

Challenges of Elementary School Management Strategies in The Implementation of Deep Learning

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Abstract. Twenty-first-century education demands a paradigm shift from the mere transfer of knowledge toward the cultivation of critical, creative, collaborative, and communicative thinking skills. The deep learning approach is regarded as a relevant framework to address these demands. However, the reality in elementary schools reveals a significant gap between modern learning expectations and managerial readiness, which remains dominated by administrative and bureaucratic practices. This study aims to analyze the challenges of elementary school management strategies in implementing deep learning and to identify potential solutions. A *Systematic Literature Review* (SLR) with a descriptive approach was employed, consisting of the stages of identification, selection, analysis, and synthesis of 20 national and international articles published between 2018 and 2025. The findings indicate that the primary challenges lie in unclear strategic direction, limited managerial competence, weak communication, and an individualistic school culture. The study concludes that adaptive, evidence-based management strategies supported by collaborative leadership and the active participation of all school members are essential to fostering a reflective and innovative culture that promotes effective and sustainable deep learning.

Keywords: Management Strategy, Deep Learning, Primary school, Leadership Adaptive, Culture of Collaboration.

INTRODUCTION

The advancement of 21st-century education demands a paradigm shift at the elementary school level. Learning is no longer limited to knowledge transfer but should nurture students' critical, creative, collaborative, and communicative skills. Deep learning serves as a relevant approach that promotes meaningful understanding, reflection, and concept application. However, its success relies heavily on schools' managerial readiness to provide supportive systems and environments in a real context (Weng et al., 2023). In Indonesia, the direction of education policy through the Independent Curriculum strengthens this principle by emphasizing student-centered learning, teacher autonomy, and flexibility in achieving essential competencies (Ministry of Education and Culture, 2022). However, the reality on the ground shows that this paradigm shift has not been fully followed by the managerial readiness of elementary schools.

Strategic management has a fundamental role in ensuring successful implementation of deep learning in elementary school. School principals as learning leaders are required to be able to design visions, strategies, and operational steps that support learning transformation. The

school's management strategy must be aligned with the values deep learning which demands reflection, collaboration, and innovation in every aspect of school management (Venty et al., 2025). Many primary schools in Indonesia still run administrative and bureaucratic management, focusing on reporting and accreditation, rather than on the quality of the in-depth learning process (Elia Azizah et al., 2024). This creates a gap between modern educational theory and school management practices.

This gap marks the emergence of a phenomenon that can be called a challenge to management strategies in elementary schools. This challenge does not only concern a lack of resources or policies that are not supportive, but also touches on the conceptual dimension, namely the inaccuracy of the direction of strategy in translating the vision of 21st-century learning into concrete practice. In this context, school principals are often not able to carry out instructional leadership functions that motivate teachers to innovate, while teachers themselves are not used to reflecting on the learning process (Sülau et al., 2024). As a result, learning innovation deep learning be against and ceremonial, not transformative.

Several studies have shown that the implementation of deep learning requires systemic support from school management. Mansyur, Judah et al. (2025) emphasizing that deep learning can only grow in a school culture that fosters collaboration, reflection, and active participation of all school residents. On the other hand, traditional leadership models that are oriented towards control and hierarchy actually hinder the birth of innovation. In many cases, teachers are more busy meeting administrative targets than developing creativity in the learning process. This condition strengthens the argument that the challenge of management strategies in elementary schools is the main obstacle in realizing deep learning authentically.

Challenges in strategic management in elementary schools can be interpreted as a result of a lack of understanding of the dynamics of change in education. School management is often not based on environmental analysis, strategies, and future learning needs. According to Rozan Taqi Junatama et al. (2025) Educational strategies must be adaptive, reflective, and participatory in order to respond to changing times. If schools do not have a strategy that fits the deep learning paradigm, then all elements of the organization will operate without a definite purpose. This is where the urgency is to update elementary school management that is more insightful and oriented towards deep learning.

