

The Principals' Role As Instructional Leaders in The Implementation of Deep Learning in Elementary Schools in Pekanbaru

Tessa Silvani ¹, Maya Novita Sari ¹

¹ Magister Manajemen Pendidikan, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

tessasilvani.2025@student.uny.ac.id, mayanovitasari@uny.ac.id

corresponding author: tessasilvani.2025@student.uny.ac.id

ABSTRACT

This study explores the role of school principals as instructional leaders in elementary schools in Pekanbaru in promoting the implementation of Deep Learning (DL). This role was examined through three principal functions of school principals as instructional leaders: (1) establishing a school vision to strengthen the dimensions of learning environments and learning partnerships; (2) conducting academic supervision to support pedagogical practices and the utilization of digital technology; and (3) developing teacher competencies to enhance teachers' readiness to implement the DL framework comprehensively. This study employs a descriptive qualitative approach, using interviews and document analysis, involving principals from six elementary schools with A and B accreditation statuses. Participants were selected through purposive sampling, and triangulation was achieved through teachers and school supervisors. The findings indicate that a participatively formulated and consistently communicated vision influenced the direction of DL implementation, particularly in preparing supportive learning environments and fostering partnerships with parents and the community. Academic supervision based on DL indicators and supported by coaching-oriented feedback was found to improve teachers' pedagogical quality and their utilization of digital technology. Furthermore, competency development through contextual training, professional learning communities, and a psychologically safe climate significantly enhanced teachers' readiness to implement the DL framework. Conversely, in schools with limited institutional capacity, the uneven internalization of the school vision, supervision practices that remained administrative in nature, and limited dissemination of training outcomes emerge as major barriers to the consistent implementation of DL.

Keywords: *deep learning, instructional leadership, deep learning framework*

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INTRODUCTION

The quality of learning is the core of the overall quality of education. In the classroom, curriculum goals are translated into authentic learning experiences that shape students' knowledge, skills, and character. However, high-quality learning does not occur automatically. It requires the systematic management of all school components, including the curriculum, teacher competencies, the learning environment, and the principal's leadership as the driving force of change at the school level.

A growing body of research has demonstrated that principals play a strategic role in improving the quality of learning through effective school leadership (Grissom et al., 2021; Papadakis et al., 2024). Within the tradition of instructional leadership, principals are viewed as instructional leaders who define the school mission, manage instructional programs, and cultivate a positive learning climate (Hallinger & Murphy, 1985; Weber, 1996). These three dimensions position principals not merely as bureaucratic administrators, but as learning leaders who actively guide and direct pedagogical processes within the school.

The importance of instructional leadership has become even more pronounced with the implementation of Deep Learning in elementary schools. The wave of twenty-first-century educational reform requires schools not only to pursue academic achievement but also to foster students' critical thinking, creativity, collaboration, and character through meaningful learning experiences (UNESCO, 2024). In Indonesia, this direction has been reinforced through two complementary national policies: Minister of Education, Culture, Research, and Technology Regulation No. 12 of 2024, which establishes the Merdeka

Curriculum as the national curriculum with an emphasis on student-centered learning, and Minister of Primary and Secondary Education Regulation No. 13 of 2025, which officially mandates the Deep Learning approach in all educational institutions beginning in the 2025/2026 academic year. These regulations confirm that Deep Learning is not merely a pedagogical innovation, but a binding national policy direction. Conceptually, this aligns with the principle of constructive alignment, which emphasizes the coherence among learning objectives, instructional processes, and assessment to promote robust conceptual understanding (Biggs, 2020; Kovač et al., 2025). This perspective is also reflected in the work of Fullan, Quinn, and McEachen (2018), who emphasize mastery of the six global competencies, known as the 6Cs: Character, Citizenship, Collaboration, Communication, Creativity, and Critical Thinking.

Nevertheless, the implementation of Deep Learning constitutes a complex systemic transformation. Developing a deep learning mindset among elementary school teachers is a significant challenge, as teachers are required not only to understand the underlying concepts but also to demonstrate pedagogical creativity in designing strategies that foster students' conceptual understanding amid curriculum changes and technological advancement (Hedrianty et al., 2024). Such capacity can only be developed through continuous professional development, professional learning communities, and the integration of innovative approaches, including digital technology and project-based learning (Fullan & Quinn, 2017). Furthermore, successful implementation requires active collaboration among teachers, principals, parents, and other stakeholders to ensure that educational processes are sustainable and have a meaningful impact on students (Mutmainnah et al., 2025). In another study, deep learning-based practicums using simple tools were shown to be effective in improving students' scientific process skills. This was evident during the learning process, where students were actively involved in designing and conducting practical activities using simple tools and materials (Mustika et al., 2025).

