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The Role of Teachers as Coaches in Developing Students' Numeracy Literacy Skils at SD Negeri Sambiroto Rembang

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A B S T R A C T

Numeracy literacy is a fundamental competency in primary education, enabling students to apply mathematical concepts in daily life and to think critically in problem solving. However, many elementary school students still face challenges in achieving adequate proficiency. This study aims to examine the role of teachers as coaches in developing students' numeracy literacy skills at SD Negeri Sambiroto, Rembang. Employing a qualitative case study design, data were gathered through classroom observations, in-depth interviews, and documentation, involving teachers, students, and school administrators. The findings indicate that teachers enact their coaching role through four interrelated strategies: creating a numeracy rich learning environment, facilitating contextual and meaningful instruction, designing structured and differentiated practice activities, and implementing formative and reflective assessments. These strategies form an integrated cycle that fosters active engagement, critical thinking, and the application of mathematics in authentic contexts. Teachers incorporate numeracy into daily routines, employ manipulative tools, adapt learning activities to varied student levels, and maintain learning portfolios to monitor progress. The study concludes that the teacher as coach model significantly enhances numeracy development, highlighting the importance of sustained teacher professional growth and strong leadership support in primary education.

1. Introduction

Numeracy literacy serves as a fundamental foundation for developing students' cognitive competencies, particularly at the elementary education level. In the context of 21st century learning, numeracy is not merely about mastering mathematical formulas but about applying mathematical reasoning to solve everyday problems. Numeracy is defined as the ability to think logically using mathematical concepts, procedures, facts, and tools across various everyday contexts (Kemendikbudristek, 2022). According to the Ministry of Education, Culture, Research, and Technology (2023), numeracy competence at the elementary level encompasses number sense, algebra, geometry, and data &

uncertainty domains, all of which are essential to developing students' logical thinking, problem-solving, and decision-making skills (Putri & Rahmawati, 2021; Hasanah, 2020).

Despite its importance, the learning outcomes of students at SD Negeri Sambiroto, Sedan District, Rembang Regency, remain below the expected standard of 70%. The 2024 Minimum Competency Assessment (AKM) shows that in literacy, students achieved an average score of 42.65 for reading informational texts and 46.63 for reading literary texts, with the ability to access and identify text content scoring 41.48. In numeracy, the performance is similarly low, with an average score of 37.35 in the number domain, 28.24 in algebra, and 33.52 in geometry. These results indicate that students still face significant challenges in both understanding and applying core competencies, underscoring the need for targeted and innovative instructional approaches.

These findings reflect students' difficulties in fundamental mathematical reasoning and problem solving. One contributing factor is the suboptimal role of teachers in embedding numeracy literacy within the learning process. Teachers are not only instructors but also *coaches*professionals who guide, motivate, and facilitate student learning in a supportive and developmental manner (Sulastri & Mulyani, 2021). According to Carolina (2022), tutoring and individualized attention play a vital role in strengthening students' numeracy and literacy performance.

Nevertheless, teachers at SDN Sambiroto still face various obstacles, including limited use of digital learning tools, non interactive pedagogical strategies, and minimal provision of constructive feedback. Additionally, low student engagement, lack of concrete teaching aids, and insufficient diagnostic assessment practices hinder the development of numeracy literacy (Kurniawan & Sari, 2020; Suryanto, 2021). Previous research often focuses on macro level literacy and numeracy improvement programs, with limited emphasis on teachers' roles as coaches especially in rural elementary schools. In fact, teachers are frontline agents of educational transformation who require greater focus in the effort to develop students' numeracy literacy through structured guidance and coaching.

This study focuses on exploring the role of teachers as coaches in improving students' numeracy literacy at SD Negeri Sambiroto with attention to four sub focuses: (1) teachers as educators who instill numeracy values, (2) teachers as instructional coaches in the classroom, (3) teachers as facilitators of practice and problem solving, and (4) teachers as assessors who provide meaningful feedback and track student progress. Using a qualitative case study approach, this research aims to describe in depth how these coaching roles are implemented, analyze the strategies that support numeracy development, and identify challenges faced by teachers, thereby offering both theoretical and practical contributions for improving numeracy literacy through teacher-driven coaching practices at the elementary level.

