

Teachers' Strategic Approach and Factors Influencing Numeracy Skill of Grade V Elementary School Students

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Abstract. Numeracy skill becoming increasingly clear that is crucial for students in the 21st century. This skill must be developed and mastered in order to be used in everyday life appropriately. This study aims to describe the pedagogical approach of teachers' teaching strategies in numeracy learning, as well as the factors that influence the numeracy skill of grade V students of elementary school in Garut. This study used a qualitative descriptive research design approach method. The sampling technique employed was purposive sampling, with the subject of this study being teachers from grade V at the elementary school in Garut. This research instruments utilized were teacher interviews and classroom observations. The research findings indicate that: a) the students' numeracy skill at the research location remain low, b) the pedagogical approach of the teacher's strategy in teaching numeracy is still less innovative, and c) the factors that affect students' numeracy skill are lack of learning motivation, lack of support from parents/guardians, and lack of effective teaching media materials. Consequently, the proposed solution include collaboration with parents/guardians, increased utilization of technology in the use of teaching media materials, the incorporation of more innovative teaching media materials and the attraction of students' interest in learning.

Keywords: Numeracy Skills, Factors, Math Learning, Elementary School

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INTRODUCTION

The development of education, particularly in the field of mathematics, has been a concomitant of the development of civilization. It is therefore important that every individual has the requisite mathematical knowledge to enable them to meet future challenges (Kurniawan et al., 2022; Muslim et al., 2022). Numeracy skill or literacy numeric is a ability to perform numerical operations and comprehend data represented in numerical and/or mathematical formats is a crucial competence in both contemporary educational settings and in the practical aspects of daily life (Ariyana & Suardipa, 2023). The capacity to utilize numeracy skills enables individuals to solve problems encountered in their daily lives to make informed decisions (Han et al., 2017; Gal & Tout, 2014). For students in elementary school, especially the grade V, the development of numeracy skill is of great importance, as they form the foundation for the acquisition of fundamental mathematical concepts that will facilitate the understanding of more complex ideas at the subsequent level of education. The term "numeracy" is divided into four fundamental domains: numbers, measurement and geometry, algebra, uncertainty and data. Numeracy tests encompass a range of tasks, including the resolution of everyday problems presented in the format of narrative scenario (Lestari et al., 2023). Thus, mathematics education is crucial for the development of numeracy skill that essential for both education and everyday life, enabling problem-solving and informed decision-making.

According to Jean Piaget, children aged 10-11 years, equivalent to grade V elementary school students, are in the concrete operational stage of cognitive development (Piaget, 2007). At this stage, they are expected to comprehend fundamental mathematical concepts and apply them to solve practical problems. Vygotsky further asserts that with appropriate scaffolding and support, children in this age group can bridge the gap between their current abilities and potential capabilities, particularly in literacy (Vygotsky, 1978). Mathematical proficiency for students of this level encompasses conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition (Kilpatrick et al., 2001). Similarly, the National Council of Teachers of Mathematics (NCTM) outlines that students at this stage should master operations with whole numbers, fractions, and decimals and apply these skills to real-world contexts (NCTM, 2000).

However, those theoretical expectations, however, contrast sharply with the reality on the ground, as evidenced by various studies and field observation. The 2022 Programme for International Student Assessment (PISA) survey results by the Organization for Economic Cooperation and Development (OECD), indicate a decline in numeracy skills on an international scale, including among Indonesian students (OECD, 2023). This suggests the existence of a gap, whereby the majority of Indonesian students continue to encounter difficulties in comprehending and utilizing their numeracy abilities. This is shaped by a multitude of factors, both internal to the students themselves and external to their surrounding environment. This encompasses their experiences within the educational system, familial context, and the broader social milieu (Farhan & Jumardi, 2023). It is evident that mathematics learning, with the objective of developing students' numeracy skills, must comprise contextual learning based on constructivism theory, which posits the learning occurs through interactions between students and their environment.

