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Integrated Literacy and Numeracy Skills in Indonesian Language Learning: A Qualitative Analysis of Fourth-Grade Elementary Students

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Abstract

This study examines the integration of literacy and numeracy skills among fourth-grade students in Indonesian language learning at SDN 15 Palembang. Using a qualitative descriptive approach with observation, interview, and documentation, data were analyzed through Miles and Huberman's three-stage model with source and method triangulation. Results indicate that students demonstrate fairly good literacy in reading fluency and explicit comprehension but struggle with implicit meaning, systematic conclusions, and critical response. In numeracy, students recognize numerical information and perform basic calculations yet face difficulties in solving word problems and communicating mathematical reasoning. These findings demonstrate that literacy and numeracy are interconnected competencies requiring integrated development through contextual instructional strategies. Teachers must design scaffolded learning experiences that merge reading comprehension with mathematical problem-solving to enhance students' higher-order thinking abilities.

Keywords: integrated literacy-numeracy; Indonesian language learning; elementary education

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INTRODUCTION

The rapid transformation of the global economy and digital technologies has elevated literacy and numeracy as indispensable foundational competencies for 21st-century education (Ramamonjisoa, 2024; Winarno et al., 2024). International frameworks consistently position these skills as prerequisites for advanced competencies such as critical thinking and digital literacy (Aşıcı & Temel, 2023). In Indonesia, this imperative intersects with persistent domestic challenges: Indonesian students perform approximately 100 points below the OECD average in PISA assessments, with 70% of 15-year-olds lacking minimum proficiency in reading and mathematics (Asmahasanah et al., 2023; Purwanta, 2023). The COVID-19 pandemic further exacerbated these deficiencies, prompting the Ministry of Education to introduce the Merdeka Curriculum as a strategic recovery mechanism targeting literacy and numeracy across all levels (Hindri et al., 2023; Silitonga, 2023).

The Merdeka Curriculum represents a paradigm shift by mandating cross-curricular integration of literacy and numeracy (Asmahasanah et al., 2023; Winarno et al., 2024). Within this framework, literacy encompasses understanding, evaluating, and reflecting upon diverse texts, while numeracy involves applying mathematical reasoning to real-world problems (Arianty et al., 2021; Purwanta, 2023). The Minimum Competency Assessment (AKM) operationalizes these definitions by assessing reasoning through language and mathematics, with materials benchmarked against PISA standards (Bastian et al., 2023; Shofiyah et al., 2021). This policy context underscores the necessity of examining how these competencies manifest in classroom practice.

Indonesian language occupies a unique strategic position within this integrated framework (Lantang et al., 2024; Puspitaningtyas & Jasmina, 2023). As the official medium of instruction, it serves simultaneously as an object of literacy development and the primary vehicle for cultivating numeracy. Research demonstrates that language proficiency and numeracy are deeply interdependent: numeracy relies on mathematical symbols and language, while reading comprehension enables interpretation of quantitative problems (Azzajjad et al., 2023; Novita et al., 2023). The Ministry has articulated six essential literacies with reading-writing and numeracy as foundational components that must be developed across all subjects (K. Aini et al., 2024; Azzajjad et al., 2023).

Despite this policy momentum, significant implementation gaps persist in Indonesian language classrooms. Curriculum content remains misaligned with AKM competencies, with instruction focusing predominantly on vocabulary and grammar rather than critical reading

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comprehension (Bima et al., 2023; Puspitaningtyas & Jasmina, 2023). Teacher readiness presents a critical barrier, as many educators demonstrate only moderate literacy proficiency and sufficient numeracy abilities (Winarno et al., 2024). Students exhibit varying abilities in comprehending texts containing numerical data, struggling with word problems requiring simultaneous application of reading and mathematical reasoning (Khomaria & Jupri, 2024). These challenges are compounded by socioeconomic and geographic disparities limiting access to quality resources (Nurcahyoko et al., 2024; Saputra et al., 2023).

Empirical evidence from elementary schools illuminates the complexity of integrated literacy-numeracy development. Project-Based Learning (PjBL) through Indonesian language instruction has demonstrated significant improvements in both literacy and numeracy outcomes compared to conventional approaches (Lantang et al., 2024). STEAM-based learning grounded in local wisdom has increased student learning completeness from 40% to 80%, highlighting the potential of culturally contextualized instruction (Aini et al., 2024). However, observational data reveal persistent difficulties: while many fourth-grade students demonstrate satisfactory reading fluency, they struggle with implicit meaning interpretation and word problem solving (Febriana et al., 2025; Rosdiana et al., 2025). These findings suggest that integration remains partial, with students able to perform discrete skills but facing challenges when orchestrating multiple competencies simultaneously.