2. Methodology

This study employed a qualitative approach with a case study design. This approach was chosen as it allows the researcher to explore and gain an in-depth understanding of the phenomenon of teachers' roles as coaches in facilitating, guiding, and assessing students' numeracy literacy development at SD Negeri Sambiroto, Rembang. The qualitative approach is exploratory and interpretative, aiming to uncover meanings, patterns, and deep understanding from the participants' perspectives (Annita, 2023). According to Creswell (2018), qualitative research seeks to understand the meanings constructed by individuals based on their social experiences, using a naturalistic process within real life contexts. This is in line with Arikunto (2019), who asserts that qualitative research emphasizes meaning over numerical data and delves deeply into social phenomena.

A case study design was chosen because it facilitates a comprehensive exploration of real-life phenomena in detailed contexts, allowing the researcher to uncover social interactions, learning processes, and the dynamics of numeracy literacy coaching by teachers in elementary school settings (Yusriani, 2022). The research was conducted at SD Negeri Sambiroto Sedan District Rembang Regency, which was purposively selected due to its consistent implementation of numeracy programs, such as numeracy focused extracurricular activities, real life problem solving exercises, and integration of numeracy tasks in thematic learning. The study was carried out from March to July 2025.

The research subjects consisted of the school principal, three classroom teachers, and three students. The subject selection employed purposive sampling, which involves selecting informants based on specific criteria considered most relevant to the research focus (Arikunto, 2019). This method aligns with qualitative research principles, which prioritize depth and relevance of information over quantity (Annita, 2023). In qualitative research, the researcher functions as the main instrument (human instrument), responsible for determining the focus, selecting informants, gathering data, and interpreting findings from the field (Sugiyono, 2016). Supporting instruments included observation guidelines, interview guides, and documentation protocols. Creswell (2018) emphasizes the researcher's role in establishing direct interaction with participants to uncover contextual meanings, especially in numeracy literacy coaching contexts.

Data were collected using three primary techniques: (1) Observation, involving direct observation of numeracy literacy teaching and learning activities, particularly strategies used by teachers in guiding students through number sense, algebra, geometry, and data interpretation. (2) In-depth interviews, conducted with the school principal, teachers, and students to explore their perceptions, experiences, and challenges in numeracy literacy learning. (2) Documentation, including analysis of lesson plans, AKM (Minimum Competency Assessment) results, teaching materials, and school numeracy activity records. According to Ghozali (2018), employing multiple data collection methods is essential for enriching information and ensuring validity through triangulation. Data credibility in this study was ensured using source triangulation (comparing data from principals,

teachers, and students) and method triangulation (comparing findings from interviews, observations, and documentation). Ghozali (2018) describes triangulation as a key step to enhance the trustworthiness and confirmation of data from multiple perspectives.

The data analysis technique used in this study followed the Miles and Huberman (2014) interactive model, which includes four stages: (1) Data Collection, (2) Data Reduction, (3) Data Display, and (4) Conclusion Drawing/Verification. This iterative process enabled the researcher to construct valid interpretations of how teachers play their roles as coaches in supporting numeracy literacy development. Ghozali (2018) notes that qualitative data analysis emphasizes meaning making and interpretation over superficial description, aiming to identify deeper patterns and relationships in accordance with the research objectives.

3. Results and Discussion

SD Negeri Sambiroto, located in Sedan District, Rembang Regency, is a public primary school serving students from diverse socio-economic backgrounds, predominantly from rural communities. The school environment is characterized by modest physical facilities, including multi-grade classrooms, a small library, and limited technological resources. Nevertheless, the school maintains a warm and collaborative atmosphere, where teachers, students, and parents actively participate in school activities. Classrooms are arranged to encourage interaction, with students' work displayed on walls and corners dedicated to learning aids. Although resources are limited, teachers creatively utilize available materials to design engaging lessons. Daily school life blends academic instruction with community-oriented activities, reflecting the school's emphasis on character education and practical life skills. This context provides an authentic setting for examining how teachers implement their coaching roles to foster numeracy literacy, especially in adapting pedagogical strategies to both the strengths and challenges of the school environment.

