p-ISSN 2355-5343
e-ISSN 2502-4795
http://ejournal.upi.edu/index.php/mimbar

Article Received: 21/04/2025; Accepted: 26/06/2025
Mimbar Sekolah Dasar, Vol.12(3), 597-610
DOI: 10.53400/mimbar-sd.v12i3.89088

Strategies to Improve Literacy and Numeracy Based on Computer-Based National Assessment Indicators

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Abstract. Low literacy and numeracy achievement remains a challenge in various regions, including East Nusa Tenggara, Indonesia. This study aims to describe strategies implemented in a primary school to improve literacy and numeracy based on Computer-Based National Assessment (CBNA) indicators. A qualitative approach with a case study method was used. Data were collected through interviews, observations, and document analysis. This study did not conduct direct testing; instead, indicators of improvement were identified through changes in school practices, student engagement in literacy and numeracy activities, teacher reflections, and official school reports. Five main strategies were identified: (1) School management, emphasizing structured programs such as the 15-minute reading habit and the formation of literacy and numeracy clubs; (2) Classroom management, using interactive methods such as abacus, the gasing method and sparking questions to build engagement; (3) Increasing teacher competency, supported through technical guidance, webinars, and workshops; (4) CBNA preparation, involving regular practice with assessment-style questions and technical readiness; and (5) Collaborative Teaching Initiatives, through collaboration between teachers, learning community, and work program. Improvements were evident in student confidence, active participation, and the ability to solve CBNA-style problems. This study contributes practical insights for schools and policymakers to develop sustainable, context-based strategies to strengthen foundational skills in literacy and numeracy.

Keywords: CBNA; Learning Strategy; Literacy; Numeracy; Primary School.

1. Introduction

Literacy and numeracy are fundamental skills that are critical in meeting the challenges of the 21st century (Deda et al., 2023). Literacy encompasses a range of essential skills, including reading, writing, speaking and listening, which together enable individuals to access, interpret, and communicate information effectively (Singh et al., 2023). Meanwhile, numeracy involves understanding number concepts, performing calculations, and applying math skills in everyday life (Rakhmawati & Mustadi, 2022). Both are essential for data-driven decision making and complex problem solving in various life domains (Zainudin & Abdul Fatah, 2023).

Globally, countries such as Singapura and Estonia have shown significant progress in literacy and numeracy through early interventions, national assessments, and teacher development (PISA, 2022). In contrast, Indonesia still struggles in these areas. The 2022 PISA results ranked Indonesia 69th out of 80 countries, with literacy and numeracy scores of 359 and 366, respectively, well below the global average (Rahmania et al., 2024). At the national level, Indonesia has introduced the Computer-Based National Assessment (CBNA) to measure student achievement in literacy and numeracy (Handoko et al., (2019); Cahyaningsih et al., (2024). The CBNA 2024 results indicate that many primary schools in East Nusa Tenggara (NTT) still struggle with low literacy and numeracy performance. Amidst these challenges, one public primary school in NTT showed notable improvement, based on its 2024 CBNA scores. This suggests that the school's internal strategies have contributed positively to student learning outcomes. These findings align with international evidence that literacy and numeracy improvement is achievable through context-based and integrated strategies.

What strategies can schools implement to improve students' literacy and numeracy based on CBNA indicators? This study is novel in that it investigates an integrated school-based approach-spanning school management, classroom management, teacher development, and CBNA preparation-directly aligned with CBNA indicators and applied in a low-performing region.

1.1. Problem Statement

Literacy and numeracy are fundamental skills essential for daily life and academic success. However, many students still struggle to master these basic competencies (Fauzan et al., 2024). Difficulties in literacy and numeracy stem from various internal and external factors (Scammacca et al., 2020). From the student's perspective, low interest in reading and poor understanding of numeracy concepts are key barriers (Suryaningsih, 2025; Iswara et al., (2022). From the teacher's side, limitations in implementing innovative teaching methods reduce the effectiveness of learning (Hazin et al., 2025). Inadequate facilities, lack of supporting teaching materials, and suboptimal use of technology in schools further exacerbate the issue (Wijaya et al., 2024).

