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## ENHANCING LITERACY AND NUMERACY IN INDONESIAN ELEMENTARY SCHOOLS: PRINCIPAL LED STRATEGIES IN A RESOURCE-LIMITED CONTEXT

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AMRI, MURNIATI, NASIR USMAN, AND MUNAWAR FAJRI

Universitas Syiah Kuala, Banda Aceh, Indonesia

Corresponding author: [24amrii@mhs.usk.ac.id](mailto:24amrii@mhs.usk.ac.id)

### Abstract

This study examines how school principals plan, implement, and evaluate literacy- and numeracy-oriented learning programs in Cluster 1 elementary schools in Krueng Sabee, as well as the challenges they face in improving students' learning outcomes in resource-limited contexts. Employing a qualitative case study design, data were collected over a three-month period from six school principals, teachers, and seven school committee members through semi-structured interviews, classroom observations, and document analysis. Data analysis followed Miles and Huberman's interactive model, encompassing data reduction, data display, and conclusion drawing, while trustworthiness was ensured through source and method triangulation and member checking. The findings reveal three principal-led strategies: (1) strategic distribution of reading and numeracy resources to support integrated literacy–numeracy learning; (2) principal leadership in enhancing teacher competence through literacy and numeracy interventions; and (3) school-wide initiatives and collaborative team support that strengthen students' motivation toward literacy. Despite limitations in facilities and learning resources, principals demonstrated adaptive and collaborative leadership that enabled schools to optimize available resources and sustain literacy and numeracy programs. Overall, the study confirms that focused and systematic principal leadership plays a critical role in strengthening literacy and numeracy learning in elementary schools operating under resource constraints.

**Keywords:** literacy and numeracy, principal leadership, elementary schools, resource-limited context

### Introduction

Low literacy and numeracy levels among elementary school students remain a major challenge in improving educational quality, particularly in regions with limited access to learning resources. Data from the 2024 National Assessment indicate that only 34.58% of elementary students achieved proficiency in reading literacy and 36.11% in numeracy (Ministry of Education, Research, and Technology, 2024). These figures signal a persistent learning crisis with potential long-term consequences for human resource development and national competitiveness. Literacy and numeracy are not merely foundational academic skills; they constitute core competencies that support critical thinking, problem-solving, and informed decision-making in increasingly knowledge- and technology-driven societies (Onoshakpokaiye & Avwiri, 2025; Sharma, 2025). Consequently, strengthening literacy and numeracy must be positioned as a central priority in basic education, particularly in contexts where learning resources are limited.

School leadership plays a crucial role in shaping learning quality, especially in strengthening students' literacy and numeracy competencies at the primary school level. In this context, principals are responsible not only for administrative management but also for guiding

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instructional practices and cultivating a supportive learning environment. Previous studies have shown that principals influence literacy and numeracy development by encouraging teachers to integrate basic competencies into contextual learning, fostering a literacy-rich school culture, and providing structural and moral support for continuous instructional improvement (Aprilia, 2025; Mbhalati & Jita, 2024). In addition, strategic managerial actions—such as targeted resource allocation, the organization of professional development programs, and the initiation of school-based learning innovations—have been found to positively affect student learning outcomes (Darling-Hammond et al., 2022). Moreover, collaborative leadership that actively involves teachers, parents, and external stakeholders is widely recognized as a key driver of sustainable school improvement and educational transformation (Parashchenko, 2025; Ridlo, 2023).

Despite the recognized importance of school leadership, empirical understanding of how principals' concrete managerial strategies directly support literacy and numeracy instruction in elementary schools remains limited, particularly in resource-constrained contexts. In many studies, leadership is still discussed primarily at a conceptual level, emphasizing leadership styles rather than the specific managerial practices that shape teaching and learning processes. Classical instructional leadership models emphasize vision-building, supervision, and the creation of a positive school climate; however, these models often conceptualize leadership influence as indirect, making it difficult to trace clear connections with measurable literacy and numeracy outcomes (Murphy, 1988). Although more recent perspectives on pedagogical and transformational leadership highlight teacher capacity building, inclusive learning environments, and collaborative practices, systematic empirical evidence explaining how principals' day-to-day managerial actions—such as planning, resource management, and instructional monitoring—contribute to improved literacy and numeracy achievement remains insufficient. This gap is particularly evident at the elementary school level and in under-resourced settings, where contextual constraints require more explicit and adaptive leadership strategies (Assefa & Mujtaba, 2025; Carrington et al., 2024).

To address this gap, the present study focuses explicitly on principal-led managerial strategies for literacy and numeracy development rather than leadership in a general sense. Specifically, it examines how principals operationalize their roles through (1) program planning that integrates literacy and numeracy across subjects, (2) academic supervision and mentoring aimed at strengthening teachers' instructional practices, and (3) systematic evaluation mechanisms that use literacy and numeracy indicators as a basis for instructional improvement. By concentrating on these core elements, the study clarifies the causal pathway linking principal management, teacher instructional capacity, collaborative school culture, and enhanced student literacy and numeracy outcomes. Empirical studies have suggested that principal-led strategies—such as data-informed supervision and structured teacher empowerment—can significantly improve literacy and numeracy achievement (Faisal & Apriani, 2025; Krisdianti et al., 2025).