This study aims to describe the role of teachers as coaches in developing students' numeracy literacy skills at SD Negeri Sambiroto, Sedan District, Rembang Regency. Based on the results of observations, in-depth interviews, and document analysis, it was found that the teacher's coaching role is manifested in four main aspects: (1) creating a numeracy-rich learning environment, (2) facilitating contextual numeracy instruction, (3) designing structured and differentiated practice activities, and (4) implementing formative and reflective assessment. These four aspects interact to form a continuous and meaningful teacher-led coaching pattern for strengthening students' numeracy literacy

Creating a Numeracy-Rich Learning Environment

Teachers deliberately build a numeracy-friendly classroom ecosystem by integrating number related routines into students' daily activities. From the beginning of the school day, students are involved in counting classmates, recording

book loans from the classroom library, and calculating revenues during school bazaars. These activities train students not only in basic arithmetic operations such as addition and subtraction but also in understanding financial value, responsibility, and real-life applications of numeracy. Classroom environments are enriched with numerical content through visual aids such as number charts, temperature graphs, and interactive calendars. Students are prompted to read dates, calculate durations, or identify patterns in calendar use. *"We integrate numeracy into daily routines so students see math as part of their lives,"* (Lower Grade Teacher, Interview, April 2025).

Teachers at SDN Sambiroto strategically craft a classroom ecosystem that is conducive to developing numeracy skills. Through intentional incorporation of number-related routines into daily classroom activities, students are continuously exposed to mathematical concepts in meaningful contexts. For example, students are engaged in counting their peers during roll call, documenting book loans in the class library, and computing income during bazaar events. These daily practices, though simple, serve as fundamental exercises in reinforcing arithmetic operations, financial literacy, and decision-making abilities.

Such practices are supported by Cheung et al. (2021), who emphasize the importance of routine-based numeracy activities in early education, noting their positive impact on students' interest and self efficacy in mathematics. The researchers argue that repeated exposure to practical mathematical tasks embedded in everyday life not only enhances basic arithmetic but also nurtures an intrinsic appreciation for mathematical thinking. In the context of this study, the deliberate blending of real life activities and numeracy ensures that mathematics is not perceived merely as an abstract academic subject, but as an essential component of daily living.

To visually reinforce this environment, classrooms are adorned with educational aids such as number charts, temperature graphs, and interactive calendars. Students are frequently encouraged to interpret these visuals, such as reading dates, calculating elapsed time, and identifying seasonal patterns, which deepens their understanding of time-related concepts and fosters pattern recognition. Risdiyanti et al. (2024) highlight that numeracy tools and visual supports foster early conceptual development and encourage active engagement in primary school students.

Overall, this strategy contributes to the formation of a numeracy conscious learning culture where mathematical reasoning becomes an organic part of students' daily behavior. As teachers embed numerical thinking across routines and the learning environment, they fulfill the role of a coach who scaffolds and sustains long-term cognitive engagement with numeracy. To explore this aspect in more depth, several interview questions were posed to teachers focusing on daily routines, integration with other subjects, the use of classroom displays, and real-life connections, as shown in table 1.

Table 1. Interview Questions

No	Interview Question
1	What daily routines in your classroom involve numerical activities?
2	How do you integrate numeracy into non-mathematics subjects?
3	What classroom displays or visual aids do you use to support numeracy?
4	How do these activities help students connect mathematics to real life?

The responses to these questions revealed that teachers at SD Negeri Sambiroto view the creation of a numeracy-rich environment as an intentional and ongoing process rather than a one-time effort. Daily routines such as roll call, managing library book loans, and organizing classroom duties are designed to involve counting, simple calculations, and comparisons. Teachers also integrate numerical elements into non-mathematics lessons such as calculating distances in physical education, counting vocabulary items in language classes, or measuring quantities in art projects so that numeracy is reinforced across the curriculum. In terms of physical spaces, they emphasized the value of displaying number charts, measurement tools, and visual data such as weather graphs or attendance records. These displays are used actively as learning references and discussion prompts, helping students interact with numbers daily in low-pressure contexts and gradually reducing anxiety towards mathematics.