These challenges become even more critical as students are required to face the National Computer-Based Assessment (CBNA), which demands a high level of literacy and numeracy competence (Kuswanti, 2023). If left unaddressed, this issue may hinder the achievement of national education standards and increase learning disparities among students.

To overcome these challenges, schools must design learning strategies aligned with the CBNA indicators. The school environment and teacher quality play crucial roles in student success (Langdon Warren, 2021). Teachers with strong pedagogical skills can foster student motivation, which is also shaped by the leadership and strategic management of the principal (Iswan et al., 2021). Furthermore, effective school and classroom management contribute directly to improving literacy and numeracy outcomes (Tripoli, Vincitta, May, 2024; Slater & Main, 2020). A public primary school in Kupang City is one example of a school that has demonstrated significant improvement in literacy and numeracy outcomes based on CBNA results. This achievement suggests that specific learning strategies have been effectively implemented. Therefore, examining the strategies used by a public primary school in Kupang City is essential to understand the supporting factors behind their success.

1.2. Related Research

Several studies have explored strategies to improve literacy and numeracy based on the Computer-Based National Assessment (CBNA) indicators. Hapsari et al., (2025) examined strategies in Madrasah Ibtidaiyah to improve students' readiness for CBNA, but the results showed that literacy and numeracy skills still needed to be improved despite the strategies implemented. Similarly, Mahatika & Trisoni, (2022) analyzed the effectiveness of Computer-Based National Assessment (CBNA) in improving education quality, with literacy and numeracy as the core components. Although CBNA aims to harmonize the education process in schools, their study emphasized policy-level analysis, indicating the need for further research on practical implementation. Meanwhile, Fadiana et al., (2022) investigated the use of Problem-Based Learning (PBL) and lesson study to improve students' literacy and numeracy. While their findings confirmed the importance of teacher roles and active learning, the study did not focus on CBNA indicators specifically. This study offers a new contribution by specifically examining the implementation of literacy and numeracy improvement strategies based on CBNA indicators at the school level, using a qualitative case study approach. It explores how principals and teachers collaboratively apply targeted strategies in daily practices, proving concrete examples that are directly aligned with CBNA expectations.

1.3 Research Objectives

This study aims to describe school-based strategies to improve literacy and numeracy based on Computer-Based National Assessment (CBNA) indicators, as well as to identify indicators

of improvement as reflected in students' participation, engagement in learning activities, teacher feedback, and school documentation.

2. Theoretical Framework

Literacy and numeracy are basic competencies that form the foundation for students' academic success and participation in daily life. Literacy includes the ability to read and write to obtain information and expand knowledge (Fatonah et al., 2023). Meanwhile, numeracy involves understanding number concepts and performing arithmetic operations in real context, such as economic calculations, measurement, geometry, and data interpretation using tables and charts (Saefurohman et al., 2023).

Improving students' literacy and numeracy has become a national education priority, especially through the implementation of the Computer-Based National Assessment (CBNA). CBNA is a digital evaluation system designed to measure school quality by assessing students' competencies in literacy and numeracy using online tests (Riawan, 2023). This assessment goes beyond factual knowledge and emphasizes high-order thinking, such as analyzing, interpreting, and solving problems based on real world data.

In this study, the theoretical framework focuses on the relationship between literacy and numeracy as measured through CBNA indicators. The school-based strategies described are aligned with these indicators, aiming to strengthen students' ability to comprehend text, use mathematical reasoning, and apply knowledge across disciplines. These competencies are essential to developing critical, reflective, and solution-oriented learners in the 21st century.

