

ANALYSIS OF TEACHERS' PERCEIVED NEEDS FOR DEVELOPING CONTEXTUAL NUMERACY LITERACY LEARNING STRATEGIES IN ELEMENTARY SCHOOLS

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ABSTRACT

Strengthening students' numeracy literacy requires learning strategies that are contextual and aligned with classroom conditions. However, numeracy learning in elementary schools often remains dominated by procedural exercises and has not sufficiently connected mathematical concepts with students' real-life contexts. This study explores teachers' perceptions of students' numeracy literacy needs and their requirements for developing contextual learning strategies in elementary schools. A qualitative descriptive approach supported by quantitative data was employed. The participants were 20 elementary school teachers selected through purposive sampling. Data were collected through interviews and teacher needs questionnaires. Interview data were analyzed through data reduction, presentation, and meaning extraction, while questionnaire data were analyzed descriptively using mean scores and percentages. The findings indicate that teachers identified several challenges in students' numeracy learning, particularly in understanding contextual problems, interpreting data, and connecting mathematical concepts with daily experiences. These findings were supported by questionnaire results showing an overall need score of 4.67 (93.4%), indicating a high level of need for contextual numeracy learning strategies. Teachers specifically required practical learning guides, visual media, real-life problem-based worksheets, contextual teaching materials, and assessment instruments. The novelty of this study lies in integrating teachers' perceived challenges and instructional needs as an empirical foundation for developing contextual numeracy learning strategies grounded in actual elementary school practices.

Keywords: Contextual Learning, Elementary School, Needs Analysis, Numeracy Literacy, Teacher Perception

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INTRODUCTION

Numeracy literacy is one of the important foundations in basic education because it is not only related to numeracy skills, but also the ability to understand quantitative information, read patterns, interpret data, make decisions, and use mathematical reasoning in daily life (Umasangaji et al., 2024). Numeracy literacy should grow through learning experiences that are close to the world of children, such as the price of snacks in the canteen, the size of objects at home, activity schedules, traditional games, building shapes, weather data, to simple problems in the surrounding environment. But in practice, learning mathematics often still feels far from the real context. Students work on numbers, but they don't always understand the meaning of numbers in life situations. This condition is in line with the finding that strengthening numeracy in primary education still requires a contextual, reflective, and student-centered learning design (Purnamasari et al., 2026).

The main problem that appears in elementary school is the uneven ability of students to connect mathematical concepts with contextual problems (Azaria & Nugraha, 2025). Some students are able to complete the calculation operation, but have difficulty when asked to read the data, choose a completion strategy, explain the reason, or interpret the results in the form of simple decisions. This shows that numeracy is not just a mastery of procedures, but a thinking process that involves understanding mathematical language, reasoning, reflection, and learning strategies. Park and Matthews assert that mathematical verbal skills play an important role in the fractional ability of elementary school students (Park & Matthews, 2025), while Ho et al. show that the language of mathematics is an important link between general vocabulary and early numeracy competence (Ho et al., 2025).

Various previous studies have offered common solutions to strengthen numeracy. Digital media-based approaches, e-comics, websites, ethnomathematics, Realistic Mathematics Education (RME), scaffolding, and local context-based learning have proven to have the potential to make numeracy more alive. Students and teachers need learning media that is interactive, relevant, and able to bridge abstract mathematics concepts with real-life contexts (Raharjo et al., 2025). A web-based learning environment can improve the numeracy and reasoning competencies of grade V students through meaningful assignment design (Adelia et al., 2025). Meanwhile, Pramulia showed that ethnomathematics-based augmented reality comics can improve literacy and numeracy of elementary school students because they present mathematical concepts through culture and visuals that are close to students' experiences (Pramulia et al., 2025).

However, the solutions needed in this study are not directly directed at the development of certain learning products, but rather start from a needs analysis. Needs analysis is an important stage because contextual learning strategies cannot be prepared based solely on teachers' assumptions or curriculum demands. A good strategy needs to be born from a map of real needs: what are the students' initial abilities, what concepts are the most difficult, what context is closest to their lives, what media are available, how teachers teach, as well as what obstacles arise in the classroom. Therefore, this study proposes a needs analysis approach by mapping teachers' perceptions of students' numeracy literacy challenges and instructional requirements as an empirical foundation for developing contextual learning strategies.