The theoretical rationale for integrated instruction is strengthened by evidence that these competencies function as mutual enablers of higher-order thinking. Analysis of AKM instruments reveals that literacy and numeracy questions are dominated by critical thinking indicators, particularly deductive reasoning (Putri et al., 2024). Numeracy literacy measures logical thinking and information processing skills that transcend mere arithmetic calculation (Prihastari & Kastono, 2022). Literacy development supports metacognitive capacities essential for mathematical problem-solving, as students must comprehend contexts and communicate solution processes (Gulo et al., 2024). This synergy aligns with broader 21st-century competency frameworks positioning foundational skills as prerequisites for creativity and collaboration (Ramamonjisoa, 2024; Ruttenberg-Rozen & Eamer, 2022).

Given the policy emphasis on integration, persistent implementation challenges, and the strategic role of Indonesian language as a medium for both competencies, systematic investigation of classroom-level integration is urgently needed. This study examines the integrated literacy and numeracy skills of fourth-grade students in Indonesian language learning at SDN 15 Palembang. Specifically, this research analyzes students' literacy profiles across reading

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fluency, comprehension, and critical response dimensions; examines their numeracy abilities in recognizing numerical information and solving contextual problems; and identifies factors influencing integration in classroom practice. By employing qualitative methodologies within the Merdeka Curriculum framework, this study seeks to provide empirical evidence for designing more effective, contextualized instructional strategies that develop literacy and numeracy as interconnected competencies.

METHODS

This study employed a qualitative descriptive approach to examine the integration of literacy and numeracy skills among fourth-grade students at SDN 15 Palembang during the even semester of the 2025/2026 academic year. The research setting involved 27 students and one classroom teacher, with data collected through three triangulated techniques: observation of learning activities and student performance, semi-structured interviews with both teachers and selected students, and documentation of student work samples and lesson artifacts. These methods were designed to capture the complexity of integrated literacy-numeracy development within authentic Indonesian language learning contexts, specifically during Chapter 5 instruction on "*Bertukar dan Membayar*."

Data analysis followed Miles & Huberman (1992) three-stage model: data reduction to select and focus on literacy-numeracy relevant information, data display through descriptive narratives and thematic matrices, and conclusion drawing with continuous verification. To ensure validity, source triangulation compared teacher and student perspectives, while method triangulation cross-checked findings across observation, interview, and documentation data. This rigorous analytical framework enabled the identification of literacy profiles across six indicators (reading fluency, accuracy, comprehension, main idea identification, conclusion-making, and critical response) and numeracy profiles across four indicators (numerical recognition, basic operations, word problem solving, and mathematical communication), alongside factors influencing their integration.

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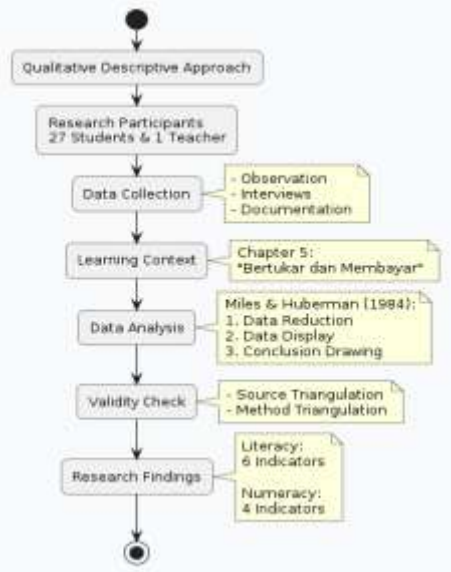


Figure 1. Research Method Framework

This five-phase systematic approach employs qualitative descriptive methods with triangulated data collection (observation, interview, documentation) and Miles & Huberman (1992) analytical model. The framework ensures comprehensive capture of how literacy and numeracy interact within Indonesian language instruction through dual validity checks (source and method triangulation), culminating in three integrated outcomes: literacy profiles, numeracy profiles, and integration factors. Each phase is color-coded for visual clarity: blue for setting, green for data collection, orange for analysis, red for validation, and purple for outcomes.