3. Method

3.1. Research Design

This study used a qualitative approach with a case study design (Taherdoost, 2022). The case study approach was chosen because this research aimed to explore school-spesific strategies in depth, within a real-life context. The focus was not to generalize findings across many schools, but to understand how one school implemented literacy and numeracy improvement strategies based on CBNA indicators.

The case study allowed the researcher to examine the planning, implementation, and outcomes of literacy and numeracy programs as they occurred naturally in the school environment. The research was conducted in one public primary school in Kupang City, East Nusa Tenggara, selected purposively because the school demonstrated a notable increase in CBNA scores in 2024. The participants included the principal and two fifth-grade teachers, who were directly involved in the implementation of literacy and numeracy programs.

Data collection was conducted through direct observation of school activities, semi-structured interviews, and document analysis. This design enabled the researcher to explore the strategies, experiences, and perceived impacts from multiple perspectives in the school setting.

3.2. Participant

Data sources in this study include interview transcripts with the principal and grade V teachers who understand the school's literacy and numeracy improvement strategies, as well as observation transcripts describing related activities inside and outside the classroom. Respondents were selected based on their competence and relevance to the literacy and numeracy improvement strategies aligned with the National Computer-Based Assessment indicators. In addition, supporting documents such as report cards, technical guidance records and other relevant files were also used.

A total of 6 participants were involved in this study, consisting of 1 principal, 3 grade V teachers, and 2 school operator. These participants were selected purposively due to their direct involvement in the planning, implementation, and evaluation of literacy and

numeracy programs in the school. The detailed characteristics of participants are presented in the table 1 below.

Table 1. Participant Characteristics

Position	Gender	Role in Literacy and Numeracy Program	Frequency	Percentage
Principal	Male	Program initiator and coordinator	1	16,7%
Grade V Teacher	Male and Female	Implementer of literacy and numeracy strategies	3	50,0%
School Operator	Female	Administrative support and data manager	2	33,3%
	Total		6	100%

3.3. Data Collection

Data in this study were collected through observation, interviews and document analysis. The process began with preliminary observations of the school environment, literacy and numeracy learning activities, and the use of media and facilities. Observation were conducted during morning reading sessions, club activities, and classroom lessons to see how strategies were applied in practice.

Interviews were conducted with the school principal and two fifth-grade teachers. The interview questions were designed to explore the school's literacy and numeracy strategies, challenges encountered, and the impact on student. Open-ended questions allowed participants to explain how students' abilities developed over time. Researchers also probed specific indicators of improvement, such as changes in students; confidence, participation, ability to answer CBNA-style questions, and engagement with texts or numeracy tasks.

Document analysis included reviewing school work programs, student assessment reports, CBNA preparation schedules, and portfolios of student work. These documents were used to triangulate the data obtained from observations and interviews.

The instruments used included observation sheets, interview guides, and document checklists, all developed based on the CBNA indicators. This allowed the researcher to identify patterns and verify whether the implemented strategies aligned with targeted literacy and numeracy improvements.

3.4 Data Analysis

The data in this study were analyzed using a thematic qualitative approach. This method was selected because it allows the researcher to identify recurring themes and patterns form multiple sources, including interviews, observations, an documents. The process followed five stages using NVivo 15 software to support coding and visualization.

First, the researcher read and reread all transcripts, observation notes coding and organization process. The analysis followed five stages: (1) Familiarizing with the data: the researcher thoroughly read interview transcripts, observation notes, and documents to become familiar with the content. In this stage, reflective notes were written to capture initial impressions.

Second, open coding was carried out using NVivo by assigning meaningful labels to important statements, in the interview transcripts, observation summaries, and school

documents. For example, repeated mentions of "15-minute reading habit" or "literacy and numeracy club" were coded under "school strategy".

Third, the codes were grouped into broader categories, such as "school management", "classroom management", "teacher competence" and "CBNA preparation". This stage focused on identifying how each strategy aligned with CBNA indicators.

