International Journal of
Humanities, Education, and Social Sciences

e-ISSN : 3026-0892
p-ISSN : 3026-1422

Index: Harvard, Boston, Sydney, Dimensions, Lens, Scilit, Semantic, Google, etc

https://doi.org/10.58578/IJHESS.v4i3.12562

Analysis of the Numeracy Literacy Profile of Elementary School Students in Solving Contextual Mathematical Problems

Yonathan S Pasinggi
Universitas Negeri Makassar, Indonesia
yonathan.saba@unm.ac.id

Submitted:	Revised:	Accepted:	Published:
Sep 30, 2026	Oct 29, 2026	Nov 9, 2026	Nov 14, 2026

Abstract

Understanding elementary school students' numeracy literacy in contextual mathematical problem-solving can inform the assessment of learning needs and the design of mathematics instruction. This study analyzes numeracy literacy across four competencies: understanding mathematical information, formulating mathematical problems, employing mathematical concepts and procedures, and interpreting results in real-life contexts. The study adopts a quantitative descriptive survey framework involving 60 elementary school students selected through purposive sampling. Assessment uses a contextual mathematical problem-solving test, with analysis based on descriptive statistics, including mean scores, percentages, and achievement categories. The reported findings derive from illustrative simulated data, which yielded an overall numeracy literacy score of 68.45%, classified as moderate. Performance was highest in understanding mathematical information (78.20%), followed by employing mathematical concepts and procedures (70.15%), formulating mathematical problems (65.30%), and interpreting results in real-life contexts (60.15%). Within this simulated profile, identifying numerical information and applying basic procedures emerged as relative strengths, while translating contextual situations into mathematical models and interpreting results meaningfully presented greater difficulties. This illustrative analysis demonstrates how assessment across these competencies can differentiate numeracy learning needs and guide instructional planning. It highlights the potential relevance of contextual, problem-based, and reflective mathematics instruction for

IJHESS Journal is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License

connecting mathematical concepts with everyday experiences. Further research should examine the effectiveness of instructional interventions in strengthening students' contextual mathematical problem-solving abilities.

Keywords: Numeracy Literacy; Elementary Mathematics Education; Contextual Mathematical Problems; Mathematical Problem-Solving; Numeracy Assessment

INTRODUCTION

Numeracy literacy is one of the fundamental competencies that students need to develop in order to participate effectively in an increasingly complex society. In contemporary education, mathematics is no longer understood merely as a collection of numerical operations, formulas, and computational procedures, but also as a practical means of interpreting information, making decisions, and solving problems encountered in everyday life. Students are expected not only to understand mathematical concepts but also to apply them appropriately in different situations, including personal, social, and environmental contexts. Therefore, numeracy literacy has become an essential component of elementary education because it provides the foundation for developing logical thinking, analytical reasoning, problem-solving abilities, and informed decision-making. At the elementary school level, the development of numeracy literacy is particularly important because students begin to construct fundamental mathematical understanding that influences their subsequent learning experiences.

The importance of mathematical literacy is also emphasized in the Programme for International Student Assessment (PISA) framework. According to the Organisation for Economic Co-operation and Development (OECD, 2023), mathematical literacy refers to an individual's capacity to reason mathematically and to formulate, employ, and interpret mathematics to solve problems in various real-world contexts. This framework highlights three interconnected mathematical processes: formulating situations mathematically, employing mathematical concepts and procedures, and interpreting mathematical outcomes. These processes indicate that mathematical competence involves more than obtaining correct answers; students must also understand the situations presented, identify relevant mathematical information, select appropriate strategies, and evaluate whether their answers are meaningful within the original context. Consequently, numeracy literacy should be

developed through learning experiences that encourage students to connect mathematical knowledge with authentic situations.

In Indonesia, numeracy literacy has become an important component of educational assessment through the Minimum Competency Assessment (Asesmen Kompetensi Minimum/AKM). The Ministry of Education's assessment framework emphasizes the ability to use mathematical knowledge to explain phenomena, solve problems, and make decisions in everyday situations (Pusat Asesmen Pendidikan, n.d.). This orientation demonstrates that numeracy literacy is not limited to mastering arithmetic operations but also involves the ability to interpret numerical information, recognize mathematical relationships, understand quantitative representations, and apply mathematical reasoning. At the elementary school level, these competencies include understanding numbers, performing calculations, measuring quantities, recognizing spatial relationships, interpreting data, and using mathematical concepts to address practical problems. Thus, elementary mathematics instruction needs to provide opportunities for students to develop these competencies progressively and meaningfully.

