



Teacher Strategies in Improving Students' Numeracy Literacy in Elementary Schools

Imam Jafar Shodiq

Universitas Nahdlatul Ulama Sunan Giri, Bojonegoro, Indonesia

Abstract

The low level of students' numeracy literacy in Indonesian primary education remains a crucial issue affecting the quality of learning outcomes and problem-solving abilities. This study aims to explore and analyze teachers' strategies in enhancing numeracy literacy among students at Madrasah Ibtidaiyah Nurul Huda Ngasem, Bojonegoro. Using a qualitative descriptive approach, the research involved three teachers, one principal, and six students as participants, selected through purposive sampling. Data were collected through observations, interviews, and documentation, then analyzed using Miles and Huberman's interactive model, consisting of data reduction, data display, and conclusion drawing. The findings reveal that teachers implement various strategies such as contextual learning, integration of numeracy into daily life, use of visual and digital media, and cross-disciplinary approaches. These strategies effectively improve students' engagement, motivation, and understanding of numerical concepts. However, challenges remain in terms of varying student readiness, limited resources, and low parental involvement. To overcome these obstacles, teachers continuously engage in professional collaboration and involve parents through community-based numeracy programs. The study concludes that the success of numeracy literacy enhancement depends on consistent teacher innovation, institutional support, and active collaboration among educational stakeholders. Strengthening these aspects can significantly contribute to the development of analytical, logical, and problem-solving competencies among students in the context of 21st-century education.

Keywords

numeracy literacy, teacher strategies, elementary education

email Corresponding:

imamjs1989@gmail.com

1. Introduction

Education serves as the primary foundation for developing intelligent, moral, and competitive human resources (Tyas, Sunarto, & Naibaho, 2020; Yang, 2024). In the context of globalization and the Fourth Industrial Revolution, critical thinking, analytical reasoning, and problem-solving abilities have become essential competencies that every student must possess (Matthee & Turpin, 2019; Sholihah & Lastariwati, 2020). One of the fundamental skills supporting these competencies is numeracy literacy, which refers to the ability to understand, use, and interpret numbers and mathematical symbols in daily life. Numeracy literacy is not merely about arithmetic skills but also encompasses logical reasoning,



quantitative data analysis, and decision-making based on available information (Astuti, Haryati, & others, 2025; Reyna & Brainerd, 2023). Therefore, improving numeracy literacy has become one of the key priorities in Indonesia's education system.

The Ministry of Education, Culture, Research, and Technology, through the Merdeka Belajar (Freedom to Learn) policy, places literacy and numeracy as key indicators of national education quality (Prayitno & Mahmudi, 2025; Saputra & Hilyatunisa, 2025). Results from international assessments such as the Programme for International Student Assessment (PISA) indicate that Indonesian students' numeracy literacy remains relatively low. The 2018 PISA data ranked Indonesia 72nd out of 79 participating countries in mathematics (OECD, 2019). This condition reflects a serious challenge in basic education, particularly at the Madrasah Ibtidaiyah (Islamic elementary school) level, which serves as the foundation for developing children's logical and analytical thinking skills. Strong numeracy literacy at this stage will significantly influence students' readiness for higher levels of education.

The low level of numeracy literacy among students in Madrasah Ibtidaiyah is often attributed to conventional, teacher-centered learning approaches. Many teachers still focus on mastering formulas and mechanical procedures without connecting mathematical concepts to real-life contexts. As a result, students tend to perceive mathematics as difficult, abstract, and uninteresting. Furthermore, the lack of varied learning media, limited opportunities for problem-solving practice, and low higher-order thinking skills exacerbate the issue. Therefore, teachers are required to design creative, contextual, and engaging learning strategies that enable students not only to understand concepts but also to apply them meaningfully.

Several previous studies have demonstrated the importance of innovative strategies in improving students' numeracy literacy. Pratiwi (2020) found that the use of project-based learning methods significantly enhanced students' numeracy abilities as it involved active engagement in real-world problem-solving. Rahman and Lestari (2021) revealed that the application of contextual teaching and learning approaches had a positive effect on students' logical and numerical reasoning. Similarly, Yuliani (2022) discovered that game-based mathematics learning media increased students' interest and comprehension of numerical concepts. Sari (2023) emphasized that teachers who effectively integrated digital technology into mathematics instruction helped students connect numbers with real-world situations.