The contextual learning strategy referred to in this study is directed at learning that relates mathematical concepts to students' real experiences, invites students to read situations, choose important information, solve problems, and reflect on answers. Such a model is in line with the RME principle which places context as the starting point for mathematical understanding. RME-based deep scaffolding helps students correct thinking errors, relate experiences to mathematical contexts, and increase reflective awareness in solving numeracy problems (Wibawa & Atmaja, 2025). Nursyahidah shows that the integration of technology,

ethnomathematics, and RME is able to build meaningful relationships between cultural practices and everyday mathematical reasoning (Nursyahidah et al., 2025).

The development of contextual learning strategies is theoretically grounded in Contextual Teaching and Learning (CTL), which emphasizes the connection between academic concepts and students' real-world experiences. Johnson (2002) explains that CTL encourages learners to construct meaning by relating new knowledge to authentic situations through inquiry, problem-solving, collaboration, and reflection. Therefore, contextual numeracy learning does not merely require students to perform mathematical operations but enables them to interpret quantitative information and apply mathematical reasoning in meaningful contexts.

Although previous studies have demonstrated the effectiveness of various approaches, such as digital media, ethnomathematics, Realistic Mathematics Education (RME), and technology-based learning environments, most studies have focused on developing or testing instructional products after identifying learning problems. However, fewer studies have examined how teachers perceive students' numeracy literacy difficulties and what instructional supports teachers require before developing contextual learning strategies. Understanding teachers' perspectives is essential because teachers are the primary actors who interpret students' learning difficulties, classroom conditions, available resources, and instructional feasibility. Many studies have developed media or models, such as e-comics, websites, AR comic, and e-modules, but not all of them depart from mapping classroom needs. Ahyar emphasized the importance of a valid instrument to assess the numeracy ability of elementary school students (Ahyar et al., 2025), while Tran showed that learning opportunities that contain the use of mathematics in the context have an effect on mathematical literacy achievement (Tran, 2026).

Needs analysis is an essential stage in educational development because it provides systematic information about the discrepancy between current conditions and desired learning outcomes. According to Kaufman (1979), needs assessment involves identifying gaps between existing performance and expected

conditions to determine appropriate interventions. Brown (1995) emphasizes that needs analysis provides empirical information regarding learners' requirements, contextual constraints, and instructional priorities before designing educational programs. In this study, needs analysis is positioned not merely as an identification of students' difficulties but as a systematic process for understanding teachers' perceptions, classroom challenges, and instructional requirements in developing contextual numeracy learning strategies.

Based on this rationale, this study aims to analyze teachers' perceptions of students' numeracy literacy challenges and teachers' instructional needs as a foundation for developing contextual learning strategies in elementary schools. The direction of the research includes the identification of students' initial ability to understand numeracy problems, students' difficulties in reading data and interpreting information, teachers' needs in designing learning, and potential local contexts that can be used in learning activities. This study contributes theoretically by extending contextual numeracy literacy research through a teacher-centered needs analysis perspective. Practically, the findings provide empirical guidance for developing contextual learning strategies, including appropriate learning resources, instructional approaches, and assessment tools that are aligned with classroom realities.

METHOD

This study employed a qualitative descriptive research design supported by descriptive quantitative data. This approach was selected because the purpose of the study was not to examine causal relationships among variables, but to explore teachers' perceptions, instructional challenges, and needs related to the development of contextual numeracy literacy learning strategies in elementary schools. Qualitative data obtained through interviews served as the primary source of information, while questionnaire data were used to complement and strengthen the interpretation of teachers' needs.

The research was carried out at SDN 213 Inpres Sanggalea, Maros Regency, South Sulawesi in the even semester of the 2025/2026 Academic Year. The research was conducted at SDN

213 Inpres Sanggalea, Maros Regency, South Sulawesi, during the second semester of the 2025/2026 academic year. This school was selected purposively because it has implemented literacy and numeracy strengthening programs and represents an elementary school context where teachers are actively involved in improving students' foundational competencies. In addition, the school provided relevant conditions for exploring teachers' experiences, challenges, and instructional needs related to contextual numeracy literacy learning.

The research population is all teachers who teach at SDN 213 Inpres Sanggalea, Maros Regency. The participants consisted of 20 teachers from different grade levels in the elementary school. The participants were selected because they had direct teaching experience and regular interaction with students' mathematics learning processes. Their classroom experiences enabled them to provide contextual information regarding students' difficulties in understanding numeracy problems, interpreting mathematical information, and applying mathematical concepts in daily situations.