Empirical studies have increasingly confirmed the relationship between instructional leadership and the implementation of DL. Hanik et al. (2025) found that principals' instructional leadership has a direct and significant effect on teachers' pedagogical competence, which serves as a key foundation for implementing DL. Nurisnaeni et al. (2026) and Tasirun et al. (2025) identified three core dimensions of effective instructional leadership in supporting innovative learning models: (1) the formulation of a school mission that aligns the school vision with 21st century competencies; (2) the management of instructional programs that provides professional support and supervision focused on the quality of learning interactions; and (3) the development of a safe and inclusive learning climate that supports students' deeper exploration. Using a mixed-methods approach, Sliwka et al. (2024) further emphasized that the transition from traditional school models to digitally integrated pedagogical models, such as DL, requires leadership that is both transformational and instructional, with the capacity to address systemic factors, including teacher collaboration and the redesign of authentic assessment. Recent studies indicate a clear shift in focus from viewing the principal as a manager to understanding the principal as an instructional leader who builds a collaborative learning culture, supports teacher professional development (Leithwood, 2021; Sliwka et al., 2024; Heenan et al., 2024).

In Indonesia, recent research has begun to confirm the role of instructional leadership and academic supervision in shaping teacher competence and improving learning quality (Elfira et al., 2024; Maulana & Suryana, 2023; Mustari, 2022; Sari, 2025). Despite extensive discussion of the relationships among principal leadership, teacher competence, and learning quality, several gaps remain in the literature. First, most studies focus on conventional performance indicators, such as examination results and administrative performance, rather than specifically examining how principals' instructional leadership supports deep learning practices in elementary classrooms, particularly within the context of the Merdeka Curriculum (Hastuti et al., 2024; Lani & Pauzi, 2024; Ralebese et al., 2025). Second, although numerous studies employ large-scale quantitative approaches, they provide limited insight into how instructional leadership operates in everyday practice, particularly regarding interactions between principals and teachers in planning, implementing, and assessing learning (Carvalho et al., 2021; Grissom et al., 2021). Third, studies that explicitly integrate the

instructional leadership framework of Hallinger and Murphy (1985) with Deep Learning theory and constructivist perspectives (Biggs, 2020; Kovač et al., 2025; Nafi'ah & Faruq, 2025) within the context of Indonesian elementary schools remain scarce.

These gaps are also reflected in the broader research landscape. Most existing studies rely on quantitative approaches to examine relationships between instructional leadership and learning outcomes, but they do not provide a rich understanding of the mechanisms through which instructional leadership functions in daily practice. The authentic interactions between principals and teachers, the operational strategies principals use to promote deeper learning, and the role of principals in managing key components of the Deep Learning framework, such as pedagogical innovation, the creation of conducive learning environments, and the strengthening of a collaborative culture, have not been adequately explored. Qualitative and contextual studies that specifically examine the relationship between principals as instructional leaders and the implementation of Deep Learning in elementary schools remain limited. This gap constitutes both the academic justification and the intended contribution of this study.

Given the urgency of the issue and the research gaps identified above, this study seeks to explore the role of principals as instructional leaders in implementing Deep Learning in elementary schools in Pekanbaru. Specifically, the study focuses on the formulation of the school mission, the management of instructional programs through academic supervision, and the creation of a supportive learning climate through teacher competency development, as applied to the core components of the Deep Learning framework: pedagogical practices, learning partnerships, learning environments, and the meaningful use of digital technology.

METHOD

This study employed a descriptive qualitative approach. A qualitative approach was selected to gain an in-depth understanding of principals' roles as instructional leaders in promoting the implementation of Deep Learning and to explore how their instructional leadership supports the Deep Learning framework at the elementary school level. John W. Creswell and Cheryl N. Poth (2018) emphasize that a qualitative approach enables researchers to understand meanings, processes, and social contexts that cannot be adequately captured through numerical data.