RESULTS

Result

1. Overview of Student Competency Profiles

The analysis of fourth-grade students at SDN 15 Palembang reveals distinct competency profiles across literacy and numeracy domains. Data collected through observation, interview, and documentation indicate that students demonstrate varying levels of proficiency when engaging with Indonesian language texts containing numerical information. The majority of students exhibit foundational reading abilities and basic number recognition skills. However, significant variation exists in their capacity to integrate these competencies for complex problem-solving tasks. These

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findings suggest that literacy and numeracy development occurs somewhat independently in current instructional practice rather than as interconnected competencies.

The overall literacy performance of Class IV.A students falls within the "fairly good" category based on six assessed indicators. Students generally succeed in surface-level reading tasks including fluent oral reading and explicit information identification. Conversely, numeracy performance is characterized as "developing" with students showing competence in number recognition but struggling with application tasks. This disparity between literacy and numeracy achievement levels indicates an uneven integration pattern that warrants targeted instructional attention. The following sections present detailed findings for each competency domain.

Table 1. Overall Competency Distribution

Competency Domain	Performance Level	Key Strengths	Primary Weaknesses
Literacy	Fairly Good	Reading fluency, explicit comprehension, main idea identification	Implicit meaning, systematic conclusions, critical reasoning
Numeracy	Developing	Number recognition, simple calculations	Word problems, mathematical communication
Integration	Partial	Basic text-number connection	Dual-processing, reasoning explanation

Table 1 summarizes the overall competency distribution showing that while students possess foundational skills in both domains, the integration level remains partial. Literacy strengths concentrate on receptive processing whereas numeracy weaknesses center on productive application. The gap between recognizing numbers in text and using those numbers for problem-solving represents the most significant integration challenge observed.

2. Literacy Skills Profile

a. Reading Fluency and Accuracy

Observational data indicate that most students demonstrate satisfactory reading fluency during group and individual reading activities. Students maintain relatively consistent tempo when reading Indonesian language texts aloud and follow textual flow without excessive pausing.

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Several students exhibit confidence when reading in front of peers, suggesting positive classroom culture for literacy engagement. However, notable variation exists in individual reading performance with some students reading slowly and hesitating at unfamiliar words.

Regarding reading accuracy, proficient students produce clear pronunciation enabling peer comprehension. These students distinguish word pronunciation correctly and attend to punctuation marks during oral reading. Conversely, several students fail to use appropriate intonation for different sentence types. For instance, students read interrogative sentences with declarative intonation and ignore comma and period pauses. These accuracy deficiencies result in unclear and monotonous oral production that may impede listener comprehension and self-monitoring.

Table 2. Literacy Indicator Performance Summary

Indicator	Performance Level	Observable Behaviors	Development Need
Reading Fluency	Mostly Good	Consistent tempo, group confidence, individual variation	Regular practice, confidence building
Reading Accuracy	Partial Issues	Clear pronunciation, intonation problems, punctuation ignored	Intensive intonation training
Comprehension	Explicit Good	Characters identified, setting recognized, events recalled	Implicit meaning instruction
Main Idea ID	Some Difficulty	Topic sentence found, supporting details confused	Paragraph structure guidance
Conclusion-Making	Weak	Simple summaries, fragmented information, missing core	Systematic synthesis training
Critical Response	Basic Level	Simple opinions, no reasoning, shallow analysis	Critical thinking activities

Table 2 presents the literacy indicator performance summary derived from classroom

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observation during Indonesian language instruction. The pattern reveals a gradient from mechanical skills (fluency) to interpretive skills (critical response) with performance declining as cognitive demand increases. Students master lower-order literacy tasks but require substantial scaffolding for higher-order processing.

b. Comprehension and Higher-Order Processing

Students demonstrate adequate comprehension of explicit information contained in Indonesian language texts. They successfully identify story elements including characters, settings, time markers, and sequential events. Several students can retell text content using their own sentences, indicating basic understanding of narrative structure. Nevertheless, students encounter significant difficulty when required to infer implicit meanings or interpret deeper messages embedded in texts.