The novelty of this study lies in three key aspects. First, it provides fine-grained empirical evidence on how principal managerial strategies operate within a resource-limited elementary school cluster, a context that remains underrepresented in leadership and literacy research. Second, it integrates classical management functions (planning, organizing, implementing, and evaluating) with pedagogical leadership practices, offering a more operational model of how school leadership supports literacy and numeracy learning. Third, it highlights how contextual constraints—such as limited facilities and varying levels of teacher readiness—do not merely hinder implementation but actively shape leadership strategies and innovation at the school level. Previous studies support this perspective, demonstrating that principals can implement effective leadership practices in

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resource-constrained schools through adaptive supervision and the utilization of internal professional learning communities (Jhonshon et al., 2024).

This study aims to examine the influence of principal leadership on the development of literacy- and numeracy-oriented learning in elementary schools with limited resources. Accordingly, the study is guided by three objectives: (1) to analyze how principals strategically design and allocate literacy and numeracy resources to support integrated learning; (2) to investigate the role of principal leadership in strengthening teacher competence through targeted literacy and numeracy initiatives; and (3) to analyze how school-wide programs and collaborative support mechanisms are implemented to enhance students' motivation for literacy.

### **Literature Review**

This literature review examines three interrelated concepts that form the theoretical foundation of this study: literacy and numeracy, principal leadership, and the role of the principal in school management. These concepts are reviewed to explain how foundational student competencies are developed and how school leadership influences their implementation, particularly in elementary schools facing resource limitations. Literacy and numeracy are discussed as core learning outcomes and key indicators of educational quality, while principal leadership and managerial roles are examined as strategic mechanisms that shape instructional practices, teacher capacity, and school culture. Through a synthesis of relevant empirical studies, this review identifies key theoretical perspectives, highlights gaps in existing research, and justifies the focus of this study on principal-led strategies for strengthening literacy and numeracy learning.

#### ***Literacy and numeracy***

Literacy and numeracy are widely recognized as foundational competencies that support students' academic achievement and their ability to function effectively in everyday life (Santiago & Mustacisa, 2024). From a contemporary theoretical perspective, literacy extends beyond the basic ability to read and write and is defined as the capacity to identify, understand, interpret, create, communicate, and use written information across various contexts (Domínguez Figaredo & Stoyanovich, 2023). This definition positions literacy as a functional and transformative competency that enables individuals to participate actively in social, cultural, and economic life. Similarly, literacy is understood as a social practice shaped by cultural, institutional, and situational contexts, emphasizing its dynamic and contextual nature rather than a purely technical skill (Noreen & Iqbal, 2025).

In educational settings, literacy is closely linked to higher-order thinking skills. According to Bloom's revised taxonomy, cognitive processes such as analyzing, evaluating, and creating depend heavily on learners' ability to comprehend and critically process information (Bloom, 2010). Empirical evidence supports this theoretical view, indicating that students with strong literacy skills demonstrate higher levels of engagement, comprehension, and academic performance across disciplines (Bassett & Macnaught, 2025; Xu et al., 2023).

Numeracy, meanwhile, is conceptualized as more than basic mathematical ability. Gal (2002) defines numeracy as critical mathematical literacy, emphasizing reasoning, data interpretation, and informed decision-making in real-world contexts. This perspective positions numeracy as an essential life skill that supports logical thinking and problem-solving in academic and everyday situations. Importantly, literacy and numeracy are increasingly viewed as interrelated and mutually reinforcing competencies. In problem-based and contextual learning environments, learners must

simultaneously interpret textual and numerical information, highlighting the integrated nature of these skills.

Empirical studies reinforce this interdependence. Davis-Kean et al. (2022) found that early numeracy skills strongly predict later academic success, sometimes exerting an even greater influence than early reading skills. Similarly, Bonifacci et al. (2021) demonstrated that literacy and numeracy jointly mediate the relationship between socioeconomic status and early academic achievement, underscoring their role in reducing educational inequality.

The importance of literacy and numeracy has become more pronounced in the context of digitalization and educational disruption. Digital learning environments have expanded the traditional understanding of literacy and numeracy to include digital and data literacy, enabling learners to access, evaluate, and apply information more effectively (Soghomonyan & Karapetyan, 2023). During the COVID-19 pandemic, strong literacy and numeracy skills were shown to be essential for learner autonomy and success in online learning environments, where students were required to engage in more self-regulated learning (Lei & Medwell, 2021).