Although the participants were limited to 20 teachers from one elementary school, this study was designed as a contextual needs analysis rather than a statistical generalization study. The purposive selection of participants was intended to obtain rich information regarding teachers' experiences and instructional needs. Therefore, the findings should be interpreted within the specific research context and may provide insights for similar elementary school settings with comparable characteristics. Before data collection, the questionnaire instrument was reviewed by three experts in elementary education and mathematics learning to examine content relevance, clarity of statements, and alignment with the research objectives. Revisions were made based on expert suggestions. The questionnaire reliability was then examined using Cronbach's alpha analysis, resulting in a coefficient of $\alpha = 0.xx$, indicating acceptable internal consistency.

Data collection techniques are carried out through interviews and questionnaires. Interviews are used as the main technique to explore teachers' needs more openly. Through interviews, the researcher obtained information about teachers' difficulties in

teaching numeracy literacy, the need for learning resources, the form of expected learning strategies, and the obstacles faced by students in understanding context-based numeracy problems. The questionnaire was used to strengthen the results of the interview by looking at the general tendency of teachers' needs for media, teaching materials, examples of contextual questions, training, and numeracy learning guides.

The instruments used consisted of interview guidelines and questionnaires for teacher needs. The interview guidelines contain open-ended questions about teachers' experiences, learning barriers, student needs, and expectations for contextual learning strategies. Meanwhile, the questionnaire was prepared in the form of a statement with an assessment scale of five categories, namely urgently needed, needed, moderately needed, and not needed.

Table 1.

Teacher Interview Guidelines

No.	Indicator	Interview Questions
1	Teachers' understanding of numeracy literacy	What is your understanding of numeracy literacy in elementary school learning?
2	The condition of students' numeracy literacy ability	What is the description of students' numeracy literacy skills in the class that you teach?
3	Students' difficulties in learning numeracy	What are the most common difficulties that students experience when solving questions or activities related to numeracy literacy?
4	Learning strategies used by teachers	What strategies or methods have you been using to help students understand the concept of numeracy?
5	The need for contextual learning	According to you, is learning related to students' daily lives necessary in strengthening numeracy literacy? Why?
6	Media and teaching materials need	What kind of media, teaching materials, or learning resources do teachers need to support contextual numeracy literacy learning?

No.	Indicator	Interview Questions
7	Expectations for the development of learning strategies	What kind of learning strategies do you hope that students' numeracy literacy can increase more effectively?

Table 2.
Teacher Needs Questionnaire

No.	Indicator	Questionnaire Statement
1	Understanding numeracy literacy	I need a deeper understanding of the concept of numeracy literacy in elementary school.
2	Understanding numeracy literacy	I need clear guidance on how to integrate numeracy literacy in learning.
3	Student ability conditions	Students still need reinforcement in understanding numeracy problems based on the context of daily life.
4	Student ability conditions	Students still have difficulty reading data, tables, figures, or simple numerical information.
5	Student learning difficulties	Students need exercises that help them relate math concepts to real-life situations.
6	Student learning difficulties	Students need learning that focuses not only on formulas, but also on understanding problems.
7	Learning strategies	I need a more contextual learning strategy to improve students' numeracy literacy.
8	Learning strategies	I need examples of numeracy learning steps that are easy to apply in the classroom.
9	Contextual learning	Numeracy literacy learning needs to be linked to students' daily experiences.
10	Contextual learning	The context of the environment around the school can be used as a source of learning numeracy literacy.

No.	Indicator	Questionnaire Statement
11	Learning media	I need an interesting learning medium to help students understand the concept of numeracy.
12	Learning media	Visual media such as pictures, tables, diagrams, or contextual stories are needed in numeracy literacy learning.
13	Teaching Materials	I need teaching materials that contain real-life based numeracy problems.
14	Teaching Materials	I need student worksheets that are designed according to the student's abilities and needs.
15	Learning evaluation	I need a suitable assessment instrument to measure students' numeracy literacy ability.
16	Implementation support	I need training or assistance in designing contextual numeracy literacy learning.
17	Development expectations	The development of contextual learning strategies is needed to help teachers improve students' numeracy literacy more effectively.