The development of numeracy literacy is closely related to the broader concept of mathematical proficiency. The National Research Council (2001), through its report Adding It Up: Helping Children Learn Mathematics, identifies five interconnected components of mathematical proficiency: conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition. These components provide a comprehensive perspective on how students develop mathematical abilities. Conceptual understanding enables students to recognize relationships among mathematical ideas, while procedural fluency supports the accurate and flexible use of mathematical procedures. Strategic competence involves formulating and representing mathematical problems, whereas adaptive reasoning refers to the capacity to explain and justify mathematical thinking. Productive disposition reflects students' confidence and appreciation of mathematics as a meaningful and useful discipline. These components are relevant to numeracy literacy because successful contextual problem-solving requires students to integrate mathematical knowledge, procedural skills, reasoning, and positive attitudes toward mathematics.

One important characteristic of numeracy literacy is its application to contextual mathematical problems. Contextual problems present mathematical situations through

familiar experiences, such as shopping activities, calculating expenses, comparing quantities, measuring objects, determining travel distances, interpreting schedules, and analyzing simple statistical information. Such problems allow students to recognize the relevance of mathematics in their daily lives. However, solving contextual problems requires more complex thinking than completing routine exercises because students must first understand the information presented in a particular situation and determine which mathematical concepts are appropriate for addressing the problem. They must then translate the situation into mathematical representations, perform relevant calculations, and interpret the results in relation to the original context. This process is consistent with the mathematical literacy framework proposed by the OECD (2023), which emphasizes the relationship between real-world situations, mathematical formulation, mathematical procedures, and interpretation.

From a learning perspective, contextual mathematical problems provide opportunities for students to develop connections between abstract mathematical concepts and concrete experiences. Students who understand the relationship between mathematics and everyday situations are more likely to recognize when mathematical knowledge can be applied and why particular procedures are necessary. Nevertheless, the ability to solve contextual problems cannot be assumed solely from students' performance on routine computational exercises. A student may demonstrate accuracy in performing arithmetic operations but experience difficulties when the same operations are presented through written situations involving unfamiliar information, multiple steps, or different forms of mathematical representation. Therefore, assessing numeracy literacy requires instruments that examine not only computational accuracy but also students' abilities to understand, formulate, employ, and interpret mathematics.

Previous research has provided important evidence regarding elementary school students' numeracy literacy and mathematical problem-solving abilities. Nurbaya et al. (2022) examined the integration of numeracy literacy activities within a problem-based learning environment and its relationship with elementary students' mathematical reasoning abilities. Their findings indicated that integrating numeracy literacy activities into problem-based learning could support students' mathematical reasoning development. This evidence highlights the importance of instructional experiences that encourage students to engage with mathematical problems rather than focus exclusively on procedural calculations. Furthermore, Hidayat et al. (2025) investigated the numeracy literacy processes of fifth-grade elementary school students in solving mathematical word problems. Their study examined

how students understood and approached mathematical problems through qualitative investigation. The research illustrates the importance of examining students' thinking processes when they encounter mathematical information presented in verbal and contextual forms. These studies demonstrate that numeracy literacy is a multidimensional competence that requires attention to students' mathematical understanding and problem-solving processes.

Although previous studies have contributed to the understanding of numeracy literacy in elementary mathematics education, further investigation is needed to provide a more comprehensive description of students' numeracy literacy profiles across different problem-solving indicators. Some studies have focused on the effectiveness of particular instructional models, while others have examined the problem-solving processes of a limited number of students. These approaches provide valuable information, but they do not necessarily offer a broader descriptive overview of students' performance across several dimensions of numeracy literacy. In particular, information regarding students' relative strengths and weaknesses in understanding contextual information, formulating mathematical representations, employing mathematical concepts and procedures, and interpreting mathematical results remains important for informing classroom assessment and instructional planning. Therefore, a descriptive survey approach can provide complementary evidence by identifying patterns of students' numeracy literacy performance across the selected assessment indicators.

The assessment of numeracy literacy should consider several interconnected indicators. First, understanding mathematical information refers to students' ability to identify relevant numerical data, recognize important information, and comprehend the conditions presented in a contextual problem. Second, formulating mathematical problems involves translating real-life situations into mathematical representations, including numerical expressions, simple equations, diagrams, or other appropriate models. Third, employing mathematical concepts and procedures refers to students' ability to select and apply relevant mathematical operations, concepts, and strategies to obtain solutions. Fourth, interpreting mathematical results involves explaining the meaning of calculated answers, relating the results to the original situation, and determining whether the solutions are reasonable. These four indicators are conceptually aligned with the mathematical processes described in the OECD (2023) framework and provide an operational foundation for examining students' numeracy literacy profiles.