The persistence of these challenges can be attributed to a complex interplay of internal and external factors that shape students' numeracy development. Internally, cognitive constraints, math anxiety, and low intrinsic motivation serve as major barriers to learning. Research suggests that students who experience math anxiety exhibit neural activation patterns similar to those observed in individuals experiencing physical pain, which can lead to avoidance behaviors and decreased engagement with numeracy tasks (Ashcraft & Krause, 2007). Additionally, deficits in early mathematical exposure and conceptual understanding contribute to cumulative learning difficulties, making it harder for students to acquire higher-order numeracy skills as they progress through their education.

Externally, environmental factors, including the quality of teaching, parental involvement, socioeconomic background, and the broader sociocultural context, play a crucial role in

determining numeracy outcomes (Farhan & Jumardi, 2023). Studies indicate that students from low-income families often have limited access to educational resources, including books, tutoring, and digital learning platforms, which are essential for reinforcing numeracy skills outside the classroom (Engel et al., 2013). Furthermore, the educational system itself may not always provide sufficiently adaptive or student-centered learning experiences, leading to a disconnect between curriculum expectations and students' lived realities.

Given these challenges, mathematics instruction must incorporate contextualized, constructivist-based learning approaches to bridge the gap between theoretical frameworks and practical applications. Constructivism, as originally proposed by Piaget (1950) and later expanded by Vygotsky (1978), posits that learning occurs through social interaction and active engagement with one's environment. In the context of numeracy education, this implies the necessity of student-centered, inquiry-based, and problem-solving approaches that allow learners to explore numerical concepts through real-world applications and meaningful experiences. Empirical research supports the use of contextualized mathematical problems, particularly those rooted in students' everyday lives, as they foster greater cognitive engagement, deeper conceptual understanding, and long-term retention of mathematical principles.

Thus, for mathematics learning to be an effective vehicle for numeracy development, it must transcend rote memorization and procedural teaching and instead embrace interactive, experiential, and culturally relevant pedagogies. This shift requires a multidimensional approach, including teacher professional development, curriculum innovations, the integration of digital learning tools, and active parental involvement to ensure that students receive the necessary scaffolding and support to develop their numeracy competencies in a holistic manner. Future research should continue exploring how interdisciplinary learning strategies, cognitive neuroscience insights, and adaptive learning technologies can contribute to the improvement of numeracy education at both national and global levels.

Extensive prior research has delineated numerous factors that critically influence the effective implementation of numeracy learning. These encompass the foundational abilities of teachers, the adequacy of school infrastructure, and the strategic integration of formal, non-formal, and informal educational settings (Siregar, 2022). Additionally, constraining factors in numeracy learning include the lack of effective numeracy programs and students' limited reasoning and critical thinking skills. The PISA 2022 study underscored the pivotal role of teacher quality in student learning outcomes. A teacher may be regarded as a learning agent, facilitating the enhancement of students' numeracy abilities (Yustitia et al., 2021). To enhance students' capabilities, it is essential to consider the role of the educational system, students, and

educators. Students' aptitudes and attitudes towards learning, in conjunction with the caliber of instruction in the classroom, are the primary determinants of student success. This aligns with the perspective of expert scholars who assert that educators must cultivate a constructive learning environment and provide exemplary instruction that positively impacts student outcomes (Meeks et al., 2014). The factors that influence students' numeracy skills can be attributed to the inherent abilities of the students themselves and the role of the learning process itself, whether it is a facilitator or an obstacle.

Those data show a gap between the expected theory and the reality in the field. The motivation for conducting this research is based on the aforementioned problem focus and the identified gaps in previous research. While national standards suggest that grade V elementary school students should achieve specific literacy numeric or numeracy benchmarks, such as demonstrating competence in applying mathematical concepts to everyday problems. Field observations indicated otherwise. These discrepancies highlight the need for further investigations into the Teachers' Strategic Approach and Factors Influencing Numeracy Skill of Grade V Elementary School Students. To this end, the investigation seek to contribute nuanced insights into the multifaceted interactions among instructional methodologies, student engagement, and environmental influences on numeracy outcomes.