The study was conducted in six elementary schools in Pekanbaru, Riau, Indonesia. The schools were selected purposively. The comparison between the two accreditation groups was not intended to determine the superiority of one group over the other, but rather to provide a richer understanding of the implications of instructional leadership across different levels of institutional capacity. Each school was represented by one key informant, namely the principal. To enhance the credibility of the data, the study also involved supporting informants, specifically teachers, who were considered to have direct knowledge of and involvement in the implementation of training programs and their application in classroom practice. These supporting informants serve as triangulation sources to verify and enrich the findings obtained from the primary informants.

This study employed two complementary data collection techniques. The first was in-depth interviews conducted using an interview protocol developed from the three dimensions of instructional leadership proposed by Philip Hallinger and Joseph Murphy (1985), as well as the four elements of the Deep Learning framework developed by Michael Fullan, Joanne Quinn, and Joanne McEachen (2017). The second was document analysis, which was used to verify and deepen the interview data.

Data were analyzed using the interactive model of Matthew B. Miles, A. Michael Huberman, and Johnny Saldaña (2014), which consists of data collection, data condensation, data display, and conclusion drawing and verification stages.

RESULTS AND DISCUSSION

This section presents the research findings conducted in six elementary schools in Pekanbaru, consisting of three schools with A accreditation (SDN 15 Pekanbaru, SD Kemala Bhayangkari 01 Pekanbaru, and SDN 47 Pekanbaru) and three schools with B accreditation (SDN 166 Pekanbaru, SDN 167 Pekanbaru,

and SD Kasih Cahaya Bunda Pekanbaru). Data were collected through in-depth interviews with six principals and twelve teachers, as well as document analysis of 34 types of institutional documents. The findings are organized according to the three dimensions of instructional leadership proposed by Philip Hallinger and Joseph Murphy (1985), and are aligned with the four elements of the Deep Learning framework developed by Michael Fullan, Joanne Quinn, and Joanne McEachen (2017), as summarized in the following table.

Table 1. Summary of Instructional Leadership Findings in the Implementation of Deep Learning

No	Dimensions	A-Accredited Schools	B-Accredited Schools	Deep Learning Elements
1	Definition of School Mission	The school vision explicitly incorporates Deep Learning (DL) principles and is communicated through meetings, flag ceremonies, and visual and digital media. It is translated into the School Operational Curriculum (KOSP), the School Work Plan (RKS), and priority programs aligned with the Merdeka Curriculum.	The school vision has a limited impact. It is communicated through meetings and posters, but its operationalization remains constrained by limited human resources and infrastructure.	<i>Learning Environment, Learning Partnerships</i>
2	Academic Supervision	It was conducted at least twice per semester using instruments that incorporate Deep Learning indicators, including student engagement, higher-order thinking skills (HOTS), and the integration of digital technology. Coaching-based feedback is provided, and 80–90% of teachers demonstrate measurable improvement in their instructional practices.	It was conducted once per semester. The supervision instruments are predominantly administrative. Although feedback is provided, follow-up actions are not yet implemented consistently, and approximately 75% of teachers show improvement.	<i>Pedagogical Practices, Digital Technological Integration</i>

No	Dimensions	A-Accredited Schools	B-Accredited Schools	Deep Learning Elements
3	Teacher Competency Development	Structured in-service training and continuing professional development programs are implemented to cover Project-Based Learning (PBL), Higher-Order Thinking Skills (HOTS), Deep Learning, and digital literacy. Professional learning communities, including Teacher Working Groups (<i>Kelompok Kerja Guru/KKG</i>), function effectively. Coaching, peer observation, and systematic dissemination of training outcomes are conducted in an organized manner.	Teachers have participated in Deep Learning training; however, the dissemination of training outcomes remains limited. Teacher Working Groups (KKG) are active, but their activities are not yet fully focused on implementing Deep Learning. Numerous teachers continue to require intensive mentoring and support.	<i>Learning Partnerships, Pedagogical Practices</i>

Definition of the School Mission and Its Relationship to the Learning Environment and Learning Partnerships

All schools included in this study possessed vision and mission documents incorporated into the School Operational Curriculum (*Kurikulum Operasional Satuan Pendidikan*) (KOSP). However, the depth of internalization and operationalization differed significantly between A- and B-accredited schools. In A-accredited schools, the principal of SDN 47 Pekanbaru formulated the school vision in a participatory manner by involving teachers, educational staff, the school committee, parents, supervisors, and student representatives through reflective discussions based on analyses of educational reports. The resulting vision explicitly incorporated the principles of meaningful learning, character development, and twenty-first-century competencies. In contrast, in B-accredited schools, the vision tends to remain declarative, with limited operationalization into daily school programs.