In addition, the cultural aspect of the organization also has a vital role in shaping the atmosphere deep learning. Schools that adopt a culture of collaboration, mutual trust, and openness to innovation have a better chance of implementing deep learning effectively (Fitri

& Kinkin Siti Sa, 2024). Many elementary schools face obstacles due to the work culture that is individual and too formal. Teachers often work individually without any habit of discussing or reflecting together. As a result, the opportunities for new ideas and innovations in learning are very limited. Therefore, school management strategies need to be directed at efforts to build a more open, reflective, and collaborative work culture among all school residents.

This research presents a novelty in the way of looking at the challenge of management strategies in elementary schools. While previous studies have tended to highlight the role of school principals or the implementation of curriculum policies, this study instead places strategy challenges as a problem that is comprehensive and affects the entire learning environment in schools. This article not only discusses the various structural obstacles that arise, but also explores the root of the problem from the conceptual and cultural aspects that make deep learning-based strategies difficult to implement. With this approach, the research is expected to make a contribution to the development of education management that is more reflective, relevant, and in accordance with the real context in the field.

METHODOLOGY

This study uses the Systematic Literature Review (SLR) method with a descriptive qualitative approach. This approach was chosen to systematically review various results of previous research that discussed the challenges of elementary school management strategies in the implementation of deep learning. The design of SLR research allows researchers to gain a comprehensive understanding of the development of concepts, strategies, and managerial constraints that arise in the context of modern basic education. The research procedure is carried out through several structured stages. The first stage is review design, where the researcher sets the research objectives, the focus of the study, and the research questions to be answered. At this stage, the data search strategy is also determined, including the selection of keywords and the determination of the database to be used. The databases selected in this study include ScienceDirect, Scopus, and Google Scholar because they have wide access to credible national and international scientific journals. Keywords used in the search process include "elementary school management strategies", "deep learning implementation", "school leadership", and "educational management challenges." The second stage is the identification and selection of articles, which is carried out based on inclusion and exclusion criteria. The inclusion criteria include articles published between 2018 and 2025, using English or Indonesian, and discussing topics relevant to elementary school management and the

implementation of deep learning. Meanwhile, the exclusion criteria include articles that are not directly related to the topic, are opinionated, or are not published in scientific journals. This process is done to ensure only relevant and quality articles are included in the analysis.

The third stage is data extraction and analysis, where each article that passes the selection is evaluated in depth. Important information such as the research objectives, methods used, findings, and recommendations are identified and classified. The analysis was carried out thematically (thematic analysis) to find patterns, main themes, and relationships between findings that are relevant to elementary school management strategies in the implementation of deep learning. This process results in a conceptual synthesis that comprehensively describes the challenges, opportunities, and best practices in the context of elementary school management in the digital age.

The final stage is the synthesis and reporting of the results of the review, where the analyzed data is arranged in the form of a structured narrative. This synthesis aims to highlight the various managerial challenges faced by elementary schools in the implementation of deep learning, as well as to showcase the trends and directions of research development in this field. The final results are presented in the form of conceptual findings and practical recommendations that can be the basis for the development of basic education management strategies in the future.

The research location is online-based because the entire data collection process is carried out through an electronic database platform. The research context covers the management systems of elementary schools in various countries, especially those that have sought to apply the principles of deep learning in learning. The subject of the research is a scientific article published in national and international journals that is relevant to the theme of elementary school management and deep learning.

Through the application of this SLR method, the research is expected to provide a systematic, transparent, and evidence-based picture of the challenges of elementary school management strategies in the implementation of deep learning, as well as contribute to the development of more adaptive and innovative educational policies and practices.

The following SLR diagram shows the systematic flow of literature selection for this study, from the initial search to the article that was finally analyzed in depth. Each stage indicates the number of articles and the main focus that is considered in the selection process.

The following SLR chart is adopted and modified from the PRISMA Elfiyani (2024) guide to fit the context of this study.