The interview data were analyzed using thematic analysis. The analysis involved several stages: (1) familiarization with interview transcripts, (2) initial coding to identify meaningful statements related to teachers' experiences and needs, (3) categorization of codes into broader themes, such as students' numeracy difficulties, instructional challenges, contextual learning needs, learning media requirements, and evaluation needs, and (4) interpretation of themes to generate meaningful findings.

To ensure the trustworthiness of qualitative findings, this study applied credibility and confirmability strategies. Data triangulation was conducted by comparing interview findings with questionnaire results. In addition, member checking was conducted by confirming the interpretation of interview summaries with several participating teachers to ensure that the findings accurately

represented their perspectives. Peer discussion was also conducted during the analysis process to reduce researcher bias.

RESULTS AND DISCUSSION
RESULT

This study involved 20 elementary school teachers as respondents. Data was obtained through two techniques, namely interviews and teacher needs questionnaires. Interviews were used to explore teachers' needs in depth, while questionnaires were used to reinforce the tendency of teachers' needs quantitatively. The results of the study show that teachers need numeracy literacy learning strategies that are more contextual, practical, easy to apply, and close to students' daily lives.

Table 3.
Main Themes of Teachers' Needs for Contextual Numeracy Learning

Theme	Qualitative Findings	Quantitative Support
Contextual learning needs	Teachers stated numeracy should be connected with daily experiences	Mean = 4.75 (95%)
Learning strategy needs	Teachers need practical and applicable strategies	Mean = 4.78 (95.5%)
Teaching materials and media	Teachers require LKPD, visual media, contextual problems	Mean = 4.70 (94%)
Assessment support	Teachers need contextual assessment instruments	Mean = 4.55 (91%)

Based on Table 3, the strongest need arises in contextual learning indicators, which is 100% of teachers stating that numeracy literacy needs to be linked to students' daily lives. In addition, as many as 95% of teachers expect a more systematic and easy-to-apply learning strategy. These findings show that teachers not only need theoretical explanations of numeracy literacy, but also need practical guidance that can be directly used in learning activities.

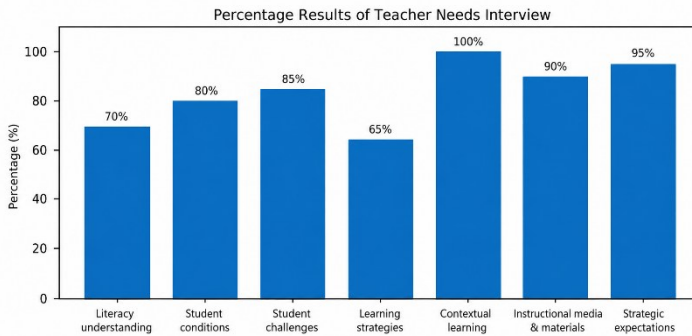


Figure 1.

Graph of Percentage of Teacher Needs Interview Results

Image 1 Caption: The graph shows that the highest needs are in contextual learning aspects, strategy development expectations, and media and teaching materials. This shows that teachers need a numeracy literacy learning strategy that not only contains practice questions, but is also able to present a learning experience that is close to students' lives.

The dominance of contextual learning needs ($M = 4.85$; 97%) indicates that teachers perceive the main challenge in numeracy instruction is not students' inability to perform calculations, but their difficulty in transferring mathematical knowledge into meaningful situations. This finding suggests that future numeracy strategies should move beyond procedural practice toward learning experiences that involve interpretation, reasoning, and problem solving.

Table 4.

Recapitulation of Questionnaire Results Based on Indicators

No.	Indicator	Average Score	Percentage	Categories
1	Understanding numeracy literacy	4,63	92,5%	Much Needed
2	Student ability conditions	4,63	92,5%	Much Needed
3	Student learning difficulties	4,65	93%	Much Needed
4	Learning	4,78	95,5%	Much

No.	Indicator	Average Score	Percentage	Categories
5	strategies Contextual learning	4,75	95%	Needed Much Needed
6	Learning media	4,65	93%	Much Needed
7	Teaching Materials	4,70	94%	Much Needed
8	Learning evaluation	4,55	91%	Much Needed
9	Implementation support	4,55	91%	Much Needed
10	Development expectations	4,80	96%	Much Needed
	Overall average	4,67	93,4%	Much Needed

Based on 'Table 5, all indicators of teachers' needs for the development of contextual learning strategies based on numeracy literacy are in the category of being urgently needed, with an overall average of 4.67 or 93.4%. The highest scoring indicator was development expectation of 4.80 (96%), followed by learning strategy of 4.78 (95.5%) and contextual learning of 4.75 (95%). The strong demand for contextual strategies reflects a gap between curriculum expectations of numeracy literacy and current classroom practices. Although teachers may already implement mathematical exercises, students still require opportunities to interpret information, identify relevant data, and justify problem-solving processes. Therefore, the findings indicate that strengthening numeracy literacy requires a pedagogical shift from answer-oriented instruction toward meaning-oriented mathematical experiences.