METHODOLOGY

This study employs a qualitative descriptive research design to explore the pedagogical strategies of teachers and the factors influencing numeracy skills among grade V students. Data gathering methodologies included semi-structured interviews with teachers and classroom observations, allowing for an in-depth understanding of teaching strategies and student responses. Data processing involved transcription and thematic coding to identify key patterns and themes. Data analysis was conducted iteratively, combining inductive and deductive approaches to ensure comprehensive insights. To ensure the validity of findings, the study employed triangulation techniques by cross-verifying data from multiple sources, such as interviews, observations, and relevant literature. In this study, the researcher assumed the role of the principal instrument. Patton (2002) asserts that researchers engaged in qualitative research must possess the ability to collect data directly and to comprehend the context of the phenomenon under study (Patton, 2002). It is therefore crucial that the researcher is present during data collection in order to gain a deeper understanding of the subject matter.

The research was conducted in a public elementary school in Garut, which operates under the K13 curriculum framework and Merdeka curriculum for grade I and IV. Participants included two grade V teachers and their student. Teacher A specializes in integrating

numeracy within mathematics, while Teacher B employs a distinct numeracy program. These contrasting approaches provided a comparative perspective on pedagogical strategies and their impacts on student outcomes.

RESULTS AND DISCUSSION

The findings of this study are derived from a comprehensive analysis of qualitative data obtained through structured interviews with educators and systematic classroom observations conducted at a public elementary school in Garut. These findings provide critical insights into the integration of numeracy literacy practices within students' daily learning experiences and underscore the role of instructional strategies in shaping numeracy competencies. Despite the presence of numeracy-related activities in classroom instruction, the school has not yet implemented a structured, measurable program specifically designed to enhance numeracy literacy on a broader scale. This highlights the pivotal role of classroom educators in fostering numeracy skills through pedagogical innovation and targeted interventions. The absence of a well-defined institutional framework for numeracy literacy development suggests a need for curriculum enhancement and professional development opportunities for educators to strengthen numeracy instruction.

The academic curriculum followed by this public elementary school remains aligned with the Kurikulum 2013 (K13) framework, which serves as the national standard for primary education in Indonesia. Within the scope of this study, two classes—Grade V-A and V-B—participated in the Asesmen Kompetensi Minimum (AKM) test, a standardized assessment designed to evaluate students' foundational literacy and numeracy skills. The AKM test aims to measure students' ability to apply mathematical concepts in real-world contexts, thus providing a diagnostic overview of their numeracy proficiency. However, an analysis of student performance in numeracy-related tasks revealed notable disparities in comprehension levels, problem-solving abilities, and mathematical reasoning. These findings reinforce existing research indicating that students often struggle with abstract mathematical concepts when instructional approaches do not adequately scaffold learning through contextualized, real-life applications.

Furthermore, qualitative data from teacher interviews and classroom observations, supplemented by student responses during numeracy instruction, indicate that a substantial proportion of students experience persistent challenges in understanding and solving numeracy-related problems. These difficulties are exacerbated by a lack of intrinsic motivation, which often results in the perception that numeracy—particularly in the context of mathematics learning—is overly complex and burdensome. Motivational factors, including self-efficacy, prior mathematical experiences, and the availability of engaging instructional methods, play a

crucial role in shaping students' attitudes toward numeracy. Research in educational psychology suggests that students who perceive mathematics as intimidating or disconnected from their lived experiences are less likely to engage with numeracy tasks in a meaningful way. This aligns with Vygotsky's (1978) sociocultural theory of learning, which emphasizes the importance of social interaction, scaffolding, and culturally relevant pedagogical approaches in cognitive development.

Additionally, the variation in students' numeracy proficiency within the observed classrooms indicates that numeracy skill development is not homogeneous. The advancement of students' numeracy abilities appears to be contingent on individual cognitive abilities, external learning support, and access to relevant educational resources rather than a standardized institutional approach. The disparities observed suggest that while some students demonstrate a capacity for mathematical reasoning and problem-solving, others struggle due to insufficient foundational knowledge, limited exposure to numeracy-enriched environments, and a lack of confidence in their mathematical abilities. Consequently, this necessitates a differentiated instructional approach in which educators implement adaptive teaching strategies tailored to diverse student needs.