At the elementary school level, empirical studies consistently show that systematic literacy and numeracy programs yield positive learning outcomes. For example, Putri et al. (2022) reported significant improvements in students' Minimum Competency Assessment (AKM) results following structured literacy and numeracy interventions. Similar findings were reported by Iswara et al. (2022), who found that literacy and numeracy development enhances not only basic academic skills but also logical reasoning and problem-solving abilities. Collectively, these studies confirm that literacy and numeracy function as complementary competencies that form the foundation of cognitive development and long-term academic success.

### ***Principal leadership***

Educational management theory positions the principal as a central factor in improving educational quality through the coordinated direction of human resources, curriculum, and infrastructure toward shared learning goals (Hoy & Miskel, 1987; Oplatka, 2009). Within this framework, the principal's role is conceptualized through core managerial functions—planning, organizing, implementing, and supervising—which must be carried out systematically to ensure effective teaching and learning processes (Fayol, 2016; Robbins & Judge, 2009). Beyond administrative responsibilities, principals are increasingly viewed as instructional leaders who shape school vision, motivate teachers, foster innovation, and conduct academic supervision to improve instructional quality (Hallinger, 2011; Sergiovanni, 1987).

From a theoretical standpoint, effective principal leadership integrates managerial and instructional functions. Fayol's management theory emphasizes the importance of coordination, supervision, and control in achieving organizational effectiveness, principles that are highly relevant to school contexts where instructional quality depends on consistent planning and monitoring (Fayol, 2016). In education, Oplatka (2009) and Leithwood et al. (2020) argue that principals play a critical role in shaping teacher professionalism, instructional coherence, and the sustainability of school improvement initiatives.

Within literacy and numeracy development, instructional leadership theory emphasizes that principals must ensure these competencies are embedded in daily teaching practices rather than treated as isolated programs. Hallinger (2011) highlights that leadership effectiveness lies in aligning curriculum planning, instructional supervision, and assessment practices with student learning needs. Empirical studies support this claim. Amelia et al. (2022) found that principals who consistently perform managerial and supervisory functions contribute significantly to improved

teacher professionalism and learning effectiveness. Similarly, research on literacy and numeracy initiatives indicates that strong principal leadership enables schools to integrate these competencies across subjects, monitor progress systematically, and make data-informed instructional decisions.

School management theory further conceptualizes leadership as a cyclical and continuous process involving planning, implementation, monitoring, and evaluation aimed at sustained improvement (Hoy & Miskel, 1987). Robbins and Judge (2009) emphasize that organizational effectiveness depends on the alignment of these managerial functions, while Sergiovanni (1987) underscores the importance of shared values and professional norms in shaping a strong school culture. Empirical evidence confirms that structured management practices enhance teacher capacity and instructional consistency, even in schools facing financial and infrastructural constraints (Mncube et al., 2023; Munawarah et al., 2020).

### *The role of the principal*

Educational leadership theory conceptualizes the principal as a multidimensional leader responsible for integrating managerial, instructional, and motivational roles to support school effectiveness. Hoy and Miskel (2013) describe principals as central actors who align institutional goals, human resources, and instructional processes. Similarly, Oplatka (2009) emphasizes that effective principals bridge strategic planning and day-to-day operations while fostering a supportive organizational climate.

Instructional leadership theory further explains how principals influence teaching quality through supervision, professional support, and curriculum alignment. Hallinger (2011) argues that principals act as instructional coaches who guide teachers toward improved practice, while Sergiovanni (1987) highlights the moral and cultural dimensions of leadership in fostering professional commitment. Empirical studies support these theoretical propositions. Hamka (2023) and Hasriani et al. (2023) found that active supervisory and consultative leadership significantly improves teachers' pedagogical competence and innovation in classroom practices.

In addition, organizational support and transformational leadership theories emphasize the importance of participatory and supportive leadership. Research shows that principals who involve teachers in decision-making and provide emotional and professional support enhance teacher motivation, resilience, and readiness to adapt to curriculum changes (Adeoye & Ainnubi, 2023; Reid, 2022). Even in resource-constrained contexts, adaptive and context-sensitive leadership enables schools to optimize available resources and maintain instructional quality (Abbaspour et al., 2024; Nachshoni, 2024).

Overall, both theoretical perspectives and empirical evidence indicate that effective principal leadership is holistic, participatory, and context-responsive. Such leadership is essential for strengthening literacy and numeracy learning, particularly in elementary schools operating under resource limitations, where principals must act as strategic managers, instructional leaders, and motivators simultaneously.

## **Methodology**

### *Research design*

This study employed a qualitative research approach using a case study design, guided by the framework proposed by Creswell (2017). This design was selected to obtain an in-depth and contextual understanding of how principals exercise leadership in developing literacy- and

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numeracy-oriented learning in elementary schools operating within resource-constrained settings. A qualitative case study allows the researcher to explore leadership practices, decision-making processes, and collaborative actions as they occur naturally in the school context, rather than focusing solely on measurable outcomes.