Fourth, data were visualized in the form of code trees and matrices, helping the researcher track relationship between strategies and indicators of improvement, such as student engagement, confidence, and performance.

Finally, the researcher interpreted these findings by comparing them across data sources and linking them to the CBNA framework. This ensured that the analysis remained grounded in the context of the school and the national assessment standards.

3.5. Validity and Reliability

To ensure the quality and credibility of the data, this study employed several validation strategies in line with qualitative research standards. Data validity was maintained through method triangulation (observation, interviews, and document analysis), source triangulation (principals, teachers, documents), and theoretical triangulation, which involved interpreting findings using relevant literature and theories. These triangulation techniques strengthened the consistency and accuracy of the data collected.

In terms of instrument reliability, the observation sheet and interview guide were designed based on established indicators from the Computer-Based National Assessment (CBNA), ensuring that the instruments measured the intended aspects. The instruments were also pre-evaluated by education experts to ensure clarity and relevance to the research objective.

Additionally, audit trails were maintained by systematically documenting each step of data collection and analysis using NVivo 15 software. This provided a transparent process and improved the dependability and confirmability of the findings. As a result, the research findings can be considered trustworthy and aligned with the chosen case study design.

4. Findings

Based on the results of interviews, observations, and document analysis, the researcher identified five main themes related to the strategy of improving literacy and numeracy based on Computer-Based National Assessment (CBNA) indicators. These themes include school management, classroom management, improving teacher competence, CBNA preparation, and collaborative teaching initiatives. This section includes insights gathered from several participants, whose roles range from classroom practitioners and school leadership to support staff. The inclusion of multiple data sources ensures that findings are triangulated and grounded in practice. The thematic map (Figure 1) and observation table (Table 2) that support these findings are presented below. This study identified five main themes based on the analysis of interview transcripts, observations, and document studies. Each theme is elaborated as follows.

4.1. School Management

Effective school management is not only about administrative oversight, but also instructional leadership and resource planning. According to Mustoip et al. (2023), school leadership plays a central role in driving educational transformation and fostering an environment conducive to student achievement. This theoretical understanding underpins the practical strategies observed in this study.

School management emerged as a central theme in supporting literacy and numeracy initiatives. Leadership plays a vital role in ensuring policy implementation, resource allocation, and teacher accountability. One participant noted, "*We are guided to implement structured literacy and numeracy activities, and all lesson plans are monitored weekly*".

Document analysis confirmed that monitoring forms, program planning sheets, and literacy targets were displayed in school administration rooms. Observational data also showed visual banners promoting daily literacy habits in classrooms and computer lab readiness.

Another teacher added, "*We received clear direction from the school leader, who even attends some of our teaching sessions to observe how well we implement CBNA-aligned lessons*." This leadership involvement reflects the integration of administrative support with instructional leadership.

In addition, the school management initiated several core programs to support literacy and numeracy development. These include the formation of literacy and numeracy clubs held twice a month as part of self-development activities. One teacher shared, "*The club meetings are held on the first and second Saturdays each month. We focus on reading comprehension and solving math challenges in groups*." These clubs are officially listed in the school's co-curricular activity program and coordinated by designated teachers.

Furthermore, the provision of a computer lab equipped with more than twenty computers is also part of the school's infrastructure strategy. This facility is used not only for digital literacy practice but also for preparing students for CBNA. "*We schedule students to use the computer lab during their literacy and numeracy lessons so they become familiar with online test interfaces*," explained one staff member.

The school also implements a daily 15-minute literacy habit before the start of formal lessons. "*This activity is part of the school's routine and supported by policy. All classes begin the day with quiet reading, and sometimes students share what they read*," added another teacher. These structured programs show that the school's leadership doesn't only provide oversight but actively creates opportunities and environments that foster literacy and numeracy culture.

