual interviews of the subjects to gather their general thoughts on the test questions. The interview transcript is as follows:

Question: Have you ever studied fraction, decimal, and percentage operations before?

SN: Mmm… yes, I have.

NT: I learned it back in grade 4, but not too much.

AAA: Yes, in grade 4.

Question: Have you encountered the types of questions on the test in your daily life?

SN: They relate to everyday life, like when you have a birthday party and share the cake with friends. Or like when measuring tea, for example, when paving a road, you have to measure how long the road is and calculate its width.

NT: Some are related, like question number three about school.

AAA: Yes, I have—questions 1, 2, 4, and 6.

Question: Were there any questions that were difficult for you to answer?

SN: Number 2, because I didn't understand it, just that one.

NT: Numbers 2, 3, and 5 were a bit confusing.

AAA: Yes, numbers 1, 2, 4, and 6.

Question: Which operations did you use to solve the questions?

SN: Multiplication, addition, division, and subtraction, if I'm not mistaken.

NT: A little multiplication, and addition and subtraction.

AAA: Addition, subtraction, division, and multiplication.

Question: *In* your opinion, which type of question is easier to answer—story problems related to daily life (mathematical literacy questions) or questions using direct mathematical symbols?

SN: The easier ones are these (points to the questions using direct mathematical symbols) because the numbers are right there. The numbers are already given, so I can remember them directly and don't need to think about whether to add or subtract.

NT: The ones… (points to the questions using direct mathematical symbols).

AAA: This one, Kak (points to the questions using direct mathematical symbols), because I don't have to read much and can directly add or subtract.

Question: Was the information in the questions sufficient for finding the answers?

SN: Yes, it was enough.

NT: It was sufficient.

AAA: Yes, it was enough.

The study's findings reveal a significant association between cumulative mathematics scores and students' performance in mathematical literacy tasks, aligning with established research that underscores the impact of foundational math skills on applied problem-solving abilities. Higher cumulative math scores appear to correlate positively with stronger mathematical literacy, suggesting that a solid grounding in mathematical concepts and operations enhances students' abilities to engage effectively with literacy tasks that require practical application of these skills (Maghfiroh et al., 2021; Manurung et al., 2020). For instance, student SN, who achieved a high cumulative math score, demonstrated strong proficiency in mathematical literacy tasks. SN's responses highlighted an effective transfer of theoretical knowledge to practical tasks, underscoring the role of comprehensive mathematical understanding in navigating real-world scenarios that require mathematical reasoning and interpretation (Kohar et al., 2014; Prabawati et al., 2019).

On the other hand, the case of student NT offers insight into the complex interplay between foundational math knowledge and reasoning skills. Although NT scored moderately on cumulative math assessments, they demonstrated competence in literacy tasks, indicating that robust reasoning and critical thinking can partly compensate for gaps in foundational math knowledge. NT's performance implies that analytical thinking and the ability to engage in problem-solving may serve as pivotal skills for mathematical literacy, even in students with less secure basic mathematical skills. This finding aligns with Tarim and Tarku (2022) as well as Ojose (2011), who argue that critical thinking is a key component of mathematical literacy and

can contribute to success in complex tasks, independent of a student's base-level math knowledge.

Further examination of student AAA's responses provides a window into a common challenge documented across various studies: the difficulty students face in translating theoretical knowledge into practical applications. While AAA was able to generate correct solutions, their struggle to clearly articulate reasoning and connect answers to realistic contexts highlights an essential area for development in mathematical education. This gap between knowing "how" and understanding "why" aligns with the observations of Hidayah (2020) and Swaratifani & Budiharti (2022), who have identified that students often encounter difficulties when expected to contextualize mathematical concepts within real-world scenarios. AAA's responses suggest that while a student may be capable of executing procedures or recalling formulas, there is an additional skill set required to communicate understanding in a manner that demonstrates the relevance and purpose of mathematics beyond the classroom.