Consistent with the research focus, the study examined three interrelated aspects of principal leadership: (1) strategic planning and distribution of literacy and numeracy resources, (2) leadership practices in strengthening teacher competence through literacy and numeracy interventions, and (3) school-wide initiatives and collaborative support systems aimed at enhancing students' motivation for literacy. These objectives guided the overall research design, data collection procedures, and analytical framework to ensure coherence between research questions and methodological choices.

### ***Research site and participants***

The study was conducted in Cluster 1 of Krueng Sabee elementary schools, which comprises six schools: SD Negeri 1 Calang, SD Negeri 2 Calang, SD Negeri 3 Calang, SD Negeri 4 Calang, SD Negeri 4 Krueng Sabee, and MIN 9 Aceh Jaya. This cluster was purposively selected because the schools actively implement literacy and numeracy strengthening programs aligned with national education policies, including the National Literacy Movement (Gerakan Literasi Nasional), the Minimum Competency Assessment (AKM), and the Independent Curriculum. As such, the cluster represents an information-rich context for examining principal-led literacy and numeracy strategies.

The primary participants were six school principals, as they hold central responsibility for planning, organizing, implementing, and evaluating literacy and numeracy programs at the school level. To enrich the data and provide instructional perspectives, several teachers were included as supporting informants, along with seven school committee members who contributed insights related to school–community collaboration. Participants were selected using purposive sampling based on the following criteria: (1) holding an active role as a principal, teacher, or school committee member; (2) direct involvement in literacy and numeracy programs; and (3) sufficient professional experience to reflect meaningfully on leadership and instructional practices. This sampling strategy aligns with qualitative research principles that prioritize information richness over representativeness (Patton, 2002).

### ***Data collection***

Data were collected over a three-month period using three primary techniques: semi-structured interviews, participant observation, and document analysis. The use of multiple data sources was intended to capture a comprehensive picture of principal leadership practices and to enhance data credibility through methodological triangulation (Creswell, 2017). Semi-structured interviews were conducted using an interview guide developed based on theories of educational management and instructional leadership. The interview questions focused on principals' strategies in planning literacy and numeracy programs, supervising teachers, allocating learning resources, and evaluating student learning outcomes. Teachers and school committee members were interviewed to obtain complementary perspectives on instructional implementation and community support. Prior to data collection, the interview guide was reviewed to ensure clarity, relevance, and alignment with the research objectives.

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Participant observation was conducted to examine the implementation of literacy and numeracy activities in authentic school settings. Observed activities included daily literacy routines, numeracy support programs for upper grades, teacher meetings, and academic supervision sessions. The researcher acted as a non-participant observer and recorded detailed field notes to capture interactions, routines, and contextual conditions that could not be fully revealed through interviews alone. Document analysis involved the examination of school work programs, supervision reports, lesson plans, literacy and numeracy assessment records, and relevant policy documents. These documents were used to corroborate interview and observation data and to trace the alignment between planning, implementation, and evaluation processes.

### ***Data analysis***

Data analysis was conducted thematically using the interactive model proposed by Miles and Huberman (2013), which consists of three interconnected processes: data reduction, data display, and conclusion drawing and verification. During data reduction, interview transcripts, observation notes, and documents were coded and categorized based on themes related to principal leadership strategies in literacy and numeracy development. The reduced data were then organized into matrices and narrative displays to facilitate pattern identification and cross-case comparison among schools.

Conclusions were drawn through an iterative process of interpretation, linking empirical findings with theoretical perspectives on school leadership and management. Throughout the analysis, emerging interpretations were continually compared with the data to ensure analytical rigor and coherence.

### ***Trustworthiness***

To ensure the trustworthiness of the findings, this study applied established qualitative validation strategies (Lincoln & Guba, 1985). Credibility was enhanced through source triangulation, method triangulation, and member checking, whereby preliminary interpretations were shared with selected participants for confirmation. Dependability was supported by maintaining detailed documentation of research procedures and analytical decisions. Confirmability was addressed by grounding interpretations in empirical evidence and minimizing researcher bias through reflective field notes. Finally, transferability was supported by providing rich contextual descriptions of the research setting and participants, enabling readers to assess the applicability of the findings to similar educational contexts.

### ***Findings***

This section presents the findings of the study based on thematic analysis of interview data, observations, and document analysis. The findings are organized into three major themes that reflect principal-led strategies for strengthening literacy and numeracy learning in resource-limited elementary schools: (1) strategic distribution of reading and numeracy resources, (2) principal leadership in enhancing teacher competence through literacy and numeracy interventions, and (3) school-wide initiatives and collaborative support that strengthen students' motivation for literacy.

*Strategic distribution of reading and numeracy resources in support of integrated literacy–numeracy learning*

The findings indicate that the strategic distribution of reading and numeracy resources constitutes a foundational leadership practice adopted by principals to support integrated literacy–numeracy learning. Principals consistently positioned school libraries and classroom reading corners as central learning resources rather than supplementary facilities. Through deliberate planning, principals ensured that reading materials—including textbooks, children’s storybooks, enrichment reading materials, and numeracy-related activity books—were accessible to students and aligned with instructional needs.