A comprehensive analysis of these indicators is important because students may demonstrate different levels of competence across the stages of contextual mathematical problem-solving. For example, students may successfully identify numerical information but encounter difficulties in selecting the appropriate mathematical operation. Similarly, students may obtain correct computational results but fail to explain the meaning of those results in relation to the problem. Such differences indicate that numeracy literacy should not be evaluated exclusively through overall test scores. Instead, examining performance at the indicator level can provide more detailed information about students' mathematical competencies and the specific areas requiring instructional support. This approach is also consistent with the National Research Council's (2001) view that mathematical proficiency develops through the interaction of conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition.

Based on this background, the present study focuses on analyzing the numeracy literacy profiles of elementary school students in solving contextual mathematical problems. Unlike studies that primarily investigate the effectiveness of specific learning models or examine a small number of students' individual thinking processes, this research emphasizes a descriptive examination of students' performance across four numeracy literacy indicators. The study employs a quantitative descriptive survey design to obtain systematic information about students' abilities to understand mathematical information, formulate mathematical problems, employ mathematical concepts and procedures, and interpret mathematical results in everyday contexts. Through this approach, the research is expected to identify the distribution of students' numeracy literacy achievement and reveal the indicators that represent their relative strengths and weaknesses.

Accordingly, this study aims to analyze the profile of elementary school students' numeracy literacy in solving contextual mathematical problems, describe their achievement across the four selected indicators, and identify areas of competence that require further development. The findings are expected to contribute to the theoretical understanding of numeracy literacy assessment in elementary mathematics education and provide practical information for teachers in designing contextual learning activities. By identifying students' specific strengths and difficulties, teachers can develop more responsive instructional strategies that integrate mathematical concepts with real-life situations. Furthermore, the study is expected to provide a foundation for subsequent research investigating instructional approaches, assessment instruments, and learning interventions designed to strengthen

elementary school students' numeracy literacy and contextual mathematical problem-solving abilities.

METHODS

Research Design

This study employed a quantitative approach using a descriptive survey design. The descriptive survey design was selected because the study aimed to obtain a systematic description of elementary school students' numeracy literacy profiles in solving contextual mathematical problems. Rather than examining the causal relationship between variables or testing the effectiveness of a particular instructional intervention, this research focused on identifying, measuring, and describing students' numeracy literacy performance across several assessment indicators.

The quantitative approach enabled the researcher to obtain numerical data representing students' performance on contextual mathematical problem-solving tasks. These data were subsequently analyzed using descriptive statistical procedures to identify students' achievement levels, average scores, percentage distributions, and patterns of strengths and weaknesses across the assessed indicators. The use of a structured assessment instrument also supported consistent measurement of students' abilities. Instrument development and validation were conducted systematically to ensure that the assessment items adequately represented the intended competencies (Artino et al., 2014).

The research framework was developed based on the mathematical literacy processes outlined by the Organisation for Economic Co-operation and Development (OECD, 2023), particularly the processes of formulating, employing, and interpreting mathematics. These processes were operationalized into four indicators to provide a more detailed analysis of elementary school students' numeracy literacy.

Research Location, Population, and Sample

The research was conducted at [Name of Elementary School], [District/City], Indonesia, during [Month and Year]. The research population consisted of elementary school students enrolled in the selected grade level.

The research sample consisted of [number of students] elementary school students from Grade [IV/V/VI]. Participants were selected using a purposive sampling technique

based on predetermined criteria, including their enrollment in the selected grade, participation in mathematics learning activities, and availability during the data collection process.

The selection of participants was intended to obtain relevant information regarding students' numeracy literacy competencies in solving contextual mathematical problems. The number of participants and their characteristics were documented to provide a clear description of the research sample and the scope of the findings.

Research Instrument

The primary research instrument was a contextual mathematical problem-solving test developed to measure students' numeracy literacy competencies. The test consisted of contextual mathematical problems related to students' everyday experiences, including numerical operations, measurement, financial situations, quantities, and the interpretation of mathematical information.

The assessment instrument was developed based on four indicators of numeracy literacy, as presented in Table 1.