To address these challenges, it is imperative to consider pedagogical interventions that integrate multisensory learning approaches, real-world problem-solving activities, and context-based numeracy instruction to enhance student engagement and comprehension. Furthermore, strengthening teacher training programs and institutional support mechanisms for numeracy instruction could play a vital role in improving outcomes. Future research should explore the effectiveness of technology-assisted learning, peer collaboration strategies, and formative assessment techniques in enhancing numeracy literacy among elementary school students. With sustained efforts, the development of a robust, structured numeracy literacy program could significantly contribute to improving mathematical competency and fostering a more positive learning environment.

Teachers' Strategy Approaches

An analysis of the data obtained from the interviews and observation conducted with teacher A indicates that there is an integration of numeracy learning with mathematics learning, carried out on three occasions a week in accordance with the predetermined schedule. Teacher A, however, pointed out a significant limitation: her lack of a formal background in mathematics education. This challenge hampers her ability to employ innovative pedagogical methods to enhance learning. They remarked, "I integrate numeracy learning with mathematics, but my limited background in mathematics education poses a challenge in applying innovative teaching strategies." This statement highlights her reliance on conventional resources such

as textbooks and digital videos on YouTube platform. This finding aligns with a research that underscores how the lack of innovative teachers in learning will make students easily bored and lazy, leaving no opportunity for children to actively discover their own concepts (Barus et al., 2023).

The lack of innovation in numeracy learning was further demonstrated by the limited use of diverse teaching media. Observations revealed that students in teacher A's class exhibited hesitation and a lack of enthusiasm during numeracy lessons. Teacher A noted, "Many students struggle with basic numerical operations, which affects their ability to solve complex problems." These challenges are compounded by low motivation among students, who often perceive numeracy-related activities as burdensome. Consequently, progress in numeracy skills varies widely among students, depending largely on their individual drive and access to resources. This aligns with findings from a study that identified low interest and learning difficulties as critical internal barriers to numeracy skill development (Lestari et al., 2023).

Furthermore, these challenges are exacerbated by low motivation among students, a phenomenon widely recognized in the field of mathematics education. Many students perceive numeracy-related activities as tedious or burdensome, which negatively impacts their engagement and willingness to persevere through complex problem-solving tasks. Self-determination theory (SDT) posits that students' intrinsic motivation is crucial for sustained engagement in learning activities, and when learning is perceived as overly difficult or disconnected from real-life applications, motivation tends to decline (Deci & Ryan, 1985). The lack of differentiated instruction, which could accommodate various learning styles and cognitive abilities, further reinforces these motivational barriers.

As a result, progress in numeracy skills varies widely among students, largely depending on individual perseverance, external support systems, and access to supplementary learning resources outside of school. Socioeconomic factors also play a crucial role in this disparity, as students with greater exposure to home-based numeracy activities, parental guidance, and digital learning tools often demonstrate more rapid skill acquisition compared to their peers from less resource-rich backgrounds (Engel et al., 2013). This aligns with findings from a study that identified low interest in mathematics, cognitive processing difficulties, and limited exposure to engaging numeracy activities as critical internal barriers to numeracy skill development (Lestari et al., 2023).

To address these challenges, future research should explore evidence-based interventions, such as game-based learning, contextualized numeracy tasks, and adaptive digital learning platforms, which have been shown to enhance motivation and conceptual understanding (Rittle-Johnson et al., 2015). Additionally, professional development programs for educators

should emphasize the importance of multisensory instruction, real-world problem-solving, and scaffolding techniques to ensure that numeracy instruction is both accessible and engaging for diverse learners. By adopting a more holistic and student-centered pedagogical approach, schools can mitigate learning disparities and foster a more inclusive numeracy learning environment.