Interview data and document analysis revealed that principals systematically expanded school book collections by allocating a portion of School Operational Assistance (BOS) funds and updating reading materials each semester. In addition to formal funding, principals actively sought external support from school committees and community partners to address resource shortages. These strategies enabled schools to maintain sufficient and diverse learning materials despite financial constraints.

Importantly, the provision of reading materials was closely linked to instructional practices. Teachers were encouraged to integrate literacy activities into daily routines, such as using storybooks during 15-minute pre-lesson literacy sessions. This integration extended beyond narrative reading to include activities that involved interpreting tables, graphs, and contextual word problems, thereby strengthening the connection between literacy and numeracy. Furthermore, principals emphasized student-centered resource selection by aligning reading materials with students’ interests, which was reported to increase engagement and reading frequency.

Overall, the findings demonstrate that principals did not merely focus on the availability of resources, but strategically aligned resource provision, instructional integration, student interest, and community collaboration to strengthen literacy and numeracy learning within the school environment.

**Table 1.** *Providing sufficient reading materials at school*

Informant	Key Statements	Key Findings
<b>KS 1</b>	"We add to the library's children's book collection every semester so students have a wider variety of reading options."	The school regularly adds to its book collection
<b>KS 2</b>	"We allocate some of our BOS funds to purchase reading books other than textbooks."	Utilization of BOS Funds for book procurement
<b>KS 3</b>	"We often use children's story books as literacy materials 15 minutes before the lesson starts."	Books are used directly in learning activities
<b>KS 4</b>	"Students are more enthusiastic about reading if the books available match their interests."	The reading collection is tailored to students' interests.
<b>KS 5</b>	"We have a reading corner program in every class to bring students closer to reading."	Reading corners act as an effective means of fostering a reading culture.
<b>KS 6</b>	"We are working with the community to receive donations of reading books."	External support (school/community committee) helps complete the reading collection.

**Table 2.** *Thematic analysis providing reading materials to support literacy and numeracy*

Theme	Informant Key	Statement	Code	Sub-theme	Key Finding
Provision of Reading Resources	K1	"We add to the library's children's book collection every semester so students have a wider variety of reading options."	Collection Expansiokn	Sustainable Resource Development	Schools regularly expand book collections
Funding Support	K2	"We allocate some of our BOS funds to purchase reading books other than textbooks".	Budget Allocation	Financial Strategy	BOS funds support book procurement
Integration into Learning	K3	"We often use children's story books as literacy materials 15 minutes before the lesson starts".	Instructional Integration	Classroom Literacy Practice	Reading materials are embedded in daily learning
Student Engagement	K4	"Students are more enthusiastic about reading if the books available match their interests".	Interest-Based Selection	Motivation Enhancement	Book selection increases student motivation
Reading Access	K5	"We have a reading corner program in every class to bring students closer to reading".	Reading Environment	Accessibility Strategy	Reading corners strengthen reading habits
External Collaboration	K6	"We are working with the community to receive donations of reading books".	Community Partnership	Resource Support	Community contributions enrich collections

This thematic analysis highlights that strategic leadership by principals, combined with adequate funding, resource diversification, classroom integration, and community collaboration, plays a critical role in strengthening literacy and numeracy in elementary schools. Systematic provision of reading materials not only increases students' interest in reading but also supports the development of analytical, logical, and mathematical thinking skills.

***Principal leadership in enhancing teacher competence through literacy and numeracy interventions***

The second major theme highlights the role of principals in strengthening teacher competence through systematic literacy and numeracy interventions. Findings indicate that professional development was treated as a continuous and structured process rather than as isolated training activities. Principals actively facilitated teachers' participation in external training programs organized by education authorities and complemented these initiatives with internal workshops and peer-sharing sessions.

Interview data revealed that principals functioned as facilitators and coordinators of teacher development by ensuring that training opportunities were relevant to classroom needs. Literacy and numeracy training focused on enabling teachers to integrate foundational competencies across

subjects and daily learning activities, rather than confining them to language or mathematics lessons. Teachers reported gaining practical strategies for designing contextual and meaningful learning activities that connect reading, reasoning, and real-life problem-solving.

Institutional support emerged as a key component of principal leadership. Principals provided logistical support for training activities and required teachers to disseminate knowledge gained from external programs through Teacher Working Group (KKG) forums. This practice promoted collaborative learning and ensured that professional development benefits extended beyond individual participants to the broader teaching community.

Overall, the findings indicate that principals enhanced teacher competence through three interconnected practices: facilitating access to professional development, strengthening pedagogical understanding of literacy and numeracy integration, and institutionalizing knowledge-sharing mechanisms. These practices contributed to the development of a collaborative professional culture and supported the consistent implementation of literacy and numeracy learning across classrooms.