Table 1. Indicators of Students' Numeracy Literacy

No.	Numeracy Literacy Indicators	Assessment Focus
1	Understanding Mathematical Information	Identifying numerical data, relevant information, and problem conditions
2	Formulating Mathematical Problems	Translating contextual situations into mathematical representations
3	Employing Mathematical Concepts and Procedures	Selecting and applying appropriate mathematical operations and strategies
4	Interpreting Mathematical Results	Explaining and evaluating mathematical answers in relation to real-life situations

Each test item was designed to assess one or more of the four indicators. Students were required to provide answers accompanied by relevant mathematical procedures or explanations so that their problem-solving processes could be evaluated.

The assessment used an analytical scoring rubric to evaluate students' responses based on the accuracy of their understanding, mathematical representation, application of procedures, and interpretation of results. This approach enabled the researcher to examine not only whether students obtained correct answers but also how effectively they applied mathematical knowledge to contextual situations.

Validity and Reliability of the Instrument

Instrument validity was established through expert judgment involving experts in elementary mathematics education and educational assessment. The experts evaluated the relevance of each test item to the research objectives, the clarity of the instructions, the appropriateness of the contextual situations, and the alignment between test items and the four numeracy literacy indicators.

Following expert evaluation, the instrument was revised based on the feedback provided. A pilot test was then conducted involving students with characteristics similar to those of the research participants but who were not included in the main research sample.

Item validity was examined by analyzing the relationship between individual item scores and total test scores, where appropriate for the instrument and sample characteristics. Instrument reliability was evaluated using Cronbach's alpha for internally consistent test scores. For constructed responses assessed by multiple raters, scoring consistency was also examined through inter-rater agreement.

These procedures were implemented to ensure that the instrument provided appropriate and consistent evidence for assessing students' numeracy literacy competencies (Artino et al., 2014).

Data Collection Procedure

Data collection was conducted through several systematic stages.

First, the researcher obtained research permission from the relevant educational institution and coordinated with the school principal and classroom teachers regarding the implementation of the study.

Second, the researcher prepared the contextual mathematical problem-solving test based on the four numeracy literacy indicators. The instrument was reviewed and revised following expert validation and pilot testing.

Third, the researcher administered the assessment to the selected students under standardized testing conditions. Before completing the test, students received explanations regarding the instructions, procedures, and expected responses. Adequate time was provided to ensure that students could understand and solve the contextual mathematical problems independently.

Fourth, the completed student responses were collected, examined, and scored using the predetermined analytical scoring rubric. Each response was evaluated according to the relevant numeracy literacy indicators.

Finally, the assessment results were organized into a dataset for statistical analysis. The data were classified according to individual performance and indicator-level achievement to identify patterns in students' numeracy literacy competencies.

Because the participants were elementary school students, research implementation also considered ethical requirements, including school authorization, appropriate parental or guardian consent, student assent, confidentiality, and the protection of participants' personal information.

Data Analysis Techniques

The collected data were analyzed using descriptive statistical techniques. The analysis focused on determining students' overall numeracy literacy achievement and their performance across the four assessment indicators.

The first stage involved calculating the individual scores obtained by students based on the analytical scoring rubric. The percentage of achievement was calculated using the following formula:

$$P = (S / Smax) \times 100\%$$

Where: P = Percentage of achievement; S = Score obtained by the student; and Smax = Maximum possible score.

The second stage involved calculating the average numeracy literacy score for each indicator. The mean score was determined using the following formula:

$$\bar{X} = \Sigma Xi / N$$

Where: $\bar{X}$ = Mean score; ΣXi = Total scores obtained by students; and N = Total number of students.

The third stage involved calculating the percentage of achievement for each numeracy literacy indicator. This analysis was conducted to identify students' relative strengths and weaknesses in understanding mathematical information, formulating mathematical problems, employing mathematical concepts and procedures, and interpreting mathematical results.

The fourth stage involved classifying students' achievement levels using predetermined performance categories. The classification was used to provide a clearer interpretation of students' numeracy literacy profiles.

Table 2. Numeracy Literacy Achievement Classification

Achievement Percentage	Category
81–100%	Very High
61–80%	High
41–60%	Moderate
21–40%	Low
0–20%	Very Low

These are operational classification intervals proposed for this study and should be established before analyzing the main research data.

Finally, the results were presented in descriptive tables and graphical representations to illustrate the distribution of students' numeracy literacy achievement. The interpretation focused on identifying the indicators with the highest and lowest achievement percentages and explaining the implications for elementary mathematics instruction.