The patterns of vision communication also demonstrated substantial differences. A-accredited schools utilized multiple communication channels, including teacher meetings, flag ceremonies, visual media displayed in strategic areas, WhatsApp groups, school social media platforms, and morning literacy habituation and routine reflection activities. Meanwhile, B-accredited schools rely primarily on meeting forums and on displaying vision posters in classrooms.

In terms of the learning environment, the vision of A-accredited schools encouraged tangible physical transformations, including the arrangement of flexible classrooms, reading and creative corners, and

interactive digital boards. Every budgeting decision was consistently evaluated for its alignment with the vision of meaningful learning. Regarding learning partnerships, all schools had established communication with parents through school committees and WhatsApp groups. However, in A-accredited schools, these partnerships evolved into more substantive forms of collaboration, with parents being involved as project resource persons, facilitators of thematic activities, and participants in three-party conferences. SDN 47 Pekanbaru had even established a formal partnership with higher education institutions to support the development of educational programs.

Academic Supervision as a Driver of Pedagogical Practices and Digital Technology Integration

All schools had established written academic supervision programs; however, the intensity and quality of follow-up actions varied considerably. A-accredited schools conducted academic supervision at least twice per semester for each teacher, whereas B-accredited schools generally conducted supervision only once per semester. A more fundamental difference was evident in the orientation of the supervision instruments. In A-accredited schools, the supervision instruments explicitly incorporated indicators of deep learning (DL) elements, including students' active engagement, the quality of teachers' questions that promote higher-order thinking, student collaboration, the relevance of learning materials to real-world contexts, and the meaningful use of digital technology.

In terms of feedback practices, principals in A-accredited schools integrated reflection and coaching sessions after each classroom observation, thereby evolving supervision into a mentoring process rather than merely an evaluative activity. As a result, approximately 80–90% of teachers in A-accredited schools demonstrated substantial improvement. Teachers who had previously relied predominantly on lecture-based instruction began implementing group discussions, problem-based learning, and collaborative learning activities.

Regarding the use of digital technology, academic supervision in A-accredited schools explicitly integrated technology into meaningful learning, guided by the principle that pedagogy should remain the primary focus, with technology serving as a reinforcing tool. Platforms such as digital interactive boards, Canva, Quizizz, Google Classroom, and Rumah Belajar have been integrated into supervised instructional planning. In contrast, the major challenges faced by B-accredited schools include limited technological infrastructure and uneven digital literacy among teachers when using digital learning media.

Teacher Competency Development as a Learning Climate Supporting Deep Learning

Principals in the A-accredited school group had established a structured and sustainable professional development ecosystem. SDN 15 Pekanbaru organized In-House Training (IHT) programs focusing on deep pedagogy, Project-Based Learning (PBL), Higher-Order Thinking Skills (HOTS)-based learning, and the strengthening of 6C competencies. The school also maintained a professional learning community (PLC/internal teacher working group) with regular agendas dedicated to discussing DL implementation and sharing best practices. In contrast, in B-accredited schools, the dissemination of training outcomes remains limited because only a portion of teachers participated in external training programs, while internal dissemination mechanisms had not yet been systematically developed.

Professional learning communities in A-accredited schools had evolved into strategic forums for discussing the development of teaching modules, differentiation strategies, and authentic assessment, as well as sharing results from pedagogical experimentation. Importantly, discussions did not conclude within the forum itself; rather, they were followed up through subsequent supervision and monitoring processes, thereby creating a continuous cycle of improvement.

Another significant finding was the presence of a strong psychologically safe climate for innovation in A-accredited schools. Principals adopted reflective, non-punitive approaches to mistakes during innovation processes, thereby encouraging teachers to independently adopt DL practices, such as portfolio-, project-, and

performance-based assessment. In B-accredited schools, a similar climate was emerging; however, several teachers still require more intensive guidance and support.