**Table 3.** *Teacher literacy and numeracy improvement training*

Types of Training	Objective	Training Methods	Duration	Organizer
<b>Reading Literacy Workshop</b>	Improve teachers' ability to guide students in understanding the content of reading	Discussion, simulation, teaching practice	2 days	Aceh Jaya Regency Education Office
<b>Contextual Numeracy Training</b>	Equipping teachers with real-life numeracy teaching strategies	Interactive lectures, case studies	3 days	Aceh BPMP
<b>Literacy Media Creation Training</b>	Train teachers to create creative media to support reading activities	Hands-on practice, group work	2 days	MGMP/KKG
<b>Reading Corner &amp; Numeracy Park Management Training</b>	Optimizing reading corners and numeracy corners as learning tools for students	Simulation, sharing	1 day	Aceh Jaya District Library Service

Literacy and numeracy training for teachers is one of the strategic steps taken by principals to ensure the sustainability and effectiveness of literacy-numeracy programs in elementary schools. Through this activity, teachers have the opportunity to deepen their understanding of literacy- and numeracy-based learning approaches, while simultaneously improving their ability to design engaging, contextual, and meaningful learning activities for students. Principals play an active role as key drivers in designing and facilitating the training, both through collaboration with the education office, internal implementation of activities at the school, and through the Teacher Working Group (KKG) forum, which serves as a means of sharing good practices among educators. Thus, this training serves not only as an activity to improve teacher competency but also as a systematic effort to build a literate and numeracy school culture.

**Table 4.** *Interview table of principal's role in teacher training*

Informant	Statements	Findings
KS 1	"We regularly send teachers to participate in literacy and numeracy training organized by the education department."	The principal actively facilitates teacher training
KS 2	"Conducting external training, and also holding internal workshops to share good practices among teachers."	There is internal training to share experiences
KS 3	"Training helps teachers understand how to link literacy to thematic learning in the classroom."	The training provides new pedagogical insights
KS 4	"Through training, teachers learn creative strategies so that numeracy is not only taught in math lessons, but also in daily activities."	Teachers are trained to integrate numeracy across subjects.
KS 5	"With a training program that provides food and logistical support during the activity."	The school supports the smooth implementation of the training
KS 6	"Every teacher is required to share the results of the training with colleagues through the KKG forum."	After the training, the teacher shared knowledge for wider benefits.

Table 4 presents interview evidence illustrating the principal's role in facilitating and sustaining teacher professional development related to literacy and numeracy. The data show that principals act not only as administrators but also as facilitators and coordinators who ensure teachers' access to both external and internal training opportunities. The interview statements indicate that professional development activities are systematically supported through institutional arrangements, including logistical assistance, structured knowledge-sharing mechanisms, and the use of Teacher Working Group (KKG) forums. Overall, the table highlights that teacher training is treated as a collective and continuous process, enabling the dissemination of literacy and numeracy pedagogical practices across the school and supporting consistent instructional improvement.

**Table 5.** *Thematic analysis of principal leadership in enhancing teacher competence*

Research Aim	Theme	Key Evidence (Interviews & Documents)	Analytical Findings
Enhancing teacher competence through literacy and numeracy interventions	Strategic facilitation of professional development	External and internal training programs; collaboration with Education Office, BPMP, MGMP/KKG	Principals act as facilitators and coordinators of systematic teacher development
	Strengthening pedagogical understanding	Teachers gain insights into integrating literacy and numeracy into thematic and daily learning	Training improves instructional quality and cross-curricular integration
	Institutional support and knowledge sharing	Logistical support and mandatory sharing through KKG forums	Principals build a collaborative and sustainable professional learning culture

Overall, the thematic analysis demonstrates that principals enhance teacher competence through deliberate professional development strategies, pedagogical strengthening, and institutional support mechanisms. These interventions not only improve teachers' literacy and numeracy teaching skills

but also contribute to the establishment of a school-wide culture of continuous learning. In this way, principal leadership plays a pivotal role in ensuring that literacy and numeracy programs are effectively implemented and sustained in elementary schools.

***School-wide initiatives and collaborative support that strengthen students’ literacy motivation***

The third theme reveals that principals strengthened students’ literacy motivation through coordinated school-wide initiatives supported by teachers, parents, and the wider school community. Rather than relying on single activities, principals embedded literacy practices into daily school routines and extracurricular programs, creating a sustained literacy culture.

One key strategy involved motivational reinforcement. Principals encouraged teachers to provide direct praise and recognition to students who demonstrated active reading behavior. Formal recognition, such as monthly awards for students with high reading engagement, was institutionalized to reinforce positive attitudes toward reading. These practices contributed to increased student confidence and motivation.

Consistent daily literacy routines also played a significant role. The implementation of a 15-minute morning reading program across grade levels ensured that reading became a regular and valued part of the school day. Observational data indicated that these routines contributed to the development of habitual reading behavior among students.