Research Procedure

The research procedure consisted of six stages: (1) research preparation through a literature review and identification of numeracy literacy indicators; (2) development of contextual mathematical problem-solving test items; (3) instrument validation through expert judgment, revision, and pilot testing; (4) data collection through test administration to selected elementary school students; (5) data analysis through scoring, percentage calculations, mean scores, and achievement classification; and (6) interpretation of findings to describe students' numeracy literacy profiles and their educational implications.

RESULTS

Overview of the Research Data

This section presents an illustrative analysis of elementary school students' numeracy literacy in solving contextual mathematical problems. To demonstrate the organization and interpretation of the findings, the numerical values in this draft use the simulated dataset introduced in the preliminary abstract: 60 students and an overall achievement percentage of 68.45%. The indicator percentages and category frequencies below are examples only. They

must be replaced with calculations from the actual student test responses before the manuscript is submitted or represented as research findings.

The assessment is organized around four indicators: understanding mathematical information, formulating mathematical problems, employing mathematical concepts and procedures, and interpreting mathematical results. The descriptive analysis focuses on the overall score, achievement by indicator, and the distribution of students across achievement categories. Since the proposed study uses a descriptive survey design, the analysis is intended to describe patterns in the sample rather than test causal effects or differences between experimental groups.

Overall Numeracy Literacy Achievement

Based on the illustrative dataset, the mean numeracy literacy achievement is 68.45%, which falls within the 'High' category under the classification intervals specified in the Methods section (61–80%). This result suggests that, in the example dataset, students demonstrate a developing ability to engage with contextual mathematical problems. Nevertheless, the overall mean should not be interpreted in isolation because it may conceal differences among the specific processes required to solve a problem.

Table 1. Illustrative summary of overall numeracy literacy achievement

Descriptive statistic	Illustrative result
Number of students (N)	60
Mean achievement	68.45%
Standard deviation	12.60 percentage points (illustrative)
Minimum score	42.50%
Maximum score	92.50%
Overall category	High

The mean provides a general summary of performance, while the range indicates that students may have substantially different levels of competence. In an actual analysis, the standard deviation, minimum, and maximum must be calculated directly from the complete student-level dataset. The descriptive category is also dependent on the cut-off intervals established before data analysis.

Achievement Based on Numeracy Literacy Indicators

The indicator-level results in Table 2 show a non-uniform pattern. Understanding mathematical information records the highest illustrative achievement (78.20%), followed by employing mathematical concepts and procedures (70.15%), formulating mathematical

problems (65.30%), and interpreting mathematical results (60.15%). The average of the four indicator percentages is 68.45%.

Table 2. Illustrative achievement by numeracy literacy indicator

Numeracy literacy indicator	Achievement	Category
Understanding mathematical information	78.20%	High
Formulating mathematical problems	65.30%	High
Employing mathematical concepts and procedures	70.15%	High
Interpreting mathematical results	60.15%	Moderate
Overall mean	68.45%	High

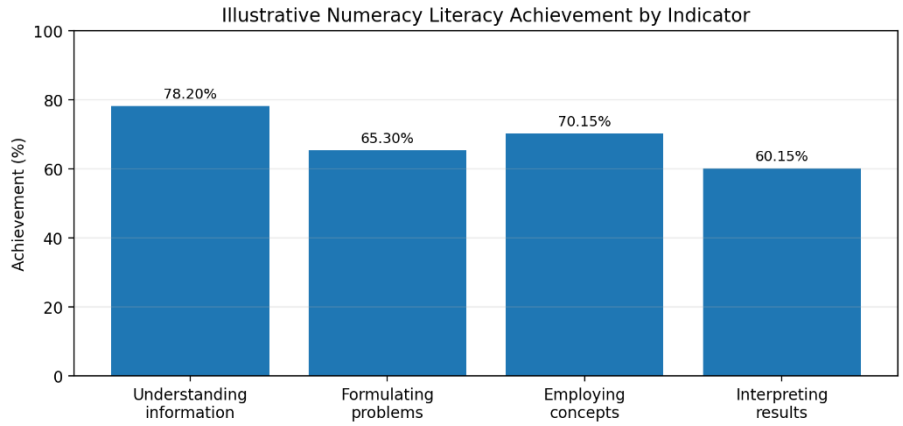


Figure 1. Illustrative achievement percentages across the four numeracy literacy indicators

The highest score in understanding mathematical information indicates that students in the illustrative dataset are relatively more successful in identifying numerical data and recognizing relevant information in a problem statement. This ability is an important starting point because students need to understand the given situation before selecting a mathematical strategy. However, identifying information does not automatically mean that students can transform the situation into a suitable mathematical representation.