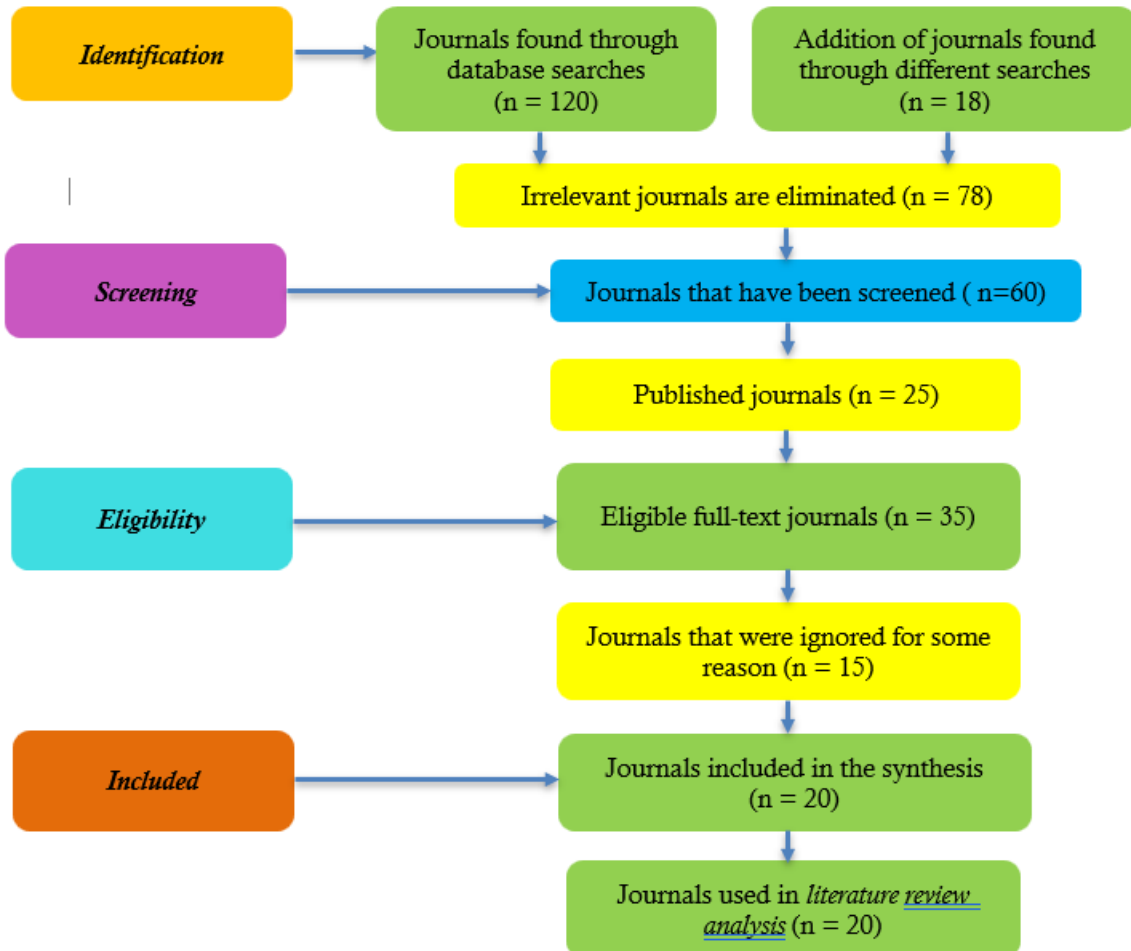


Figure 1. PRISMA flowchart

RESULTS AND DISCUSSION

This chapter presents findings and discussion of the challenges of management strategies in elementary schools in supporting deep learning. Discussions include the impact of challenges on leadership, decision-making, and teacher and student engagement. The findings are linked to management theory and previous research to provide a comprehensive interpretation. This chapter also highlights the role of school-wide adaptation strategies, technologies, and

collaborations in the successful implementation of deep learning, as well as the challenges and opportunities to improve learning effectiveness in the future.