In addition, principals supported the creation of engaging literacy environments through classroom reading corners, library improvements, and literacy-based competitions such as speed reading and retelling activities. These initiatives made reading more accessible and enjoyable for students. Collaboration with parents further strengthened literacy motivation, as principals actively encouraged families to support reading activities at home.

Taken together, the findings show that principals successfully enhanced students’ literacy motivation by combining motivational reinforcement, structured routines, supportive learning environments, and school–parent collaboration. These integrated strategies transformed literacy from a compulsory academic task into a meaningful and engaging daily practice.

**Table 6.** *Providing sufficient reading materials at school*

Informant	Statements	Findings
KS 1	"We always emphasize to teachers to give direct praise to students who read diligently."	Teacher praise motivates students to learn
KS 2	"Morning literacy program by reading 15 minutes before studying is done routinely every day"	Regular Literacy Programs foster reading habits
KS 3	"We held a speed reading competition and a retelling competition of the contents of the reading."	Competition activities increase student enthusiasm
KS 4	"We provide a reading corner in every classroom with books that are interesting for children."	Reading corners make it easier for students to access books
KS 5	"Every month we give awards to the students who read the most."	Awards encourage reading enthusiasm
KS 6	"We work with parents to support and motivate their children at home."	Collaboration between schools and parents strengthens student motivation

Table 6 presents interview evidence describing the strategies employed by principals to enhance students’ reading motivation through school-wide literacy initiatives. The interview statements

indicate that principals emphasize consistent literacy routines, motivational reinforcement, and the creation of supportive reading environments as key approaches to fostering students’ interest in reading. The data also show that these strategies are implemented collaboratively, involving teachers and parents to extend literacy practices beyond the classroom. Overall, the table illustrates that principals play a central coordinating role in embedding reading motivation into daily school practices, thereby supporting the development of a sustained literacy culture.

**Table 7.** *Interview with the principal's strategy for motivating students to increase reading interest*

Theme	Subtheme	Key Evidence (Interview Data)	Analytical Interpretation
School-Wide Initiatives and Team Support for Literacy	Motivational reinforcement	KS 1, KS 5: Praise and monthly awards for active readers	Positive reinforcement enhances students’ confidence and motivation to read
	Daily literacy routines	KS 2: 15-minute morning reading program	Consistent routines foster sustainable reading habits
	Engaging literacy environment	KS 3, KS 4: Competitions and classroom reading corners	Interactive activities and access to books increase reading enthusiasm
	School–parent collaboration	KS 6: Parental involvement in reading at home	Home-school synergy strengthens students’ literacy motivation

In summary, the findings demonstrate that principals enhance students’ literacy motivation through integrated school-wide initiatives supported by teachers, parents, and the school community. By combining motivational reinforcement, structured literacy routines, engaging learning environments, and collaborative support, principals successfully embed literacy practices into students’ daily experiences. These strategies collectively transform reading from a compulsory academic activity into a meaningful and enjoyable habit, directly addressing the study’s aim of strengthening students’ literacy motivation through effective principal leadership.

## Discussion

This study examined how principal-led strategies contribute to strengthening literacy and numeracy learning in resource-limited elementary schools. The discussion interprets the findings through the lens of educational leadership and school management theories, highlighting how principals translate managerial and instructional leadership into concrete practices that address contextual constraints.

### *Strategic distribution of reading and numeracy resources*

The findings indicate that principals’ strategic management of learning resources plays a central role in supporting integrated literacy–numeracy learning. Rather than treating books and learning materials as supplementary assets, principals positioned them as core instructional resources aligned with daily classroom practices. This finding reinforces school management theory, which emphasizes planning and resource allocation as strategic functions that directly influence instructional quality (Fayol, 2016; Robbins & Judge, 2009).

Importantly, the integration of resource provision with instructional routines—such as daily literacy sessions and classroom reading corners—demonstrates how principals operationalize instructional leadership in under-resourced settings. This aligns with Hallinger's (2011) assertion that effective leadership connects curriculum planning, teaching practices, and assessment into a coherent instructional system. The emphasis on interest-based book selection further suggests that principals recognize student engagement as a mediating factor between resource availability and learning outcomes, echoing research on motivation-driven literacy development (Barber & Kluda, 2020).

The reliance on community collaboration to supplement limited funding reflects adaptive leadership in constrained contexts. Consistent with Epstein's (2018) partnership model, principals expanded the school's resource base by mobilizing social capital, thereby reducing the impact of financial limitations. This finding supports prior evidence that effective leadership in disadvantaged schools often depends on principals' ability to leverage external networks rather than internal resources alone (Mncube et al., 2023).

### ***Principal leadership in enhancing teacher competence through literacy and numeracy interventions***

The findings further show that principals enhance teacher competence by institutionalizing professional development as a continuous and collaborative process. Rather than viewing training as episodic, principals coordinated external workshops and internal knowledge-sharing mechanisms to ensure sustained instructional improvement. This approach reflects instructional leadership theory, which positions principals as facilitators of teacher learning and instructional coherence (Hallinger, 2011).