On the other hand, interviews with Teacher B and classroom observations revealed a markedly different approach. Teacher B separated numeracy instruction from mathematics lessons, dedicating two sessions a week exclusively to numeracy activities. This routine habituation is in line with research which found that students tend to have developed literacy and numeracy skills (Kirani et al., 2024). Furthermore, during these sessions, the class teacher consistently directs the learning process towards a learning-by-play approach. This is achieved through the implementation of various activities, including the utilisation of games such as snakes and ladders, poison ball, hide and seek, *sondah*, and the like. Teacher B explained, “Using games motivates students and makes learning enjoyable.” Observations supported this claim, showing heightened student engagement and enthusiasm during game-based activities. This is also line with Dienes’ theory of learning while playing which is contained in research which states that use of game-based learning media can increase students’ numeracy learning motivation (Rismawanti et al., 2024).

Despite these positive outcomes, challenges persisted. Observations indicated fatigue and disinterest among students in teacher B’s class, even before lessons began, and many expressed dis-satisfaction with the teaching strategies employed. Guardians and parents echoed these concerns. Teacher B observed, “Students’ lack of motivation is a significant obstacle to their comprehension and resolution of problems, particularly those involving the simplification of fractions and narrative problems.” Consequently, the teacher B has striven to integrate story-based problems into the practice routines, incorporating numerical values and mathematical operation symbols commonly encountered in daily life. The teaching methods employed have varied, both individually and in groups. However, classroom teachers have not utilised more innovative and interactive teaching media materials.

Factors Influencing Students’ Numeracy Skill

Interviews and observations identified several factors influencing numeracy learning implementation at this elementary school. Such factors include the provision of training for teaching staff and the organisation of forums involving educators who have expertise in the field of numeracy teaching. Teacher A highlighted, “Training sessions and forums with experienced educators help us refine our approaches to numeracy teaching.” This underscores the vital role of professional development programs in improving teachers’

instructional effectiveness. The results of the interviews indicate that these forums frequently include PPG graduate educators, in addition to other individuals who possess expertise in the effective and efficient teaching of numeracy. These individuals gain invaluable insight that is instrumental in enhancing the pedagogical efficacy of educators when instructing students, particularly in the domain of numeracy. Furthermore, the recently appointed principal has underscored the significance of fostering students' numeracy development through dedicated initiatives. Despite these endeavours, this public primary school has not yet introduced a dedicated programme that incorporates numeracy literacy habituation activities for all students.

The inhibiting factors affecting students' numeracy skills can be classified into two categories: internal factors and external factors. From an internal perspective, students' own abilities, low interest and motivation to learn, perceptions that mathematics is a burdensome subject, deliberate absence from scheduled mathematics or numeracy learning days, and a lack of understanding of numeracy concepts and their application in everyday life were identified as factors that hinder students' numeracy skills. Teacher A observed, "Students often perceive numeracy tasks as too difficult, which discourages them from trying." This is in line with research that reveals that internal factors that affect numeracy skills are learning difficulties within students characterised by difficulties in learning to count, errors in using formulas, and difficulties in working on narrative story problems (Utari et al., 2019). Students' ability, low interest and motivation to learn, perceptions that mathematics is considered a burdensome subject, deliberate absence on mathematics learning days or deliberate numeracy on days scheduled for mathematics lessons, and lack of understanding of numeracy concepts and their application in everyday life were identified as factors inhibiting students' numeracy skills (Lestari dkk., 2023).

Besides, in terms of external factors, limited parental or guardian support for numeracy-related programmes, inadequate school infrastructure facilities, and a lack of innovative teaching approaches and interactive teaching media materials that can be utilised to attract students' interest in learning by educators were also identified as factors that inhibit students' numeracy skills. Teacher B pointed out, "Limited parental support and inadequate school facilities significantly hinder students' progress." This is in line with research which states that the lack of support from parents for numeracy-related programmes, inadequate school facilities and infrastructure, and the absence of innovative teaching approaches and interactive teaching media materials that can engage students were also identified as factors that hinder students' numeracy skills (Farhan & Jumardi, 2023). The absence of effective numeracy reinforcement programs, coupled with the low levels of students' critical thinking and reasoning abilities, has been identified as a significant challenge in education (Siregar, 2022). In addition to this, the quality of teachers emerges as a pivotal factor in addressing these issues. It is crucial to

recognize and pay attention to the interconnected roles of the education system, students, and teachers in overcoming these challenges.