Main idea identification presents particular challenges for a subset of students. While some learners recognize topic sentences that anchor paragraph meaning, others confuse supporting details with central arguments. Students frequently select sentences that appear interesting or are positioned in paragraph middle rather than identifying the foundational sentence that drives paragraph development. This pattern suggests insufficient understanding of paragraph architecture and topic sentence conventions. Conclusion-making abilities remain similarly underdeveloped with students providing fragmented information rather than coherent syntheses of complete text meaning.

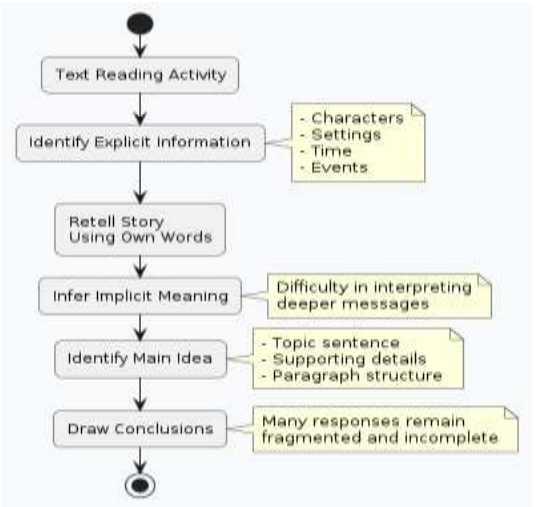


Figure 2. Integrated Findings Overview

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Literacy and numeracy skill profiles, teacher instructional perspectives, and student self-reported experiences across four data domains. The diagram illustrates the interconnected nature of findings while distinguishing competency strengths from persistent challenges.

3. Numeracy Skills Profile

a. Numerical Recognition and Basic Operations

The majority of students successfully recognize numerical information embedded within Indonesian language texts. When encountering texts containing quantities, time references, or simple data, students accurately identify and restate the numerical content. This ability demonstrates established text-to-number connections that form the foundation for integrated literacy-numeracy tasks. Students show particular competence when numbers appear in familiar contexts such as counting objects or identifying prices.

Basic arithmetic operations reveal partial competence among fourth-grade learners. Some students accurately perform addition and subtraction calculations based on text-derived information. For example, when instructed to calculate totals from data presented in reading passages, certain students complete computations correctly. However, other students struggle to determine which operations apply to given textual scenarios. The disconnect between reading comprehension and mathematical operation selection indicates that students have not yet developed integrated problem-solving schemas.

b. Word Problem Solving and Mathematical Communication

Word problem solving represents the most significant numeracy weakness observed in this study. While some students connect textual information with required calculation steps, many others fail to comprehend problem demands. These students cannot identify relevant numerical information from extraneous text or determine appropriate solution sequences. The difficulty frequently stems from inadequate overall text comprehension rather than isolated mathematical skill deficits. Students who struggle with implicit literacy comprehension similarly fail to interpret word problem requirements.

Mathematical communication skills remain notably underdeveloped. Some students describe calculation steps when explaining solutions, demonstrating emerging metacognitive awareness. However, the predominant pattern involves writing final answers without accompanying process explanation. Students rarely offer oral or written reasoning for their solution approaches, suggesting that instructional emphasis has focused on product rather than process. This communication gap limits teachers' ability to diagnose thinking errors and students' capacity to develop self-regulated problem-solving abilities.