By emphasizing cross-curricular integration of literacy and numeracy, principals encouraged teachers to move beyond subject-bound instruction toward contextualized learning practices. This supports Leithwood et al.'s (2020) argument that successful leadership strengthens teacher capacity by aligning professional development with instructional goals and student needs. The requirement for teachers to disseminate training outcomes through Teacher Working Group (KKG) forums further illustrates the application of organizational learning theory, where shared professional practice enhances collective competence and program sustainability (Sergiovanni, 1987).

These findings confirm that in resource-limited contexts, leadership effectiveness is less dependent on the availability of sophisticated training infrastructures and more reliant on principals' ability to organize, coordinate, and sustain collaborative learning cultures. This aligns with prior studies demonstrating that structured management and participatory leadership practices can compensate for material constraints (Munawarah et al., 2020; Sutrisno, 2021).

### ***School-wide initiatives and collaborative support for literacy motivation***

The findings related to school-wide initiatives underscore the role of principals in shaping motivational and cultural dimensions of literacy learning. By embedding literacy practices into daily routines and recognizing student achievement through praise and awards, principals fostered a school climate that values reading as a meaningful and enjoyable activity. This supports motivational theories suggesting that consistent reinforcement and recognition enhance students' intrinsic motivation and engagement (Guthrie & Wigfield, 2000).

The establishment of structured literacy routines, such as daily reading sessions, reflects strong managerial control over time and school processes. Hattie (2008) emphasizes that

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consistent routines and expectations significantly influence learning behavior, particularly in primary education. Additionally, the creation of engaging literacy environments through reading corners and competitions illustrates how principals shape the physical and social learning environment to support student engagement (Clark & Rumbold, 2006).

Collaboration with parents further extends the literacy ecosystem beyond the school. In line with Epstein's (2018) framework, principals acted as coordinators who aligned school and home literacy practices, strengthening continuity and sustainability. This finding highlights that leadership influence on literacy motivation operates not only within classrooms but also across the broader social context of learning.

Taken together, the findings demonstrate that principal leadership in resource-limited elementary schools functions through an integrated set of managerial and instructional practices. Strategic resource management supports instructional integration; systematic teacher development strengthens pedagogical capacity; and school-wide initiatives cultivate a motivating literacy culture. These practices collectively confirm that effective leadership can mitigate structural constraints and embed literacy and numeracy learning into everyday school life.

This study extends existing leadership literature by providing empirical evidence that leadership impact in under-resourced settings is best understood through principals' concrete managerial actions rather than leadership style alone. By operationalizing leadership through planning, implementation, supervision, and evaluation, principals play a decisive role in strengthening foundational learning outcomes, even in contexts characterized by limited resources.

### **Conclusion**

This study concludes that principal leadership plays a pivotal role in strengthening integrated literacy and numeracy learning in resource-limited elementary schools. Through strategic managerial and instructional practices, principals are able to translate policy goals and educational priorities into concrete actions that directly influence teaching quality, learning culture, and student engagement.

The findings demonstrate that principals contribute to literacy and numeracy development through three interconnected strategies. First, principals strategically manage and distribute reading and numeracy resources by aligning availability with instructional use, student interests, and community support. This approach ensures that learning materials function not merely as supplementary resources but as integral components of daily teaching and learning practices. Second, principals enhance teacher competence by institutionalizing continuous professional development focused on literacy and numeracy integration, supported by collaborative knowledge-sharing mechanisms. These practices strengthen instructional coherence and promote sustainable improvements in teaching quality. Third, principals foster students' literacy motivation through coordinated school-wide initiatives, including consistent literacy routines, motivational reinforcement, supportive learning environments, and active collaboration with parents and the wider school community.

Collectively, these strategies illustrate that effective principal leadership in resource-constrained contexts is characterized not by the abundance of material resources but by the ability to optimize existing capacities through planning, coordination, supervision, and collaboration. By embedding literacy and numeracy into everyday school practices, principals cultivate a learning culture that supports foundational competencies and mitigates the limitations imposed by resource constraints.

From a theoretical perspective, this study contributes to the literature by operationalizing school leadership through concrete managerial actions rather than abstract leadership styles. It demonstrates how management functions and instructional leadership intersect to influence literacy and numeracy outcomes in elementary education. Practically, the findings suggest that policymakers and school leaders should prioritize leadership development that emphasizes adaptive resource management, teacher capacity building, and whole-school collaboration, particularly in under-resourced educational settings.

Despite its contributions, this study is limited to a specific school cluster and relies on qualitative data, which may constrain the generalizability of the findings. Future research could extend this work by employing mixed-method approaches, examining longitudinal impacts, or exploring principal leadership strategies across diverse regional and institutional contexts.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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