Facilitating Contextual Numeracy Instruction

The teacher's role as a coach is evident in the design and implementation of contextual numeracy learning. Teachers do not merely deliver content; they create learning experiences grounded in real-life situations. For instance, when teaching measurement concepts, students measure their height, desk length, or calculate the area of the school garden. These activities help bridge abstract mathematical ideas with concrete student experiences. Teachers also utilize manipulative tools such as rulers, wall clocks, play money, and number cards to enhance conceptual understanding. In data processing topics, students collect peer data and present it using simple tables or bar charts. This approach promotes active student engagement, logical reasoning, and mathematical communication. As one teacher stated, *"When content is connected to student experiences, they understand better and are more enthusiastic"* (Upper Grade Teacher, Observation, May 2025).

Another key dimension of coaching observed in this study is how teachers deliver numeracy instruction within contextual and meaningful learning frameworks. Instead of relying solely on traditional didactic methods, teachers at SD Negeri Sambiroto design learning activities based on real life problems and student experiences. Examples include measuring the length of classroom furniture, calculating the area of the school garden, and simulating a marketplace to determine the total cost of purchased goods. These practical tasks provide tangible connections between abstract mathematical concepts and the students' everyday realities.

This instructional approach reflects constructivist learning theory, which posits that learners build knowledge more effectively when it is linked to prior experience and

real-world relevance (Bruner, 1966; Arissaputra, 2023). The use of contextual problems not only strengthens conceptual understanding but also boosts student motivation and engagement. Arissaputra (2023) further explains that problem-based and contextually relevant instruction fosters deeper cognitive processing and develops logical reasoning and problem solving skills. The integration of manipulative materials such as rulers, wall clocks, play money, and number cards supports this approach by making abstract concepts more concrete. Similarly, when students collect peer data and present it in tables or bar charts, they practice both analytical thinking and mathematical communication an approach consistent with pedagogical recommendations from Cheung et al. (2021).

Ultimately, facilitating contextual numeracy instruction positions teachers as designers of meaningful learning experiences rather than mere transmitters of information. Their coaching role is evident in how they adapt teaching content to match student backgrounds, ensuring that numeracy becomes more relatable, practical, and impactful. To gain deeper insight into this practice, teachers were asked several interview questions focusing on the selection of contexts, use of materials, and observations of student engagement, as shown in table 2.

Table 2. Interview Questions for Facilitating Contextual Numeracy Instruction

No	Interview Question
1	Can you give examples of real-life situations you use to teach numeracy concepts?
2	How do you decide which contexts are most relevant for your students?
3	What materials or tools do you use to make abstract concepts more concrete?
4	How do students respond to contextual learning compared to traditional methods?

The responses indicated that teachers deliberately select learning contexts that are closely connected to students' daily lives, such as measuring their height, calculating the area of the school garden, or simulating market transactions using play money. These choices are based on student age, local culture, and the availability of resources, ensuring that lessons remain relevant and meaningful. Simple and tangible tools like rulers, clocks, and number cards are preferred to make abstract concepts concrete and encourage hands-on exploration. Teachers also observed that students are more engaged, ask more questions, and participate more actively when lessons are linked to familiar situations rather than delivered through traditional lectures. This finding reinforces the idea that contextual instruction not only improves comprehension but also strengthens the connection between mathematics and everyday life, aligning closely with constructivist principles of meaningful, experience-based learning.

Designing Structured and Differentiated Practice Activities

Teachers at SD Negeri Sambiroto design structured numeracy exercises that cater to students' varying ability levels. For students struggling with concepts, teachers provide simplified tasks and guided step by step instruction. Advanced students are challenged with open ended problems, logic games, or project based tasks such as compiling simple financial reports. Practice sessions are conducted regularly through individual tasks, group work, and projects. For instance, in a simulated

marketplace, students practice calculating transactions and analyzing profits. Teachers also assign daily schedule planning, time conversion, and data interpretation tasks that mirror real life contexts. To illustrate the variety of practice formats and the skills targeted, table 3 presents examples of numeracy activities implemented by teachers along with their intended learning outcomes and coaching approaches.