Furthermore, the school leadership ensured that all literacy and numeracy strategies were integrated into the school's annual program. "*The principal provided guidance and ensured that each teacher had a copy of the CBNA indicator matrix to use in their teaching plans*," said another teacher. Leadership meetings were also held monthly to evaluate the program's effectiveness and make data-driven decisions based on classroom observations and students' progress reports.

Additional insights were obtained from the school's administrative operator, who emphasized the importance of internal evaluations. "*Every month, the principal asks us to recap student participation in literacy activities. It helps track progress and identify who needs support,*" said the operator. This form of monitoring supports data-driven decision-making by the leadership team.

4.2. Classroom Management

According to Abidin (2020), classroom management is essential in shaping students' learning experience, particularly when integrating 21st-century competencies. Effective management requires the teacher to not only facilitate content delivery but also create a learning environment that fosters critical thinking, engagement, and self-regulation.

In daily classroom routines, several practical strategies were consistently applied to enhance students' engagement and conceptual understanding. Among these were the use of the abacus, which helped students visualize numerical operations by manipulating physical objects-making abstract arithmetic more concrete. One teacher noted, "*When students use the abacus, they move the beads and can 'see' the calculation process*."

Another widely used method was the gasing (easy, fun, enjoyable) approach, a mental calculation technique that builds fluency in basic operations. According to a respondent, "*The gasing method allows students to calculate quickly without relying on written tools. It builds confidence and fluency*."

To maintain student attention and reduce monotony, teachers regularly applied ice breaking techniques. "Before moving to new topics, we do a short energizer like a quiz or game. It helps reset the class," explained one teacher.

Additionally, teachers used sparking or trigger questions at the beginning of lessons to stimulate students' critical thinking and link prior knowledge. "*I ask real-life scenarios that relate to the topic so students think critically right away*," said a respondent.

Teachers also integrated learning videos to enrich lessons and present content in a more engaging way. These videos were especially helpful for visualizing complex mathematical or literacy concepts. "*Videos help visualize concepts, especially in math where shapes or processes can be hard to explain verbally*," stated a teacher. Observations confirmed that such multimedia integration increased student focus and participation.

Another observation highlighted the importance of routines in supporting literacy and numeracy. "*We structure the lesson with consistent steps-warm-up with mental math or short reading, then move to the main concept. It helps students feel secure*," said one teacher. This routine practice was found to boost student engagement and reduce anxiety during lessons.

Another grade V teacher emphasized that these approaches create a strong student-teacher connection. "*When we do gasing competitions or watch videos together, students become more expressive and less afraid to ask questions*," she said. This reflects the broader impact of classroom strategies on confidence and interaction.