In addition, the indicator of teaching materials obtained a score of 4.70 (94%), while students' learning difficulties and learning media each received a score of 4.65 (93%), which indicates the need for teaching materials and media that are able to help students understand the concept of numeracy in the context of daily life. Meanwhile, the indicators of understanding numeracy

literacy and the condition of students' abilities obtained the same score, which was 4.63 (92.5%), while learning evaluation and implementation support obtained the lowest score of 4.55 (91%), although it remained in the category of being needed. Overall, these results show that teachers need comprehensive support, ranging from strengthening their understanding of numeracy literacy, providing relevant learning strategies, media, and teaching materials, to evaluation and mentoring instruments in the implementation of numeracy learning in elementary schools.

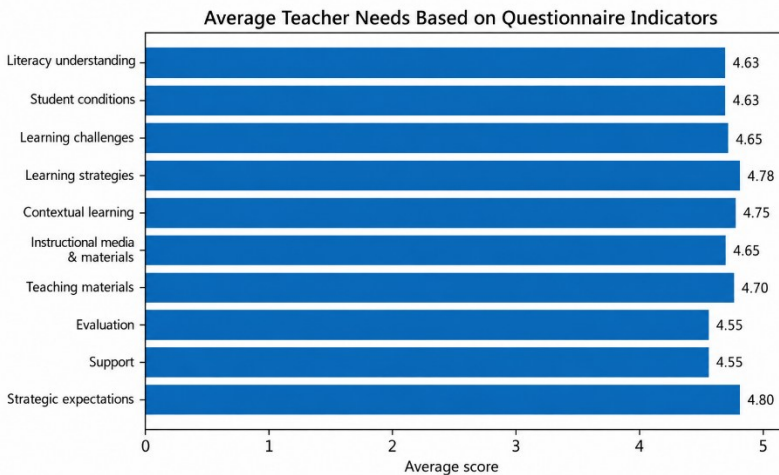


Figure 2.
Average Graph of Teacher Needs Based on Questionnaire
Indicators

Image 2 Remarks: The graph shows that all indicators are at a high score, which is above 4.50. The indicator with the highest score was the expectation of learning strategy development with a score of 4.80, followed by learning strategies with a score of 4.78 and contextual learning with a score of 4.75. This data shows that the greatest need for teachers lies in the availability of numeracy literacy learning strategies that are practical, contextual, and in accordance with the conditions of elementary school students.

The results of the integration showed a match between the interview data and the questionnaire. The interviews show that teachers experience a real need to understand, design, and

implement numeracy literacy learning. The questionnaire strengthened the findings with an overall average of 4.67 or 93.4%, which is in the category of urgently needed. Thus, the development of contextual learning strategies can be seen as an important need to help teachers improve the numeracy literacy of elementary school students

DISCUSSION

The results of the study show that teachers' needs for the development of contextual learning strategies based on numeracy literacy are in the very high category. The interview data shows that teachers still face several main obstacles, especially in helping students understand context-based numeracy problems, reading simple data, determining important information, and explaining the reasons for completion. This finding was strengthened by the results of the questionnaire with an overall average of 4.67 or 93.4%, which is in the category of being urgently needed. This means that the need for teachers does not only lie in understanding the concept of numeracy literacy, but also in the availability of learning strategies that are practical, easy to apply, and close to students' life experiences.

The high need for teachers for contextual learning strategies shows that there is still a gap between the demands of developing numeracy literacy and learning practices that take place in the classroom. Most teachers stated that students were relatively able to complete basic calculation operations, but had difficulty understanding the problems presented in the form of stories, tables, graphs, or everyday life situations. This condition shows that numeracy skills are not only related to numeracy skills, but also involve the ability to understand information, reason, choose solution strategies, and communicate the results of thought logically. In other words, numeracy is a complex ability and requires meaningful learning experiences in order to develop optimally.