Although previous research has explored various learning models to improve numeracy literacy, few studies have specifically examined teachers' strategies in Madrasah



Ibtidaiyah. The social context, student characteristics, and religious-based approaches unique to madrasah settings create distinct teaching strategies compared to public elementary schools. Prior studies have mostly focused on public school contexts, leaving madrasahs—with their potential and challenges—largely underexplored. Thus, there is a need for in-depth research on how Madrasah Ibtidaiyah teachers design, implement, and evaluate effective learning strategies to enhance students' numeracy literacy

Additionally, each madrasah has its own characteristics in terms of teacher resources, students' socioeconomic backgrounds, and available learning facilities. Teachers in madrasahs often face limited access to learning media and technology, requiring them to adapt their strategies to local conditions and students' needs. Research on teachers' strategies in this context is expected to provide insights into best practices that can be adopted by other madrasahs to develop numeracy literacy. Through contextual approaches, teachers can create more meaningful learning environments and empower students' potential more effectively

Based on the aforementioned background, this study aims to analyze teachers' strategies in enhancing students' numeracy literacy at Madrasah Ibtidaiyah. Specifically, it seeks to identify the types of strategies used by teachers, the supporting and inhibiting factors in their implementation, and their impact on students' numeracy skills. The results of this study are expected to contribute to teacher professional development, inform madrasah education policy, and improve the quality of mathematics learning based on numeracy literacy at the primary education level.

2. Method

This study employs a descriptive qualitative approach aimed at providing an in-depth description of teachers' strategies in enhancing students' numeracy literacy at Madrasah Ibtidaiyah Nurul Huda Ngasem (Darmalaksana, 2020). The qualitative approach was chosen because it allows for the exploration of phenomena in their natural and contextual settings without manipulating variables, emphasizing the meaning behind teachers' behaviors, experiences, and teaching practices. The researcher serves as the primary instrument, directly observing, interviewing, and documenting learning activities. Consequently, the data obtained are narrative, descriptive, and rich in meaning. This research emphasizes an in-depth interpretation of the strategies, challenges, and solutions implemented by teachers to foster students' numeracy literacy in the madrasah environment.



The research was conducted at Madrasah Ibtidaiyah (MI) Nurul Huda Ngasem, located in Bojonegoro Regency, East Java. This school was purposively selected due to its strong commitment to the development of literacy and numeracy, as well as its active engagement in implementing innovative learning practices based on students' real-life contexts. The research subjects consisted of three classroom teachers, one principal, and six upper-grade students (grades IV–VI) who were considered representative in describing the numeracy learning process. The informants were selected using purposive sampling, taking into account their teaching experience, involvement in literacy programs, and reflective capacity regarding their teaching practices. Through this selection, the researcher was able to obtain rich and relevant information concerning teachers' strategies for improving numeracy skills at the madrasah.

Data collection techniques included participatory observation, in-depth interviews, and documentation. Observation was carried out to directly examine the learning strategies applied by teachers in the classroom, including the use of media, methods, and teacher-student interactions (Moleong, 2017). In-depth interviews were conducted with teachers and the principal to explore their perceptions, challenges, and reflections on the implementation of numeracy literacy programs. Meanwhile, documentation was used to gather supporting data such as lesson plans (RPP), students' work, and literacy activity evaluation records. Data analysis was conducted using Miles and Huberman's (1994) model, which involves three main stages: data reduction, data display, and conclusion drawing or verification. To ensure data validity, the researcher employed source and technique triangulation, as well as member checking with the informants to confirm the accuracy and reliability of the findings. Through this approach, the study is expected to provide a comprehensive and valid depiction of teachers' strategies in improving numeracy literacy at Madrasah Ibtidaiyah Nurul Huda Ngasem.

3. Finding and Discussion

A. Teachers' Understanding of Literacy and Numeracy Concepts

Based on the findings, most teachers at Madrasah Ibtidaiyah Nurul Huda Ngasem have a solid conceptual understanding of literacy and numeracy as integral skills within the learning process. They perceive literacy not only as reading and writing ability but also as critical and reflective thinking, while numeracy is viewed as the competence to apply mathematical concepts in daily life. This understanding aligns with the Ministry



of Education and Culture's emphasis that literacy and numeracy are foundational skills for lifelong learning. Teachers in this madrasah consistently integrate these skills into classroom activities to ensure students can connect theoretical knowledge with practical application.