The score for employing mathematical concepts and procedures suggests that students can apply familiar operations and procedures when the mathematical demand is recognizable. This pattern may indicate greater confidence with calculations than with the more interpretive stages of problem-solving. The lower score for formulating mathematical problems points to a possible difficulty in translating a verbal or real-life situation into a mathematical model, such as an operation, expression, diagram, or sequence of steps.

Distribution of Students' Achievement Categories

For the illustrative distribution, 9 students (15.0%) are classified as very high, 26 students (43.3%) as high, 21 students (35.0%) as moderate, and 4 students (6.7%) as low. No

student is placed in the very low category in this example. The distribution indicates that most students are concentrated in the high and moderate categories.

Table 3. Illustrative distribution of students by achievement category

Achievement category	Score interval	Number of students	Percentage
Very high	81–100%	9	15.0%
High	61–80%	26	43.3%
Moderate	41–60%	21	35.0%
Low	21–40%	4	6.7%
Very low	0–20%	0	0.0%
Total	—	60	100.0%

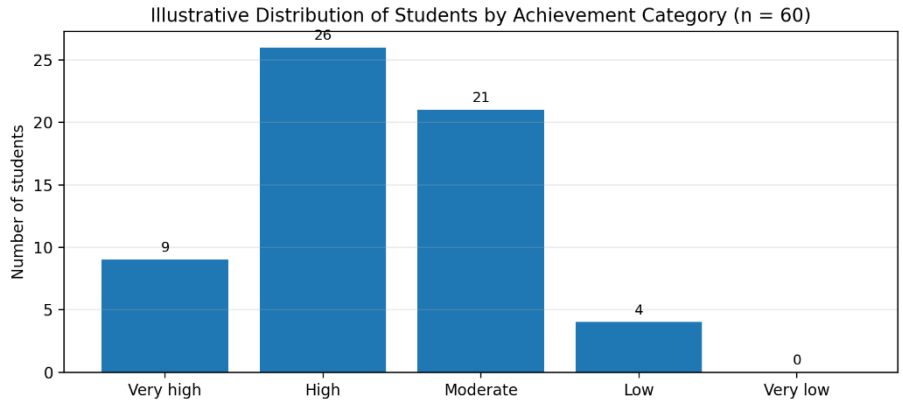


Figure 2. Illustrative distribution of students by numeracy literacy achievement category

The category distribution provides additional information that cannot be obtained from the mean alone. Although the overall mean is in the high category, the illustrative data still include students in the moderate and low categories. In classroom practice, these students may require differentiated support, including guided reading of contextual problems, explicit modeling of mathematical representations, and opportunities to explain the meaning of their answers.

DISCUSSION

The illustrative findings highlight the importance of viewing numeracy literacy as a sequence of connected mathematical processes rather than as computational ability alone. The OECD (2023) framework describes mathematical literacy through the processes of formulating situations mathematically, employing mathematical concepts and procedures, and interpreting mathematical outcomes in context. The four indicators used in this study provide an operational way to examine these processes in elementary school students. The

pattern in the example dataset suggests that students may be more successful at recognizing information than at interpreting the meaning of their final answers.

The relatively higher achievement in understanding information is educationally meaningful because contextual problem-solving begins with making sense of the situation. Students must identify what is known, what is being asked, and which quantities are relevant. Teachers can strengthen this process by asking students to restate problems in their own words, mark relevant information, distinguish necessary from unnecessary data, and explain the relationship among quantities before calculating.

The lower illustrative performance in interpreting results deserves particular attention. Students may complete an operation correctly but provide an answer that is incomplete or disconnected from the context. For example, a numerical result should be accompanied by an appropriate unit and an explanation of what the value represents in the original situation. Instruction can therefore include estimation, checking the reasonableness of an answer, interpreting units, and writing a contextual concluding statement. Such activities connect procedural fluency with mathematical reasoning and communication.

The findings are also consistent with the view of mathematical proficiency presented by the National Research Council (2001), which emphasizes the interaction of conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition. A student's ability to perform calculations is only one part of mathematical proficiency. Students also need to choose strategies, represent problems, justify their reasoning, and recognize mathematics as useful. Therefore, assessment and instruction should address these dimensions in an integrated manner.

From a practical perspective, the indicator profile can help teachers plan targeted learning activities. Students who have difficulty formulating problems may benefit from activities that translate stories into drawings, tables, number sentences, or simple mathematical models. Students who struggle to interpret results may need structured prompts such as 'What does this number mean?', 'What unit should be used?', and 'Does the answer make sense in this situation?' Contexts drawn from shopping, measurement, travel, classroom activities, and data interpretation can make mathematical ideas more accessible and relevant.