Leadership Challenges in Deep Learning Implementation

Challenges in education often pose a major challenge for primary school strategy management, especially in implementing strategies that support implementation deep learning. Deep learning, as a learning approach that emphasizes deep understanding and critical reflection, requires a management strategy that is adaptive and responsive to change. Schools that are not prepared for challenging situations often have difficulty managing resources, optimizing technology, and facilitating in-depth understanding for students. Deep learning demands a management strategy that is adaptive and responsive to change, so that managerial readiness is a key factor in success (Paraskevi Chatzipanagiotou & Eirene Katsarou, 2023). In addition, research by Figueiredo et al. (2024) emphasizing the importance of flexible and balanced leadership skills, so that schools can leverage existing learning strategies while trying new approaches, which are critical to facing challenges in implementation deep learning. Furthermore, research by Papadopoulou et al. (2023) shows that a developing managerial mindset can improve the effectiveness of strategies, and this concept is also relevant to be applied in education management to help schools be more adaptive and responsive to change.

Culture and Managerial Barriers

One of the main challenges is the lack of understanding and managerial skills in dealing with challenges. Research shows that school leaders are often unprepared in challenging situations, which impacts their ability to implement effective learning strategies (Paraskevi Chatzipanagiotou & Eirene Katsarou, 2023). In addition, the lack of clear strategic planning and communication can cause confusion among teachers and staff, affecting the effectiveness of learning (Lazaris, 2025). Meanwhile, research by Mincu. (2024) emphasizes that clear governance mechanisms and effective leadership skills are essential in creating a collaborative and student-oriented school culture, which in turn can improve the effectiveness of education management strategies.

Resource Limitations and Infrastructure Constraints

Limited resources and infrastructure are also significant obstacles to implementation deep learning. Primary schools often lack access to the technology and training needed to support deep learning. This hinders the ability of teachers and students to engage in deep and

meaningful learning processes (Almayali & Almusawy, 2021). Research by Isnayanti, no. Nur., Putriwanti, Kasmawati. (2025) emphasizes that integration deep learning In the primary school curriculum it can improve the quality of education and shape 21st century competencies, including character strengthening, critical thinking skills, creativity, collaboration, communication, and awareness, and citizenship. However, challenges such as lack of understanding and limited resources are obstacles in its implementation (Sudarmono et al., 2025).

Collaborative Leadership and Innovation Strategies

Adaptive and collaborative leadership is key to facing challenges in elementary school. Leaders who are able to encourage teachers, students, and parents to jointly design a learning strategy based on deep learning will create a sustainable educational environment (Ertem, 2024). This is in line with research Almayali & Almusawy. (2021) which emphasizes the importance of the involvement of all stakeholders in ensuring the effectiveness of management strategies. Nonetheless, many school leaders do not yet have the necessary competencies to manage challenges effectively (Peltola et al., 2024). In addition, research conducted by Marugi & Mugwe. (2023) shows that stakeholder involvement in secondary school strategy planning can increase awareness of educational needs and strengthen the effectiveness of management strategy implementation.

The challenges faced by schools, although complex, can actually be opportunities for innovation if management strategies are designed flexibly and schools are able to adapt. In this context, the management of educational innovation is crucial to create sustainable positive change. For example, research by (Haq et al., 2023) emphasizes that the management of educational innovation in the perspective of effective schools involves a systematic process that includes planning, implementation, evaluation, and follow-up. This process aims to optimize all school resources to achieve educational goals efficiently and effectively. Factors such as leadership, school culture, and teacher performance play a crucial role in the success of educational innovation management. In addition, research by Hernawaty et al. (2025) It shows that the influence of principal leadership and organizational culture on teacher performance is also an important factor in improving the effectiveness of education management.

Evidence-Based and Data-Driven Management

It is important to note that an effective management strategy in the face of challenges must be based on data and evidence. The literature suggests that evidence-based approaches can improve the effectiveness of management and learning strategies in primary schools (Lazaris, 2025). This is in line with the findings in research by Kamila, I. F., Nurhadi, A., Juhairiyah. (2025) which emphasizes that decision-making in education should be based on valid evidence, by utilizing data from learning evaluations, teacher performance, and student needs and potential. With this approach, evidence-based management strategies are able to improve the quality and effectiveness of the educational process in elementary schools, while encouraging the creation of deep learning.