Theoretically, these results are in line with constructivist learning theory which views that knowledge is actively constructed by students through experience, interaction, and the process of meaning. In the context of numeracy learning, it is not enough for students to be given formulas or calculation exercises, but it is

necessary to be invited to understand real problems, connect numerical information with concrete situations, and then formulate solutions based on their own reasoning. Support can also be seen from the contextual learning approach, which emphasizes the importance of relating the subject matter to everyday life. When students learn through familiar contexts, such as the price of goods, distance, time, environmental data, games, or school activities, the concept of numeracy becomes easier to understand because it does not exist as a dry number, but rather as part of life experience.

The findings of this study are also in line with the principles of contextual learning (*Contextual Teaching and Learning*) which emphasizes the importance of connecting learning materials with the real-life context of students (Aisyah et al., 2025). When the concept of numeracy is learned through situations that are close to the student's experience, the learning process becomes more meaningful because students can see the relationship between what is learned and the real needs of everyday life (Nurwahid et al., 2025). This condition explains why all teachers in this study consider that numeracy learning needs to be associated with the context of students' lives and supported by media, teaching materials, and learning activities that are relevant to their environment.

The linkage with relevant research also strengthens the results of this study. First, Purnamasari found that the integration of numeracy in elementary school mathematics learning requires a contextual, reflective, and student-centered model (Purnamasari et al., 2026). These findings are in line with the results of this study, especially on the need for teachers for learning strategies that not only emphasize procedures, but also understanding problems. Second, Rahardjo pointed out that teachers and students need culturally-themed e-comic media to improve the numeracy skills of elementary school students (Raharjo et al., 2025). This supports the research findings that teachers need visual media, contextual stories, and teaching materials that are close to the student's environment. Third, Adelia proves that a web-based learning environment can improve students' numeracy and reasoning (Adelia et al., 2025). The research strengthens the results of the questionnaire that teachers need more varied learning strategies and

resources so that students not only memorize, but also be able to reason.

The novelty of this research lies in its focus that does not directly develop certain media or models, but first maps the needs of teachers as the basis for developing contextual learning strategies. Thus, the strategy to be developed does not depart from the researcher's assumptions alone, but from the real conditions of teachers and students in elementary school. The contribution of this research is theoretical and practical. Theoretically, this study enriches the study of numeracy literacy based on field needs. Practically, the results of the research can be the basis for teachers, schools, and researchers to develop numeracy learning strategies that are more relevant, simple, and meaningful for elementary school students.

Practically, the findings of the study imply that strengthening numeracy literacy in elementary schools needs to be supported by the provision of contextual learning guides, attractive visual media, real problem-based LKPD, teaching materials that are close to students' lives, and evaluation instruments that are able to measure numeracy skills authentically. In addition, teachers also need training and assistance in designing and implementing contextual numeracy learning so that the strategies developed can be applied consistently and sustainably. Thus, the development of contextual learning strategies not only contributes to improving students' numeracy skills, but also supports the improvement of the quality of mathematics learning in elementary schools more broadly.

CONCLUSION

The findings of this study indicate that teachers perceive a strong need for contextual learning strategies to strengthen elementary students' numeracy literacy. Teachers identified several challenges, particularly students' difficulties in interpreting contextual problems, reading numerical information, selecting appropriate solution strategies, and explaining mathematical reasoning. These findings were supported by questionnaire results showing a high level of perceived need for contextual numeracy learning strategies. Theoretically, this study contributes to

contextual numeracy literacy research by demonstrating the importance of teacher-informed needs analysis as an initial stage in designing instructional strategies. Rather than developing learning interventions based solely on theoretical assumptions, this study highlights that contextual numeracy strategies should be grounded in teachers' classroom experiences, instructional challenges, and available learning conditions. Practically, the findings provide an empirical foundation for developing contextual numeracy learning frameworks that integrate real-life problems, meaningful learning experiences, appropriate instructional media, and authentic assessment approaches. However, this study has limitations because it involved a relatively small number of teachers from a single elementary school, which limits the transferability of the findings to broader educational contexts. Future research should involve multiple schools with diverse characteristics and utilize these identified needs as the basis for developing, implementing, and experimentally evaluating contextual numeracy learning strategies.

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