The interviews conducted in this study further emphasize the role of context-based learning in enhancing mathematical literacy. Students, particularly SN and NT, frequently relied on everyday scenarios as a framework for their answers, indicating a natural inclination to relate mathematical concepts to familiar contexts. This practice aligns with findings from Hadiyanti (2021) and Maryani and Widjajanti (2020), which highlight that context-based learning strategies can significantly enhance students' engagement and understanding by making mathematical concepts feel more relevant to their lives. The students' use of contextual scenarios also reflects the core principles of the Realistic Mathematics Education (RME) approach, which encourages the use of real-world contexts as a basis for exploring mathematical ideas, thereby facilitating deeper cognitive engagement with mathematical concepts.

Despite these positive indications, the challenges observed across all participants underscore a recurring theme in mathematical education: the need to develop students' communication skills in the context of mathematics. Most students struggled to express their reasoning clearly, particularly when asked to justify their answers or describe the logical steps underlying their problem-solving process. This aligns with prior research, such as the work of Julie et al (2017) and Turner (2014), which stresses the importance of communicative competence as a component of mathematical literacy. Effective communication in mathematics requires students not only to perform calculations but also to convey their understanding in a structured and comprehensible manner. This aspect is especially critical when students encounter tasks that require them to explain their reasoning to peers or teachers, as well as in real-world situations where they may need to justify decisions based on mathematical analysis.

Another key observation from the findings is the multidimensional nature of mathematical literacy, which comprises not only procedural fluency and conceptual understanding but also contextual application, reasoning, and effective communication. Student SN's high performance across all dimensions exemplifies how these elements interact to support a holistic understanding of mathematics. Conversely, students who excelled in one area but faced challenges in others, like NT and AAA, illustrate that gaps in one dimension can impact overall mathematical literacy. This underscores the importance of a multifaceted approach to mathematics instruction that prioritizes the development of varied competencies, as suggested by Ekawati et al (2020).

Additionally, the findings support the argument that integrating real-life contexts in mathematics curricula is instrumental in fostering mathematical literacy. By allowing students to apply mathematical concepts in meaningful contexts, educators can create a learning environment that not only emphasizes theoretical knowledge but also encourages practical application and real-world relevance. The consistency of this finding across the participants suggests that context-based learning can significantly enhance students' motivation and comprehension, providing them with opportunities to see mathematics as a valuable tool for solving everyday problems rather than merely an academic subject.

Collectively, these findings reinforce the notion that a comprehensive approach to mathematics education—encompassing theoretical knowledge, practical application, critical reasoning, and clear communication—is essential to cultivate well-rounded mathematical literacy. This approach aligns with the overarching goals of the Realistic Mathematics Education (RME) model, which emphasizes the importance of connecting mathematical concepts to real-world situations and equipping students with the skills necessary to tackle practical challenges (Dare et al., 2021; Mierluş-Mazilu & Yilmaz, 2024; Szabo et al., 2020).

CONCLUSION

This study reinforces the importance of a well-rounded approach to developing mathematical literacy, particularly focusing on foundational knowledge, critical reasoning, and communication skills. The correlation observed between students' cumulative math scores and their performance in literacy tasks highlights that a solid grasp of fundamental mathematical concepts is essential for tackling real-world problems. High-achieving students were not only proficient in these concepts but were also adept at applying them in meaningful contexts, indicating a strong link between theoretical understanding and practical application.

Additionally, the findings suggest that students with moderate foundational skills can still excel in applied mathematical tasks if they possess strong analytical thinking and reasoning abilities. This adaptability underscores the critical role of reasoning skills in mathematical literacy, showing that students can often bridge knowledge gaps with solid critical thinking abilities. However, the challenges some students faced in articulating their problem-solving processes point to an area in need of further emphasis in mathematics education. Without effective communication skills, students may struggle to clearly express and justify their reasoning, which is an important aspect of real-life problem-solving.

The study also demonstrates the impact of context-based learning on student engagement and comprehension. Many students appeared to benefit from connecting mathematical problems to real-life situations, which made the content more accessible and relevant. This tendency suggests that context-based learning approaches may not only support comprehension but also help students appreciate the practical value of mathematics in everyday life. Emphasizing this connection can motivate students to engage more deeply with the subject and to view mathematical literacy as an essential skill set.