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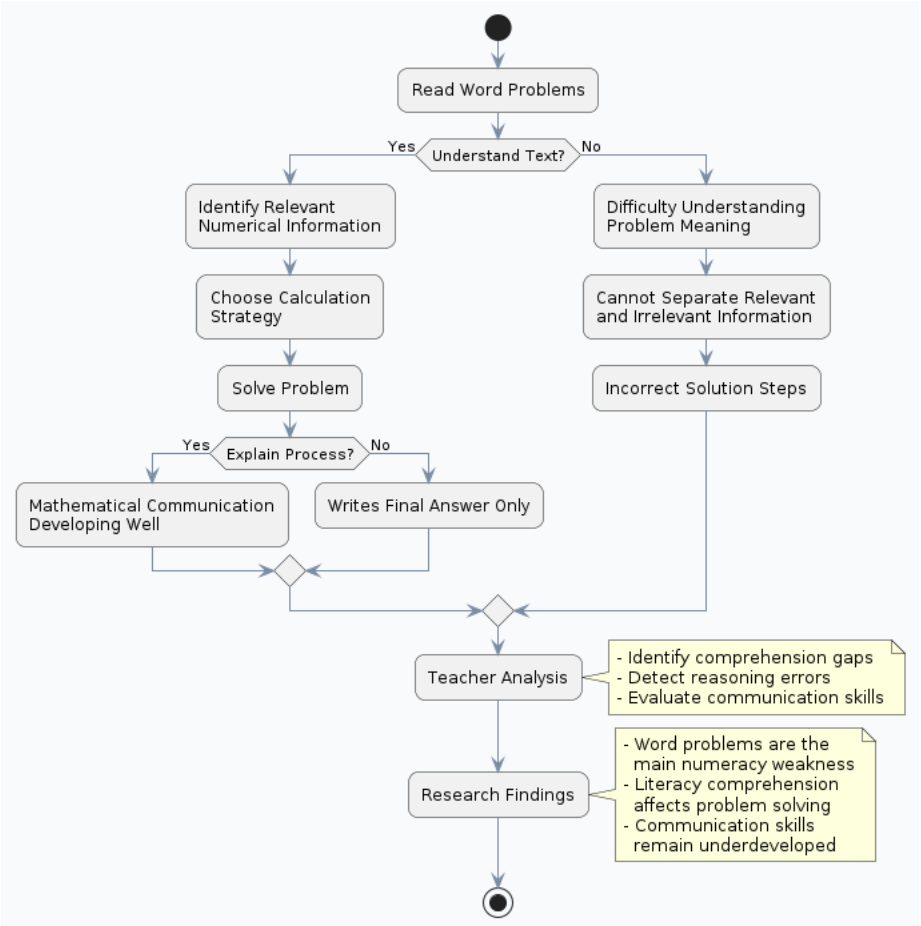


Figure 3. Literacy Skill Indicator Analysis

Observational data from Indonesian language learning showing six assessed dimensions with performance levels and specific behavioral markers. The central "Fairly Good" assessment reflects surface-level competence while peripheral indicators reveal deeper processing weaknesses.

4. Teacher Instructional Perspectives

Interview data from the classroom teacher reveal deliberate efforts to develop student literacy through varied instructional methods. The teacher implements shared reading activities at lesson beginnings to build reading fluency and collective comprehension. Group discussions and question-answer sessions facilitate peer interaction with text content. Independent reading

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assignments encourage autonomous literacy engagement. These methods reflect established pedagogical practices for Indonesian language instruction.

Regarding numeracy integration, the teacher has begun incorporating numeracy-focused activities into language lessons. Text selections now include numerical data requiring student attention and interpretation. The teacher explicitly connects mathematical concepts with textual contexts to demonstrate real-world relevance. However, the teacher acknowledges persistent challenges including limited student reading interest and difficulties with combined reading-mathematics tasks. These challenges necessitate gradual scaffolding and engaging material selection to maintain student motivation.

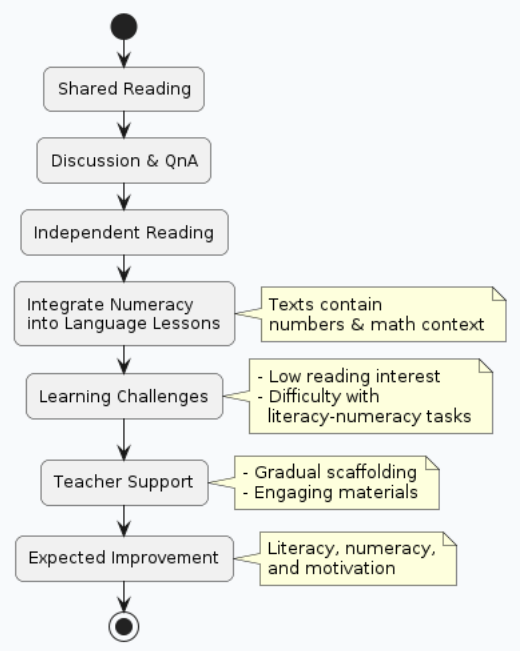


Figure 4. Numeracy Skill Indicator Analysis

Four assessed dimensions showing students can recognize numerical information but struggle with problem-solving and mathematical communication in language-based contexts. The cross-dimensional arrows indicate the interdependence between recognition and application skills.