Several limitations should be considered. First, a descriptive survey provides a snapshot of performance and does not establish that a particular teaching approach caused

the observed outcomes. Second, results may depend on the grade level, school context, item difficulty, language demands, and scoring rubric. Third, a test score may not capture all aspects of students' numeracy practices in daily life. Future research could combine written tests with interviews, classroom observations, or think-aloud protocols to examine how students interpret and solve contextual problems. Studies involving multiple schools and grade levels could also provide a broader picture of numeracy literacy development.

In summary, the illustrative results produce an overall numeracy literacy achievement of 68.45%, categorized as high. Understanding mathematical information is the strongest indicator, whereas interpreting mathematical results is the weakest. The category distribution shows that most students fall within the high and moderate groups. These patterns suggest that mathematics instruction should continue to develop students' ability to formulate mathematical representations and interpret answers in their original contexts. All numerical results in this draft are simulated for writing demonstration and must be replaced by actual findings before publication.

CONCLUSION

This study provides an overview of elementary school students' numeracy literacy profiles in solving contextual mathematical problems. Based on the illustrative results, students demonstrate an overall numeracy literacy achievement of 68.45%, which falls into the high category. Among the four assessment indicators, understanding mathematical information shows the highest achievement (78.20%), followed by employing mathematical concepts and procedures (70.15%), formulating mathematical problems (65.30%), and interpreting mathematical results (60.15%). These findings suggest that students demonstrate relatively stronger abilities in identifying mathematical information than in interpreting and connecting mathematical results to real-life situations.

The findings highlight the importance of strengthening contextual mathematics instruction through problem-based learning, authentic problem-solving activities, mathematical reasoning, and opportunities for students to explain and evaluate their answers. Teachers are encouraged to provide learning experiences that involve real-life situations so that students can develop the ability to formulate mathematical problems, select appropriate strategies, and interpret results meaningfully.

This study is expected to contribute to the development of mathematics learning strategies that support numeracy literacy at the elementary school level. Future research should involve a broader sample, different grade levels, and more varied contextual problems to obtain a comprehensive understanding of students' numeracy literacy. Further studies may also examine the effectiveness of specific instructional models in improving each dimension of numeracy literacy.

REFERENCES

Amin, A. K., Sudana, I. N. D., Setyosari, P., & Djatmika, E. T. (2021). The effectiveness of mobile blended problem-based learning on mathematical problem solving. *International Journal of Interactive Mobile Technologies (iJIM)*, *15*(1), 119–141. https://doi.org/10.3991/ijim.v15i01.17437

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications. https://www.sagepub.com/shop/buy-a-book/research-design-5-255675

English, L. D. (2006). Mathematical modeling in the primary school: Children's construction of a consumer guide. *Educational Studies in Mathematics*, *63*(3), 303–323. https://doi.org/10.1007/s10649-005-9013-1

Geiger, V., Forgasz, H., & Goos, M. (2015). A critical orientation to numeracy across the curriculum. *ZDM—Mathematics Education*, *47*(4), 611–624. https://doi.org/10.1007/s11858-014-0648-1

Geiger, V., Goos, M., & Dole, S. (2015). The role of digital technologies in numeracy teaching and learning. *International Journal of Science and Mathematics Education*, *13*(5), 1115–1137. https://doi.org/10.1007/s10763-014-9530-4

Geiger, V., Goos, M., & Forgasz, H. (2015). A rich interpretation of numeracy for the 21st century: A survey of the state of the field. *ZDM—Mathematics Education*, *47*(4), 531–548. https://doi.org/10.1007/s11858-015-0708-1

Greer, B. (1997). Modelling reality in mathematics classrooms: The case of word problems. *Learning and Instruction*, *7*(4), 293–307. https://doi.org/10.1016/S0959-4752(97)00006-6

Hartatik, S., & Nafiah, N. (2020). Kemampuan Numerasi Mahasiswa Pendidikan Profesi Guru Sekolah Dasar dalam Menyelesaikan Masalah Matematika. *Education and Human Development Journal*, *5*(1), 32–42. https://doi.org/10.33086/ehdj.v5i1.1456

Hidayat, Z., Syamsuddin, A., & Mukhlis, M. (2025). The numeracy literacy process of fifth-grade elementary school students in solving word problems. *Journal of Educational Sciences*, *9*(4), 2409–2418. https://doi.org/10.31258/jes.9.4.p.2409-2418