In terms of pedagogical practices, teachers in A-accredited schools had implemented student-centered learning more consistently through the application of Project-Based Learning (PBL), Project-Based Learning (PJBL), Discovery Learning, and differentiated instruction. Assessment practices had shifted from a predominance of written examinations toward project-based assessments, portfolios, and process observation. Teachers in B-accredited schools also demonstrated notable progress, particularly in the dimensions of Mindful and Meaningful Learning; nevertheless, time constraints and curriculum density continue to pose significant challenges.

Overall, the differences between the two groups of schools were not determined solely by accreditation status. School supervisors emphasized that accreditation does not automatically guarantee the successful implementation of deep learning. Rather, the most decisive factors were instructional leadership, a collaborative school culture, and teacher commitment. Accreditation is, therefore, more appropriately viewed as a reflection of governance capacity that may facilitate, but cannot substitute for, visionary and consistent instructional leadership.

CONCLUSIONS AND RECOMMENDATION

The present study indicates that principals who effectively serve as instructional leaders can promote the implementation of deep learning (DL) through three mutually reinforcing dimensions. A participatively formulated and consistently communicated vision encouraged tangible changes in the learning environment, including the arrangement of flexible classrooms, reading corners, and interactive digital boards, as well as the establishment of substantive partnerships with parents and the community in students' learning processes. Academic supervision based on DL indicators, combined with coaching-oriented feedback, led to significant instructional changes, with schools shifting from lecture-based teaching to group discussions, problem-based learning, and the meaningful integration of digital technology. Furthermore, competency development through contextual In-House Training, professional learning communities, and a psychologically safe climate for innovation encouraged teachers to independently adopt DL practices such as portfolio assessment, project-based assessment, and Discovery Learning, while simultaneously creating a continuous cycle of instructional improvement.

Conversely, schools with limited institutional capacity demonstrated consistent patterns of barriers. Declarative visions had not yet driven change in the learning environment; supervision practices remain administrative, occurring only once per semester and with insufficient coaching support; and the lack of structured dissemination of training outcomes hindered the equitable development of teacher competencies. These findings affirm that differences in the quality of DL implementation are determined not solely by accreditation status but by the quality of instructional leadership, collaborative culture, and overall teacher commitment.

This study addresses a gap in the existing literature, which has predominantly examined instructional leadership through quantitative approaches, by providing a qualitative, contextually grounded explanation of the operational mechanisms linking instructional leadership to DL practices in classroom settings. The study recommends that principals, particularly in schools with limited institutional capacity, prioritize coaching-based supervision supported by DL indicator-based instruments, structured internal professional learning communities, and psychologically safe school climates as the foundation for pedagogical transformation toward meaningful and sustainable deep learning.

Author Contributions

First Author: Conceived and designed the research proposal; conducted data collection; processed and analyzed the data; prepared the initial draft of the manuscript; revised the article to conform to the target journal's template; managed citations and references; revised the manuscript based on the supervisor's

feedback; addressed comments from journal reviewers and editors; and ensured the originality of the data and the integrity of the research.

Second Author: Provided conceptual and academic guidance throughout the study; supervised the development of the conceptual framework and research methodology; contributed to the analysis and interpretation of the findings; reviewed and edited the substantive content of the manuscript; ensured the academic quality, originality, and publication readiness of the article; guided the adaptation of the manuscript to meet the standards of scholarly journals; directed revisions in response to peer-review comments; ensured compliance with publication ethics; supported the submission, revision, and publication processes; and provided academic mentoring throughout the student's scholarly publication process.

Conflict of Interest Declaration

The authors declare that this research and the preparation of this manuscript were conducted in the absence of any financial or personal relationships that could be construed as potential conflicts of interest that might have influenced the research process or the findings reported.

Ethics Statement

This study was conducted in accordance with established research ethics principles. Prior to data collection, all participants provide informed consent after receiving a clear explanation of the study's objectives, procedures, and their right to withdraw from the study at any time without penalty. Participant confidentiality and anonymity were strictly maintained throughout the research process, and all data were used solely for academic purposes. The authors carefully reviewed and edited the translated text and assume full responsibility for the accuracy, integrity, and content of the final manuscript.

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