5. Student Self-Reported Experiences

Student interviews confirm observational findings regarding literacy task preferences and challenges. Students express enjoyment of reading activities when texts contain illustrations and

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engaging narratives. Pictures are identified as important comprehension supports that help students visualize story content and remember key events. Students report confidence when reading short texts with familiar vocabulary. Conversely, lengthy texts and unknown words generate frustration and comprehension breakdown.

Numeracy-related interview responses reveal students' awareness of their own difficulties. Students acknowledge ability to recognize numbers in text but admit confusion when required to solve story problems. The problem comprehension barrier frequently causes students to abandon tasks or provide random answers. Students attribute these difficulties to unclear problem requirements rather than calculation inability. This metacognitive awareness suggests that students possess foundational skills but lack strategic knowledge for orchestrating integrated literacy-numeracy tasks.

Table 3. Student Self-Report Summary

Aspect	Positive Reports	Negative Reports	Implication
Text Preference	Illustrated, short, contextual	Long, unfamiliar vocabulary	Material design should prioritize visual supports
Reading Confidence	Group reading, easy texts	Individual reading, complex texts	Scaffolding needed for independent tasks
Number Recognition	Confident in identification	Confused by application	Recognition ≠ problem-solving ability
Problem Solving	Simple calculations possible	Word problems overwhelming	Integrated strategy instruction required
Explanation Ability	Can state answers	Cannot explain reasoning	Process-focused assessment needed

Table 3 synthesizes student self-report data comparing positive and negative learning experiences. The pattern reveals alignment between student perceptions and observed behaviors: students recognize their own limitations in integrated tasks while feeling confident in isolated skill demonstrations. This self-awareness provides a foundation for targeted intervention focusing on strategy transfer between literacy and numeracy contexts.

6. Integration Gap Analysis

The comprehensive analysis reveals a significant gap between discrete literacy and

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numeracy competencies versus integrated application skills. Students who read fluently cannot necessarily solve word problems presented in those texts. Students who calculate accurately cannot explain their reasoning using language-based communication. This compartmentalization suggests that current instruction develops parallel rather than integrated competency structures.

Six core challenges emerge from cross-domain analysis. First, text complexity overwhelms working memory when students must simultaneously process language and numerical information. Second, cognitive load from dual processing exceeds student capacity for higher-order reasoning. Third, unfamiliar mathematical vocabulary in Indonesian language creates comprehension barriers. Fourth, students cannot transfer reading comprehension strategies to mathematical problem contexts. Fifth, communication expectations focus on answers rather than reasoning processes. Sixth, instructional methods historically separate literacy and numeracy rather than integrating them through contextual tasks.

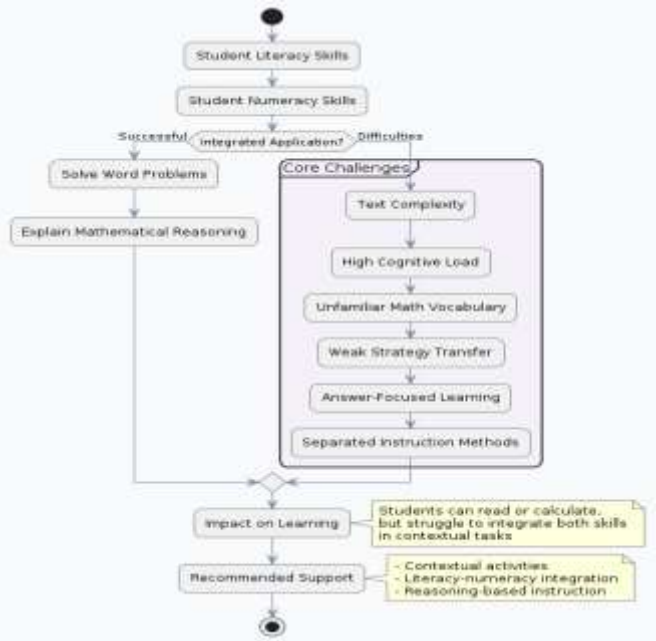


Figure 5. Integration Gap Analysis

Mapping the disconnect between literacy and numeracy competencies, identifying six core challenges, and proposing a four-step contextual integration pathway for Indonesian language learning. The diagram visualizes the transition from isolated strengths through identified gaps toward recommended solutions.