In summary, the findings suggest that fostering mathematical literacy requires a holistic educational approach that balances foundational skills with opportunities for critical reasoning, contextual application, and communication. As students prepare to navigate an increasingly complex world, the ability to understand, apply, and articulate mathematical concepts will be vital. Educators should prioritize strategies that integrate real-life relevance, cultivate analytical thinking, and build expressive clarity to help students develop into confident, capable problem-solvers.

However, this study has some limitations. The small sample size, comprising only three students, may limit the generalizability of the findings to broader populations. Additionally, the reliance on a single written test as the primary instrument might not capture the full spectrum of mathematical literacy, particularly in practical and oral contexts. Future research could address these limitations by incorporating larger, more diverse samples and employing a wider range of assessment methods. Exploring interventions designed to strengthen communication in mathematics could also provide valuable insights to support a more comprehensive development of mathematical literacy skills.

REFERENCES

Cahyani, C. M., & Susanah, S. (2022). Profil of Students' Mathematical Literacy in Solving AKM Task in Terms of Personality Types. *Journal of Medives : Journal of Mathematics Education IKIP Veteran Semarang*, *6*(1), 153. https://doi.org/10.31331/medivesveteran.v6i1.1949

Cohen, P. C. (2016). *A Calculating People*. Routledge. https://doi.org/10.4324/9781315538617

Dare, E. A., Keratithamkul, K., Hiwatig, B. M., & Li, F. (2021). Beyond Content: The Role of STEM Disciplines, Real-World Problems, 21st Century Skills, and STEM Careers within Science Teachers' Conceptions of Integrated STEM Education. *Education Sciences*, *11*(11), 737. https://doi.org/10.3390/educsci11110737

Ekawati, R., Susanti, & Chen, J. C. (2020). Primary Students' Mathematical Literacy: A Case Study. *Infinity Journal of Mathematics Education*, *9*(1), 49–58. https://doi.org/10.22460/infinity.v9i1.p49-58

Gabriel, F., Buckley, S., & Barthakur, A. (2020). The impact of mathematics anxiety on self-regulated learning and mathematical literacy. *Australian Journal of Education*, *64*(3), 227–242. https://doi.org/10.1177/0004944120947881

Gall, M. D., Gall, J. P., & Borg, W. R. (2010). *Applying Educational Research: How to Read, Do, and Use Research* (P. A. Smith, Ed.; 6th ed.). Pearson Education.

Hadiyanti, N. F. D., Hobri, Prihandoko, A. C., Susanto, Murtikusuma, R. P., Khasanah, N., & Maharani, P. (2021). Development of mathematics e-module with STEM-collaborative project based learning to improve mathematical literacy ability of vocational high school students. *Journal of Physics: Conference Series*, *1839*(1). https://doi.org/10.1088/1742-6596/1839/1/012031

Hapsari, T. (2019). Literasi Matematis Siswa. *Jurnal Euclid*, *6*(1), 1–116.

Hidayah, N., Arief Budiman, M., Cahyadi, F., & Dasar, J. P. (2020). Analisis Kesulitan Siswa Kelas V Dalam Memecahkan Masalah Matematika Pada Materi Operasi Hitung Pecahan. *TSCJ*, *3*(1).

Julie, H., Sanjaya, F., & Anggoro, A. Y. (2017). The Students' Ability in Mathematical Literacy for the Quantity, and the Change and Relationship Problems on the PISA Adaptation Test. *Journal of Physics: Conference Series*, *890*(1). https://doi.org/10.1088/1742-6596/890/1/012089

Kohar, A. W., Zulkardi, & Darmawijoyo. (2014). Developing PISA-Like Mathematics Tasks to Promote Students' Mathematical Literacy. *Proceeding the 2nd SEA-DR*, 14–26. www.oecd.org/pisa

Kurniawati, N. D. L., & Mahmudi, A. (2019). Analysis of mathematical literacy skills and mathematics self-efficacy of junior high school students. *Journal of Physics: Conference Series*, *1320*(1). https://doi.org/10.1088/1742-6596/1320/1/012053

Maghfiroh, F. L., Amin, S. M., Ibrahim, M., & Hartatik, S. (2021). Keefektifan Pendekatan Pendidikan Matematika Realistik Indonesia terhadap Kemampuan Literasi Numerasi Siswa di Sekolah Dasar. *Jurnal Basicedu*, *5*(5), 3342–3351. https://doi.org/10.31004/basicedu.v5i5.1341

Manurung, A. S., Halim, A., & Rosyid, A. (2020). Gerakan Literasi Matematika Bagi Siswa untuk Peningkatan Kemampuan Berpikir Kreatif di SDN Kenari 07 Pagi. *The 2st National Conference on Education, Social Science, and Humaniora: "Potensi Penelitian Dan Pengabdian Di Era New Normal"*.