Table 3. Types of Numeracy Practice Activities and Targeted Skills

Type of Activity	Targeted Skill	Grade Level	Coaching Approach	Type of Activity
Sales simulation & financial report	Arithmetic, basic business logic	Grades 4–6	Small-group guidance	Sales simulation & financial report
Measuring school objects	Length and area measurement	Grades 3–5	Hands-on exploration	Measuring school objects
Price comparison from shopping brochures	Estimation, subtraction, decision-making	Grades 5–6	Guided discussion	Price comparison from shopping brochures
Daily schedule planning	Time, addition, division	Grades 3–6	Simulation & reflection	Daily schedule planning

The third coaching role identified is the design and implementation of structured, differentiated practice activities tailored to the diverse learning needs of students. At SDN Sambiroto, teachers intentionally plan exercises that accommodate a spectrum of ability levels. For lower achieving students, the instruction is scaffolded through step by step guidance and simplified tasks, while advanced learners are challenged with open ended problems, logic puzzles, and exploratory projects. This approach reflects principles of differentiated instruction, as described by Tomlinson (2017), which emphasize the importance of aligning content, process, and product with student readiness, interests, and learning profiles. Differentiated instruction enables all students to engage meaningfully with content at their appropriate levels, thereby promoting equitable learning opportunities. Students regularly engage in numeracy practice through varied formats such as individual work, collaborative group tasks, and project based activities. Examples include planning daily schedules, estimating prices from shopping brochures, and preparing basic financial reports from simulated sales events. These activities mirror real life challenges and foster students' skills in mathematical modeling and decision making.

Dudek et al. (2019) provide empirical support for this strategy, showing that structured and scaffolded practice under teacher coaching significantly enhances students' perseverance and learning outcomes in mathematics. By offering both support and challenge, teachers at SDN Sambiroto demonstrate how coaching involves ongoing diagnosis and adjustment of instructional methods to ensure effective skill development. The integration of such structured and adaptive practices reflects a commitment to inclusive teaching. It confirms the idea that teachers, as coaches, not only transfer knowledge but also develop strategies to address each learner's zone of proximal development.

Implementing Formative and Reflective Assessment

Teachers exercise their coaching role by conducting not only summative but also formative and reflective assessments. Each learning session concludes with a reflective discussion, during which students review problem solving strategies and receive direct feedback both oral and written focused on process rather than outcome. Teachers use learning portfolios to document student growth, including completed tasks, teacher notes, and student reflections. These portfolios guide instructional planning and serve as communication tools with parents. To provide a clearer picture of the assessment types used in numeracy instruction, table 4 summarizes the different activities, targeted skills, grade levels, and coaching approaches implemented by teachers at SD Negeri Sambiroto.

Table 4. Types of Assessments in Numeracy Instruction

Type of Activity	Targeted Skill	Grade Level	Coaching Approach	Type of Activity
Contextual word problems	Assess problem-solving ability	Weekly	Linked to daily learning	Contextual word problems
Classroom observation	Monitor thinking strategies and engagement	Daily	Teacher reflection notes	Classroom observation
Student portfolios	Track individual progress	Monthly	Shared with parents	Student portfolios
Group reflection sessions	Build numeracy awareness and reasoning skills	End of class	Guided class discussions	Group reflection sessions

Teachers also conduct simple diagnostic assessments such as one-on-one interviews or group discussions to identify learning difficulties. Based on the findings, they provide targeted remedial instruction for those in need and enrichment activities for high-achievers. The fourth aspect of the coaching role is evident in the comprehensive assessment strategies employed by teachers. At SD Negeri Sambiroto, teachers conduct assessments that go beyond evaluating outcomes; they also assess learning processes, identify misconceptions, and provide feedback that informs instructional decisions. Assessments are carried out through various means, including contextual word problems, classroom observations, learning portfolios, and group reflection sessions. This multi faceted assessment approach aligns with formative assessment theory, which emphasizes continuous feedback and the use of assessment data to support learning (Black & Wiliam, 2009). According to Kim (2019), primary teachers who adopt formative assessment practices tend to witness greater gains in student achievement, particularly when they emphasize the use of diagnostic tools and qualitative observation.