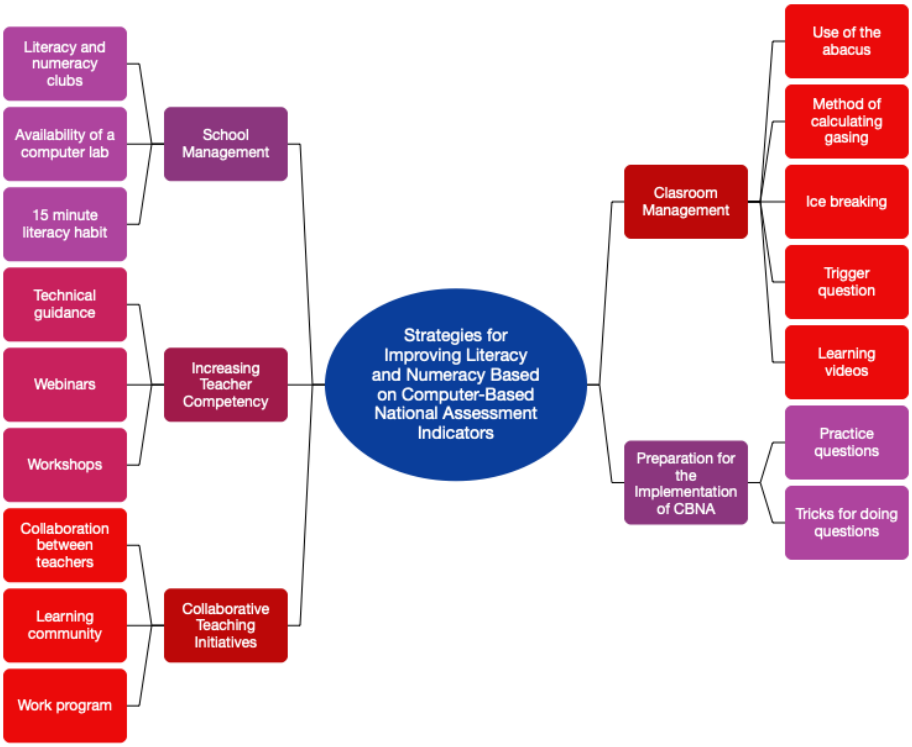

Figure 1. Mind Map of Research Results

4.3. Increasing Teacher Competency

To enhance teaching capacity, the school facilitated training programs such as technical guidance, webinars, and workshops. These were designed to equip teachers with strategies for integrating literacy and numeracy into everyday teaching. "*We follow up on these red indicators with improvement activities, namely through technical guidance, webinars, and workshops*" (Principal, Interview). Observation of teacher meetings showed active sharing of strategies and experiences. Training modules, collaboration logs, and attendance sheets supported the implementation of continuous professional development.

The webinars were held periodically and covered topics relevant to the CBNA indicators, such as assessing higher-order thinking and contextual literacy tasks. Meanwhile, workshops allowed teachers to simulate activities they would later apply in class, ensuring hands-on experience. Teachers who attended these training sessions showed increased confidence in lesson planning and demonstrated more innovative approaches during classroom observations.

This aligns with the findings of Nasution et al. (2023), who emphasized that teacher training is instrumental in enriching teachers' knowledge, skills, and pedagogical understanding. According to them, well-designed professional development leads to higher teacher confidence and more effective student guidance, which was evident in this case through the consistent application of new teaching techniques observed in the classroom.

A second grade V teacher added, "*After attending the workshop, I started including problem*-solving *activities and noticed students were more involved. They began discussing answers more openly*." This shows how training directly translated into classroom impact.

Table 2. Observation Results of Literacy and Numeracy Activities

Indicator	Description
Literacy and numeracy activities	Literacy activities such as 15-minute morning reading sessions were observed before lessons. Numeracy activities include the formation of a literacy and numeracy club that holds sessions every Saturday in the first and second week.
Facilities and infrastructure	Available library, computer lab, abacus and numeracy tools in classroom
Learning media used	Interactive videos, gasing method, abacus, trigger questions used in class
Teacher training	Regular worskhops, webinars, technical guidance documented
Student CBNA readiness	Weekly CBNA-style practice observed; guidance provided by teachers
Teacher collaboration	Evidence of joint lesson planning, learning communities, and teacher coordination

4.4. Preparation for the Implementation of CBNA

In preparing students for CBNA, the school conducted weekly practice sessions using CBNA-style questions and provided test-taking strategies. "*At that time we made the most practice questions and we asked students to read the questions first and then find the answers from the long text, and the results were good*" (Teacher 02, Interview). Students were observed working in groups during these sessions, with teacher assistance. Student worksheets, simulation results, and CBNA preparation documents confirmed that CBNA-style exercises were conducted regularly.

Teachers also guided students in understanding common question patterns and shared test-taking tricks, especially for time management and identifying keywords. Observation data showed that students became more comfortable navigating digital question formats and managing time effectively during simulations. Documentation such as student answer sheets and school-level CBNA preparation schedule were available and aligned with national guidelines.

A teacher mentioned, "*At first, students were anxious with computer-based questions, but after weekly drills, they started to enjoy the challenge*." Field observations also revealed that students developed better concentration and accuracy after multiple practice sessions.