Maryani, N., & Widjajanti, D. B. (2020). Mathematical Literacy: How to Improve It using Contextual Teaching and Learning Method? *Journal of Physics: Conference Series*, *1581*(1). https://doi.org/10.1088/1742-6596/1581/1/012044

Maslihah, S., Waluya, S. B., Rochmad, & Suyitno, A. (2020). The Role of Mathematical Literacy to Improve High Order Thinking Skills. *Journal of Physics: Conference Series*, *1539*(1). https://doi.org/10.1088/1742-6596/1539/1/012085

Mierluş-Mazilu, I., & Yilmaz, F. (2024). *Teaching Mathematics in STEM Education* (pp. 147–170). https://doi.org/10.1007/978-3-031-49218-1_11

Ojose, B. (2011). Mathematics Literacy: Are We Able to Put the Mathematics We Learn into Everyday Use? *Education*, *4*(1).

Oktiningrum, W., Zulkardi, & Hartono, Y. (2016). Developing PISA-Like Mathematics Task With Indonesia Natural and Cultural Heritage as Context to Assess Students Mathematical Literacy. *Journal on Mathematics Education*, *7*(1), 1–10.

Prabawati, M., Herman, T., & Turmudi. (2019). Mathematical Literacy Skills Students of the Junior High School in Term of Gender Differences. *Journal of Physics: Conference Series*, *1315*(1). https://doi.org/10.1088/1742-6596/1315/1/012084

Rizki, L. M., & Priatna, N. (2019). Mathematical Literacy as the 21st Century Skill. *Journal of Physics: Conference Series*, *1157*(4), 1–5. https://doi.org/10.1088/1742-6596/1157/4/042088

Schleicher, A. (2023). *Programme for International Student Assessment Insights and Interpretations PISA 2022*.

Setyosati, P. (2020). *Metode Penelitian Pendidikan dan Pengembangan*. Kencana.

Sugiyono. (2019). *Metode Penelitian dan Pengembangan Reseach and Development* (4th ed.). Alfabeta.

Swaratifani, Y., & Budiharti, B. (2022). Analisis Faktor Kesulitan Belajar Matematika Materi Operasi Hitung Pecahan Kelas V SD Mutiara Persada. *Lucerna : Jurnal Riset Pendidikan Dan Pembelajaran*, *1*(1), 14–19. https://doi.org/10.56393/lucerna.v1i1.120

Szabo, Z. K., Körtesi, P., Guncaga, J., Szabo, D., & Neag, R. (2020). Examples of Problem-Solving Strategies in Mathematics Education Supporting the Sustainability of 21st-Century Skills. *Sustainability*, *12*(23), 10113. https://doi.org/10.3390/su122310113

Tarim, K., & Tarku, H. (2022). Investigation of the Questions in 8th Grade Mathematics Textbook in terms of Mathematical Literacy. *International Electronic Journal of Mathematics Education*, *17*(2), em0682. https://doi.org/10.29333/iejme/11819

Turner, R. (2014). *Assessing Mathematical Literacy the PISA Experience*. Springer International Publishing AG. https://doi.org/10.1007/978-3-319-10121-7

Yuniar Ardiniawan, D., Subiyantoro, S., & Bayu Kurniawan, S. (2022). Effectiveness of The RME (Realistic Mathematical Education) Approach To Learning Achievement in View of Students' Mathematic Reasoning. *Qalamuna: Jurnal Pendidikan, Sosial Dan Agama*, *14*(2), 783–800. https://doi.org/10.37680/qalamuna.v14i2.3520