Teachers, in particular, must be seen as key agents of change, playing an active role in improving students' numeracy skills. They are responsible for creating a conducive and high-quality learning environment that supports the development of these skills. By fostering a positive and engaging classroom atmosphere, teachers can help students not only improve their numeracy abilities but also enhance their critical thinking and problem-solving skills. As emphasized by Meeks et al. (2014) and Yustitia et al. (2021), teachers must employ effective teaching strategies and adapt their approaches to meet the diverse needs of their students. This comprehensive approach is essential in ensuring that numeracy education becomes more impactful and accessible, ultimately contributing to better learning outcomes for all students (Meeks et al., 2014; Yustitia et al., 2021).

The findings from this needs analysis indicate that there is still a significant underutilization and underdevelopment of media resources in numeracy instruction. Despite this, the integration of media into the learning process holds considerable potential as a viable alternative solution. As highlighted by Kurniawan et al. (2022), incorporating various forms of media into educational practices can provide innovative and effective strategies to enhance student engagement and improve learning outcomes. This suggests that there is an opportunity to explore and expand the use of media in numeracy education, which could contribute to more dynamic and impactful learning experiences for students (Kurniawan et al., 2022). It is crucial to identify the factors that facilitate and impede numeracy learning in order to direct future efforts towards improving students' numeracy skills. These efforts should focus on enhancing teacher training, developing innovative teaching approaches, and creating an environment that is conducive to the development of numeracy skills in primary schools.

CONCLUSION

Based on the data and findings presented in the previous chapter, it can be concluded that the numeracy skills of fifth-grade students at a primary school in Garut remain inadequate. Students continue to face challenges in understanding the underlying meaning of the problems presented in each question. The teaching approach adopted by the classroom teacher lacks innovation, resulting in an ineffective and inefficient numeracy learning process, as it takes a considerable amount of time to thoroughly analyse each question. Several factors influencing students' numeracy skills include an imperfect school program in terms of instilling numeracy literacy habits, insufficient student motivation, a lack of support from parents or guardians, and the underutilization of more innovative and engaging learning media, which could potentially boost student motivation.

Thus, the proposed solutions involve fostering stronger collaboration between teachers, parents, and guardians, as parental involvement has been shown to play a critical role in reinforcing numeracy skills beyond the classroom. Regular communication between educators and parents can facilitate home-based numeracy activities, ensuring that students receive continuous support in their learning process. Additionally, increasing the use of technology-enhanced learning tools can further bridge the gap between traditional and modern instructional strategies, making numeracy education more engaging and accessible. Digital platforms, adaptive learning software, and virtual simulations can cater to diverse learning styles, allowing students to explore mathematical concepts through interactive and self-paced learning experiences.

This study is expected to contribute not only to the enhancement of students' numeracy skills but also to the broader improvement of mathematics education quality in Indonesia. Given the persistent challenges identified in national and international assessments, such as the PISA and TIMSS studies, these findings underscore the urgent need for pedagogical innovation and curriculum development tailored to Indonesian students' learning needs (OECD, 2023). Furthermore, the study aims to provide practical insights for educators, enabling them to develop more effective, evidence-based teaching strategies that integrate cognitive science principles, educational technology, and differentiated instruction techniques.

Additionally, these findings are anticipated to assist policy-makers and curriculum developers in designing more inclusive and comprehensive numeracy programs, ensuring that students from diverse backgrounds receive equitable access to high-quality mathematics education. By addressing the key factors influencing students' numeracy abilities—such as learning environment, instructional methods, socio-economic factors, and cognitive development—this study contributes to a more holistic and sustainable approach to mathematics education reform. Future research should explore longitudinal studies and experimental interventions to assess the long-term impact of these proposed strategies on students' mathematical performance and overall academic success.

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