Collaborative Ecosystem for Deep Learning

In addition, collaboration between various stakeholders, including teachers, parents, and communities, is critical in designing and implementing supportive management strategies deep learning. This collaboration can create a holistic and sustainable learning environment (Baxter et al., 2025). This emphasis on collaboration means that each party has a clear role, where teachers contribute to the development of learning methods, parents support the learning process at home, and communities provide relevant real-world resources and experiences. This integration allows for the creation of a learning environment that is responsive to student needs, encourages active participation, and strengthens the sustainability of basic education innovation. Research conducted by Pahi et al. (2024) shows that the use of AI in collaborative learning can make the interaction between teachers and students stronger, while encouraging deeper discussion and reflection.

Resilience, Planning, and Continuous Improvement

In the face of challenges, it is important for elementary schools to have a clear and structured plan. This plan should include measures to maintain learning continuity, ensure the well-being of students and staff, and make effective use of technology to support learning. In addition, a good plan also needs to include problem-solving strategies, such as anticipating learning disruptions, resource limitations, or policy changes, as well as periodic monitoring and evaluation mechanisms. Research Bou Zeid & Abouchdid. (2025) emphasizing that the resilience of the education system can be formed through well-planned managerial policies and practices, especially in the face of learning challenges or changes. Meanwhile, Xuan Lam et al. (2024) highlighting the importance of using data analytics that can provide a quick overview of learning outcomes, so that schools can be more responsive to issues that arise,

adjust strategies quickly, and ensure that learning objectives are still achieved despite various challenges.

Finally, periodic evaluation and reflection on the management strategies implemented is essential. This process allows schools to identify strengths and weaknesses in their approach, as well as make necessary adjustments to increase effectiveness in supporting deep learning. Research by (Pangesti et al., 2025) demonstrate that the implementation of the curriculum deep learning At the elementary level, literacy and learning can be improved through collaboration between principals and teachers. In addition, the results of the study also revealed that the deep learning can be used as an automated teaching quality evaluation tool, allowing schools to measure the effectiveness of strategies quickly and continuously (Gao, 2025).

Synthesis and Link to Deep Learning Concept

In general, various challenges in education can be a driver of positive change if handled through sound management strategies. With a flexible, evidence-based, and collaborative approach, elementary schools are able to create a learning environment that supports deep learning while preparing students to face various challenges in the future.

Table 1. Summary of Main Findings: Key Challenges and Recommendations

Theme	Key Challenges Identified	Recommendations / Solution
Leadership challenges	Limited managerial competence in implementing deep learning frameworks.	Provide leadership training focused on pedagogical innovation and change management.
Culture barriers	Resistance to shifting from traditional teacher-centered models to student-centered learning.	Promote school-wide professional learning communities and continuous reflective practices.
Resource limitations	Insufficient technological and financial resources to support deep learning implementation.	Optimize available resources through collaborative partnerships and local innovations.
Collaborative Solutions	Lack of synergy among teachers, principals, and stakeholders.	Strengthen interprofessional collaboration and shared decision-making processes.

CONCLUSION

Based on the findings and discussions presented, it can be concluded that the challenge of management strategies in elementary schools in the implementation of deep learning is not

just a technical problem or lack of resources, but a systemic challenge rooted in the inaccuracy of the direction of the strategy and the lack of managerial readiness in the face of the changing learning paradigm of the 21st century. Key challenges include a lack of understanding and skills of school leaders to manage challenges and implement effective learning strategies, as well as a lack of clear strategic planning and communication, all of which hinder the effectiveness of deep learning. In addition, the dominance of administrative management and school culture that tends to be individual and formal hinders the formation of a collaborative, reflective, and innovative environment that is essential to support deep learning. However, these challenges can be overcome and transformed into innovation opportunities through adaptive, flexible, and evidence-based management strategies, which demand collaborative leadership and the active involvement of all stakeholders including teachers, students, and communities in regularly designing and evaluating educational plans. For follow-up, further research can focus on developing instructional leadership competency training models specifically designed to encourage a culture of reflection and collaboration at the elementary school level.

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