However, interviews revealed that some teachers still faced challenges in distinguishing between numeracy skills and mathematics learning itself. For instance, they often equate numeracy solely with arithmetic operations rather than its broader meaning—such as problem-solving, reasoning, and interpreting data. This indicates that while conceptual awareness exists, there is still a need for deeper pedagogical enrichment. Studies such as by Sari & Hidayat (2021) and Fitriani (2020) also highlight that many elementary and madrasah teachers still need support in transforming their conceptual understanding of literacy and numeracy into pedagogical practice.

To address this, Madrasah Ibtidaiyah Nurul Huda Ngasem regularly conducts teacher sharing sessions to strengthen professional understanding of literacy and numeracy concepts. Through this collaborative learning culture, teachers exchange best practices and adapt successful teaching strategies used by peers. Such collegial activities support the notion proposed by Fullan (2019) that professional collaboration among educators is a powerful driver of educational innovation. As a result, teachers gradually develop a more comprehensive vision of literacy and numeracy, enabling them to design learning experiences that are both engaging and meaningful.

B. Strategies Used by Teachers to Enhance Numeracy Literacy

The findings indicate that teachers at MI Nurul Huda Ngasem employ various strategies to enhance students' numeracy literacy, emphasizing contextual learning, the use of concrete media, and integration with real-life situations. Teachers frequently relate mathematical problems to students' everyday experiences, such as trading, household measurements, and counting in religious practices. This contextualization makes abstract numerical concepts more tangible, aligning with Bruner's constructivist theory (1966) that learning becomes effective when students build knowledge through meaningful experiences.

Another dominant strategy observed is the use of learning media and visual aids, such as number cards, fraction models, and interactive board games. Teachers believe these media help bridge the gap between symbolic and conceptual understanding. Moreover, digital learning tools like Kahoot and Wordwall are occasionally used to make



numeracy practice enjoyable. Research by Suryani (2021) supports this, emphasizing that interactive and visual learning media significantly increase student engagement and retention in numeracy learning.

In addition, teachers integrate numeracy literacy across different subjects, such as using data interpretation in science lessons or arithmetic in Islamic charity counting. This cross-disciplinary approach reflects the spirit of Merdeka Belajar that encourages learning beyond subject boundaries. Such integration also reinforces what OECD (2020) identifies as key to improving numeracy skills—embedding mathematical reasoning across all learning areas. Thus, numeracy becomes not merely a skill taught in mathematics but a life competence developed through all learning contexts.

C. Challenges in Implementing Numeracy Literacy Strategies

Despite these positive efforts, several obstacles were identified in the implementation process. The first major challenge is the variation in students' basic numeracy skills. Teachers reported that some students, especially in lower grades, struggle with basic number concepts, making it difficult to engage them in higher-order reasoning activities. This disparity is compounded by the limited time allocation for remedial sessions. According to Lestari & Pratama (2020), the uneven readiness of students is a common challenge in literacy and numeracy programs, requiring differentiated instruction strategies.

Another constraint lies in teachers' workload and limited access to updated learning resources. Teachers often prepare materials independently, without adequate support from institutional programs or digital repositories. Although the school provides a literacy corner, specific numeracy resources such as manipulative kits or context-based storybooks are scarce. This affects the variety and quality of activities designed to develop numeracy literacy. The lack of consistent training on numeracy pedagogy further limits teachers' ability to innovate in the classroom.

Environmental and parental support also remains relatively low. Some parents still perceive numeracy learning as solely the responsibility of schools, without reinforcing it at home. Teachers expressed that home-based learning activities could significantly improve students' numeracy fluency if parents were more actively involved. This is consistent with Hornby (2011) who emphasizes that effective home-school collaboration contributes to higher academic achievement, particularly in foundational skills like literacy and numeracy.