Teachers noted that students became more confident in navigating the test independently and were more willing to attempt complex questions.

This is supported by Nathaniel et al. (2023), who emphasized that structured and continuous CBNA preparation, including simulation practices and familiarization with digital platforms, significantly improves students' readiness for computer-based assessments.

One additional respondent, a teacher responsible for facilitating CBNA simulations, explained, "*We create scenarios similar to the CBNA instructions so students won't be surprised by the format. We even rehearse how to navigate between pages*."

4.5. Collaborative Teaching Initiatives

According to (Gupta & Lee, 2020), collaborative teaching initiative foster a professional learning culture that enhances instructional quality and student outcomes. They argue that collaboration among educators supports reflective practices and continuous improvement, which is essential in adapting to evolving educational demands.

Teacher collaboration was a key aspect of the school's literacy and numeracy strategy. Educators worked together through professional learning communities and shared responsibility for planning and evaluating instructional programs. "*School activities namely learning communities, are held around the middle of the year, in June, and there is a work program in the form of group teaching and material discussions*" (Teacher 01, Interview).

This collaboration allowed teachers to align their strategies, share successful practices, and collectively solve instructional challenges. Observation notes from these sessions documented open dialogue and mutual feedback among teachers. The school maintained regular schedules for collaboration meetings and had clear documentation of work programs and thematic planning.

Teachers also developed joint lesson plans and engaged in reflective sessions to assess the effectiveness of their teaching. These efforts contributed to more cohesive and effective instructional practices that directly supported students' literacy and numeracy development.

Another respondent highlighted the importance of peer learning. "*Sometimes the best training* comes *from discussions with fellow teachers. We learn new methods just by observing each other*," said one teacher. These informal collaborations contributed to a more adaptive and responsive learning environment, showing that competency building can happen both formally and informally.

In addition, collaborative meetings were used to review and refine curriculum planning. "*In our* collaboration *group, we also revise our curriculum mapping every semester based on literacy and numeracy results*," explained one teacher. This ensures the relevance of instructional planning with student learning needs and CBNA expectations.

A member of the teaching community shared, "*Every teacher brings a unique strength. In our sessions,* someone *focuses on numeracy integration, others on writing tasks. We complement each other's planning*." This peer-to-peer synergy strengthened the overall teaching framework.

These five themes illustrate how a school can implement an integrated, context-responsive strategy to improve students' literacy and numeracy. The triangulation of data from interviews, observations, and document provides robust support for the effectiveness of these strategies.

5. Discussion

The findings of this study highlight five key strategies in improving students' literacy and numeracy skills aligned with CBNA indicators: school management, classroom management, improving teacher competency, preparation for the implementation of CBNA and collaborative teaching initiatives. These strategies are not only structured but also implemented consistently through targeted programs and activities.

First, strong school management provides a foundation for literacy and numeracy improvement. The leadership of the principal ensures that programs are aligned with CBNA standards and that resources such as literacy and numeracy clubs, computer labs, and structured reading habits are accessible to students. This strategic approach creates a learning ecosystem that promotes active engagement and skill mastery. This strategy is in line with the findings of Mustoip et al., (2023) and Perez & Lumaad, (2021), which emphasize that effective school leadership combines administrative and pedagogical support to enhance learning outcomes.

Second, classroom management that are interactive and student-centered contribute significantly to building literacy and numeracy competence. Teachers' use of contextual tools such as the abacus and the gasing method, along with learning videos and questioning techniques, foster deeper understanding and encourage students to participate actively. These practices reflect the integration of 21st-century skills in daily lessons. This is support by Abidin, (2020) and Zainuddin & Hardiansyah, (2023), who demonstrate that interactive classroom management can increase student participant and foster critical thinking skills.