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DISCUSSION

The findings of this study indicate that fourth-grade students at SDN 15 Palembang demonstrate fairly good literacy skills in Indonesian language learning, particularly in reading fluency, explicit comprehension, and main idea identification. This aligns with Mahendra et al (2025) who found that elementary students generally possess foundational literacy abilities sufficient for basic text navigation but struggle with higher-order reasoning tasks. Similarly, Arifa et al (2025) reported that students in Barito Kuala showed comparable patterns where reading mechanics exceeded interpretive capabilities. The ability to identify explicit information reflects surface-level processing that does not guarantee deep understanding (Yuda & Rosmilawati, 2024). These consistent findings across Indonesian elementary contexts suggest that literacy instruction prioritizes decoding over critical engagement.

The observed difficulties in implicit meaning comprehension, systematic conclusion-making, and critical response correspond with broader national patterns documented in recent studies. Wati et al (2025) identified low reading interest and shallow processing as primary factors limiting student engagement with complex texts in Palembang schools. Anugrahana and Pamekas (2024) similarly noted that elementary students struggle to infer meaning beyond literal text content when literacy activities lack cognitive challenge. The inability to synthesize information into coherent summaries indicates underdeveloped metacognitive monitoring strategies (Gulo et al., 2024). Such findings underscore the necessity of instructional approaches that scaffold progressively from explicit to implicit comprehension.

In the numeracy domain, students' capacity to recognize numerical information and perform basic calculations contrasts sharply with their difficulties in solving word problems and communicating mathematical reasoning. This pattern mirrors Aini et al (2025) who observed that elementary students could identify numbers in mathematical tasks yet failed to apply operational knowledge to contextual problems. Asmi et al (2025) further confirmed that students performing below standard on Minimum Competency Assessment (AKM) numeracy items typically possessed calculation skills but lacked problem interpretation abilities. The present study extends these findings by situating numeracy within Indonesian language texts rather than isolated mathematics problems. This contextual embedding reveals that linguistic comprehension serves as a gatekeeper for mathematical application.

The interdependence of literacy and numeracy difficulties observed in this study finds support in recent theoretical and empirical literature. Febriana et al (2025) emphasized that Indonesian language functions as the medium through which scientific and numerical literacies

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are constructed, making language proficiency foundational to cross-curricular competence. Barus et al. (2023) demonstrated that Realistic Mathematics Education (RME) methods improve numeracy by grounding abstract concepts in meaningful contexts, suggesting that decontextualized instruction contributes to the word problem deficit. Furthermore, Rosdiana et al (2025) found that fifth-grade students' numeracy literacy correlated significantly with their reading comprehension levels, indicating that text-based mathematical reasoning requires integrated skill sets. These studies collectively validate the present finding that literacy and numeracy are not isolated competencies but mutually reinforcing domains requiring coherent development.

The integration challenges identified—text complexity, cognitive load, vocabulary barriers, strategy transfer limitations, communication gaps, and instructional misalignment—demand systemic pedagogical responses. Hardjo et al. (2023) successfully enhanced both literacies through structured reading programs combined with numeracy-embedded texts, demonstrating the feasibility of integrated approaches. Anggraeni & Emi (2025) showed that technology-mediated practice through Google Form improved numeracy literacy by providing structured, repetitive engagement with contextual problems. Additionally, Yasa (2025) argued that Merdeka Curriculum implementation must explicitly connect literacy and numeracy objectives across subject boundaries rather than treating them as separate learning outcomes. The present study contributes to this discourse by providing empirical evidence that contextual, scaffolded, and process-oriented instruction can bridge the observed integration gap in Indonesian language classrooms.

CONCLUSION

Based on the findings of this study, it can be concluded that fourth-grade students at SDN 15 Palembang demonstrate fairly good literacy skills in Indonesian language learning, particularly in reading fluency, explicit comprehension, and main idea identification, while exhibiting significant weaknesses in implicit meaning interpretation, systematic conclusion-making, and critical response. In numeracy, students show developing competence in numerical recognition and basic calculations but struggle substantially with word problem solving and mathematical communication, often providing final answers without explaining reasoning processes. These findings reveal that literacy and numeracy are deeply interconnected competencies that require integrated development through contextual learning approaches, as students cannot effectively apply mathematical reasoning within language-based tasks without strong foundational reading

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comprehension. Therefore, teachers must design instructional strategies that deliberately merge literacy and numeracy objectives using scaffolded, process-oriented, and culturally relevant materials to foster students' higher-order thinking and problem-solving abilities in Indonesian language classrooms.

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