**D. Efforts and Recommendations to Strengthen Numeracy Literacy**

In response to these challenges, the teachers and management of Madrasah Ibtidaiyah Nurul Huda Ngasem have developed several initiatives aimed at strengthening numeracy literacy culture. One notable program is the integration of numeracy activities in weekly literacy hours, where students engage in simple problem-solving games, math storytelling, and peer tutoring. This regular exposure encourages positive attitudes toward numeracy and gradually reduces math anxiety among students. The initiative mirrors findings from Han & Park (2022), who found that sustained engagement in playful numeracy tasks enhances both confidence and comprehension.

The school also promotes teacher collaboration and continuous professional development, providing opportunities for teachers to join workshops and online communities of practice on numeracy pedagogy. Through these forums, teachers gain access to innovative approaches such as Problem-Based Learning (PBL) and STEM integration. These strategies not only foster numeracy literacy but also cultivate critical thinking and creativity.

Furthermore, efforts are made to involve parents and the community through numeracy-based competitions and exhibitions. Parents are encouraged to participate in math-themed storytelling or market-day simulations that showcase how numerical reasoning applies in daily life. This holistic approach aligns with the whole-school literacy model recommended by UNESCO (2019), emphasizing that literacy and numeracy development should engage all educational stakeholders.

Overall, these efforts have gradually cultivated a stronger numeracy culture within the madrasah, transforming numeracy learning from a rigid academic subject into an engaging, meaningful, and community-supported practice.

4. Conclusion

The findings of this study demonstrate that the teachers at Madrasah Ibtidaiyah Nurul Huda Ngasem have implemented a variety of innovative and contextual strategies to enhance students' numeracy literacy, integrating mathematical reasoning into daily learning experiences. Teachers' efforts to contextualize lessons, use interactive media, and embed numeracy across subjects have proven effective in fostering student engagement and comprehension. However, challenges such as unequal numeracy readiness among students, limited teaching resources, and



insufficient parental involvement still hinder optimal outcomes. To address these issues, it is recommended that schools strengthen continuous professional development programs, provide accessible teaching materials, and foster stronger collaboration among teachers, parents, and the broader community. Additionally, education policymakers should support madrasah through structured numeracy enhancement initiatives, ensuring that every student receives equitable opportunities to develop critical, logical, and problem-solving skills. Ultimately, promoting numeracy literacy is not solely about mastering numbers, but about nurturing a generation capable of thinking analytically and applying mathematical reasoning to solve real-world problems in an ever-evolving society.

References

- Astuti, D. H. F., Haryati, T., & others. (2025). Teachers' Role in Enhancing Students' Literacy and Numeracy: A Qualitative Case Study at SDN Sambiroto Rembang. *SOSIOEDUKASI: JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL*, 14(2), 896–906.
- Darmalaksana, W. (2020). Metode penelitian kualitatif studi pustaka dan studi lapangan. *Pre-Print Digital Library UIN Sunan Gunung Djati Bandung*.
- Matthee, M., & Turpin, M. (2019). Teaching critical thinking, problem solving, and design thinking: Preparing IS students for the future. *Journal of Information Systems Education*, 30(4), 242–252.
- Moleong, L. J. (2017). *Metodologi penelitian kualitatif*/Lexy J. Moleong.
- Prayitno, M., & Mahmudi, M. R. (2025). Effectiveness of the Merdeka Belajar Policy: Challenges and opportunities in improving the quality of primary and secondary education in Indonesia. *MANDALIKA: Journal of Social Science*, 3(1), 16–21.
- Reyna, V. F., & Brainerd, C. J. (2023). Numeracy, gist, literal thinking and the value of nothing in decision making. *Nature Reviews Psychology*, 2(7), 421–439.
- Saputra, M. R., & Hilyatunisa, N. (2025). Towards 13 Years of Compulsory Education: Strategies for Equitable Access to Quality Education in Indonesia. *Journal of Smart Pedagogy and Education*, 1(1), 21–32.



- Sholihah, T. M., & Lastariwati, B. (2020). Problem based learning to increase competence of critical thinking and problem solving. *Journal of Education and Learning (EduLearn)*, 14(1), 148–154.
- Tyas, E. H., Sunarto, S., & Naibaho, L. (2020). Building superior human resources through character education. *TEST Engineering & Management*, 83, 11864–11873.
- Yang, K. (2024). Continuously Promoting Education to Serve Economic and Social Development While Promoting Comprehensive Human Development. *Journal of Advanced Research in Education*, 3(5), 91–100.