Third, improving teacher competency plays a crucial role in equipping teachers to meet learning objectives. Regular training, collaborative meetings, and knowledge-sharing practices have empowered teachers to implement innovative literacy and numeracy strategies. This not only enhances teacher confidence but also supports the personalization of learning to meet diverse student needs. This finding is consistent with Nasution et al., (2023) and Gupta & Lee, (2020), who state the continuous training has a positive impact on learning innovation and student achievement.

Fourth, preparing for the implementation of CBNA ensures that students are familiar with the format and demands of the national assessment. Practice mock tests, time management exercises, and test-taking strategies build students' confidence and technical readiness. This preparation directly supports improved student performance in the assessment. This result reinforces the evidence from Nathaniel et al., (2023) that familiarization with exam formats and test-taking strategies can enhance students' readiness and confidence.

Finally, collaborative teaching initiatives foster a culture of shared responsibility. The existence of learning communities and collective program planning reflects the school's commitment to sustainable improvement. This shared practice encourages reflective teaching and continuous program refinement. This strategy is consistent with Nguyen & Ng, (2020) and Sonsupap & Cojorn, (2024), who explain that teacher collaboration fosters a professional learning culture and enhances the quality of instruction.

These findings are consistent with previous research by Awan (2023) and Apriyani & Elizar, (2024), which emphasize the importance of integrated school strategies in improving foundational competencies. However, this study contrasts with Asihati et al. (2025), where similar strategies showed limited impact due to inconsistent implementation. This highlights that the success of such strategies depends not only on program design but also on execution, commitment, and contextual relevance. Overall, this study affirms that when school practices are implemented cohesively and collaboratively, literacy and numeracy outcomes can improve meaningfully, contributing to a generation of learners who are skilled, reflective, and prepared for academic and real-life challenges.

6. Conclusion

The strategy to improve literacy and numeracy at a public primary school in Kupang City was implemented through four integrated aspects: (1) School management, (2) Classroom management, (3) Improving teacher competency, (4) Preparing for the Implementation of CBNA, and (5) Collaborative Teaching Initiatives. Each aspect contributed to building a supportive learning environment that enhances students' foundational skills. School

management provided structural support by launching programs such as literacy and numeracy clubs, the availability of a computer lab, and the 15-minute literacy habit. Classroom management was enriched through the use of interactive learning media including abacus, gasing method, ice breaking, triggering questions and learning videos. Teacher competence was develop through technical guidance, webinars, and workshops that encourage learning innovation. In preparation for CBNA, the school also regularly organizes practice sessions and equips students with test-taking strategies to improve their readiness. Collaborative teaching initiatives are carried out through collaboration between teachers, learning community, and work program. All of these integrated strategies collectively contribute to building a sustainable learning ecosystem that supports the continuous strengthening of students' literacy and numeracy skills, thereby improving assessment results and preparing students for the challenges of 21st century learning. This implication of this study is that literacy and numeracy improvement requires a systemic and sustainable school-wide approach. Strategies aligned with CBNA indicators can serve as a model for schools facing similar challenges. These findings provide practical insights for school leaders, educators, and policymakers to design contextually relevant and collaborative programs that strengthen students' basic competencies and prepare them for future learning challenges.

Limitation

This study has limitations both in terms of the locus which was only conducted within the scope of one school in Kupang City, as well as limited informants consisting of principals and grade V teachers.

Recommendation

This research could be conducted in several schools and regions. Likewise, in terms of information, it can be developed by involving many parties who contribute to improving literacy and numeracy in schools.

Acknowledgements

This research did not receive any grant funding.

Conflict of Interest

The authors declare no conflict of interest.

Declaration of Generative AI-assisted Technologies

This script was prepared with the help of Generative AI such as ChatGPT and Translator. AI was used to assist in language refinement. All intellectual contributions, critical analysis, and final revisions were made by the author. The author takes full responsibility for the accuracy, originality, and integrity of the content presented in this work.

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