At SD Negeri Sambiroto, teachers use learning portfolios as a structured tool to record students' academic growth, containing work samples, teacher observation notes, and reflective narratives from both teachers and students. These portfolios include daily exercises, project-based tasks, and assessment results, accompanied by qualitative feedback that highlights learning strategies, problem solving approaches, and areas for improvement, serving both as evidence of progress and

as a planning guide for individualized instruction. In addition, reflective sessions are held regularly, allowing students to review the steps taken in solving problems, assess the effectiveness of their strategies, and explore alternative methods. Guided by teacher questions, these discussions promote self-analysis, critical thinking, and peer learning, while the integration of portfolio documentation and reflective dialogue builds metacognitive awareness, strengthens mathematical reasoning, and fosters a classroom culture that values continuous improvement and meaningful engagement with numeracy..

The study by Pinger et al. (2018) further confirms that formative assessments embedded within instruction significantly improve conceptual understanding and problem-solving skills. Klute et al. (2017) and Bureau et al. (2022) add that student centered feedback practices contribute to increased intrinsic motivation and self confidence. Teachers also conduct informal diagnostic assessments through one on one interviews or group discussions to identify and address specific learning barriers. This flexibility allows for timely remedial actions or enrichment activities, reinforcing the teacher's role as a responsive and reflective coach. As emphasized by Förster and Souvignier (2015), adaptive assessments and progress monitoring contribute significantly to personalizing instruction and supporting student growth.

Integrative Reflections and Implications

The four coaching dimensions explored in this study do not operate in isolation but form a synergistic model of numeracy development. A numeracy rich environment lays the groundwork for contextual instruction, which is reinforced through structured practice and sustained by formative assessments. This pedagogical coherence exemplifies how coaching by teachers leads to deeper learning and long-term competency development. The implications for practice are profound. Teachers must be empowered not only with content knowledge but also with pedagogical strategies for differentiation, contextualization, and formative evaluation. Coaching, in this sense, transcends traditional instruction it requires teachers to mentor, guide, and inspire students as active participants in their learning journey.

These findings also resonate with broader policy implications. Professional development programs should focus on strengthening teachers' coaching capacities, including their ability to design engaging tasks, facilitate reflection, and utilize formative assessments effectively. As supported by Dudek et al. (2019), such coaching-oriented professional learning can lead to sustained instructional improvement. From a systems perspective, school leaders should prioritize collaborative structures that allow teachers to share best practices, engage in lesson study, and co-develop numeracy programs that are responsive to student needs. Investment in teacher coaching roles has the potential to transform classroom practices and elevate student outcomes across foundational competencies.

In conclusion, the role of teachers as numeracy coaches represents a paradigm shift in instructional practice one that integrates environment, instruction, practice, and assessment into a holistic model of learning. This approach affirms that with the

right support, guidance, and reflection, teachers can cultivate numeracy skills that are not only academically rigorous but also practically relevant and lifelong in their impact

4. Conclusion

This study concludes that the role of teachers as coaches plays a pivotal part in developing students' numeracy literacy skills at SD Negeri Sambiroto. The findings highlight four interrelated coaching aspects: (1) creating a numeracy-rich learning environment, (2) facilitating contextual numeracy instruction, (3) designing structured and differentiated practice activities, and (4) implementing formative and reflective assessment. These components form a continuous cycle of support, guidance, and feedback that enables students to build conceptual understanding, apply mathematical thinking in real-life contexts, and gradually improve their performance. Teachers do more than deliver content; they actively create experiences where numeracy is embedded in everyday activities, making mathematics relevant and meaningful. By contextualizing lessons with real-life scenarios, students are encouraged to engage, reason, and solve problems logically. Teachers also design differentiated learning pathways that accommodate students' diverse needsensuring both remedial and enrichment strategies are effectively applied. Through continuous formative assessments and reflective discussions, students receive process-oriented feedback that promotes self-awareness and improvement.

The coaching approach empowers teachers to function not only as instructors but also as facilitators, mentors, and learning partners. Their presence fosters a supportive atmosphere that motivates students to explore numeracy with confidence. This study affirms that sustainable numeracy literacy development is most effective when driven by teacher-led coaching that is intentional, reflective, and responsive to student growth. Ultimately, the role of teachers as numeracy coaches is not a one-time intervention but a long-term commitment requiring consistent practice, professional collaboration, and strong instructional leadership at the school level.

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