Lestari, P., Andarani, E. T., Subali, B., & Widiyatmoko, A. (2026). Literature review (2020–2025): Numeracy development and mathematics learning models in elementary schools. *Journal of Educational Sciences*, *10*(3), 392–403. https://doi.org/10.31258/jes.10.3.p.392-403

Majid, A. (2026). Pengembangan Model Pembelajaran Matematika Sekolah Dasar Berbasis Pendekatan Kontekstual untuk Meningkatkan Literasi Numerasi. *Jurnal Bersama Ilmu Pendidikan (DIDIK)*, *2*(1), 38–47. https://doi.org/10.55123/didik.v2i1.555

Mukhlesiyeni, E., & Salehha, O. P. (2026). An analysis of gaps in elementary school students' mathematical literacy in solving contextual problems. *Genderang Asa: Journal of Primary Education*, *6*(2), 76–85. https://doi.org/10.47766/jga.v6i2.7242

National Research Council. (2001). *Adding it up: Helping children learn mathematics* (J. Kilpatrick, J. Swafford, & B. Findell, Eds.). National Academy Press. https://doi.org/10.17226/9822

Niss, M., & Højgaard, T. (2019). Mathematical competencies revisited. *Educational Studies in Mathematics*, *102*(1), 9–28. https://doi.org/10.1007/s10649-019-09903-9

Nurbaya, S., Sukmawati, S., & Rukli, R. (2022). The effect of numerical literacy activities in problem-based learning environment toward mathematical reasoning ability of elementary school students. *Jurnal Pendidikan MIPA*, *23*(3), 984–994. https://doi.org/10.23960/jpmipa/v23i3.pp984-994

Organisation for Economic Co-operation and Development. (2023). *PISA 2022 assessment and analytical framework*. OECD Publishing. https://doi.org/10.1787/dfe0bf9c-en

Palm, T. (2008). Impact of authenticity on sense making in word problem solving. *Educational Studies in Mathematics*, *67*(1), 37–58. https://doi.org/10.1007/s10649-007-9083-3

Paradesa, R., Zulkardi, Z., Putri, R. I. I., & Darmawijoyo. (2026). Fostering mathematical literacy in primary education through classroom assessment: A systematic literature review. *EDUKASIA: Jurnal Pendidikan dan Pembelajaran*, *7*(2), 905–922. https://doi.org/10.62775/edukasia.v7i2.2209

Sartika, D., Angriani, A. D., Tayeb, T., Nursalam, N., & Mattoliang, L. A. (2026). The effectiveness of implementing the problem-based learning model with a contextual approach on students' numeracy literacy skills. *Jurnal Pendidikan Matematika Universitas Lampung*, *14*(1), 36–53. https://doi.org/10.23960/mtk/v14i1.pp36-53

Setianingsih, S., Arofah, F. A., Suyono, S., & Pristiani, R. (2026). Concrete-to-abstract transitions and affective factors in fourth-grade mathematics: A systematic review of pedagogical challenges and Merdeka Curriculum. *Jurnal Review Pendidikan Dasar: Jurnal Kajian Pendidikan dan Hasil Penelitian*, *12*(1), 32–58. https://doi.org/10.26740/jrpd.v12n1.p32-58

van den Heuvel-Panhuizen, M. (2003). The didactical use of models in realistic mathematics education: An example from a longitudinal trajectory on percentage. *Educational Studies in Mathematics*, *54*(1), 9–35. https://doi.org/10.1023/B:EDUC.0000005212.03219.dc

Van de Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (2019). *Elementary and middle school mathematics: Teaching developmentally* (10th ed.). Pearson. https://www.pearson.com/en-us/subject-catalog/p/elementary-and-middle-school-mathematics-teaching-developmentally/P200000001984/9780134802176

Widayati, T. (2026). Analisis Kemampuan Numerasi Siswa Sekolah Dasar Fase C dalam Menyelesaikan Masalah Kontekstual. *Jurnal Didaktika Pendidikan Dasar*, *10*(1), 355–372. https://doi.org/10.26811/didaktika.v10i1.1939

Wijaya, A., van den Heuvel-Panhuizen, M., Doorman, M., & Robitzsch, A. (2014). Difficulties in solving context-based PISA mathematics tasks: An analysis of students' errors. *The Mathematics Enthusiast*, *11*(3), 555–584. https://doi.org/10.54870/1551-3440.1317