

Principal Management in Implementing the Deep Learning Approach to Improve Educational Quality at SMA Negeri 1 Penajam Paser Utara

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ABSTRACT

This study examines the principal's management in implementing the deep learning pedagogical approach to improve educational quality at SMA Negeri 1 Penajam Paser Utara. The research was motivated by the need to strengthen 21st-century competencies, character development, and meaningful learning in the context of Indonesia's Merdeka Belajar (Freedom to Learn) curriculum policy. Employing a qualitative case study design, data were collected through in-depth interviews, observation, and documentation analysis involving the school principal, vice principal for curriculum affairs, teachers, the school committee, and students. Data were analyzed using Miles and Huberman's interactive model: data reduction, data display, and conclusion drawing. The findings reveal that the principal's management in implementing deep learning was executed strategically across four management functions: (1) Planning the principal integrated deep learning principles into the School Operational Curriculum (KOS), lesson plans, and teacher professional development programs, with sensitivity to student diversity including student athletes;



(2) Organizing — collaboration was strengthened through internal subject teacher forums (MGMP), academic supervision, and a school quality assurance team, reflecting principles of distributed leadership; (3) Implementing learning shifted toward student-centered activities including project-based learning, contextual discussion, formative assessment, and reflective practice, enhancing student engagement and critical thinking; (4) Evaluating comprehensive and participatory evaluation involving teachers, students, and the school committee served as the basis for continuous improvement and evidence-based decision making. The study concludes that visionary, collaborative, and instructionally-focused principal leadership is the key determinant in successful deep learning implementation and educational quality improvement.

Keywords: Principal Management, Deep Learning, Educational Quality, Instructional Leadership, Merdeka Belajar

INTRODUCTION

The global educational landscape in the 21st century demands a fundamental transformation in how knowledge is constructed and shared. Education systems worldwide are challenged to move beyond surface-level instruction toward deeper forms of learning that foster critical thinking, collaboration, creativity, and the ability to apply knowledge in real-world contexts (Winje & Løndal, 2020; Weng et al., 2022). In Indonesia, this imperative is reflected in the Merdeka Belajar (Freedom to Learn) curriculum framework, which explicitly promotes the deep learning approach as a means of developing the Profil Pelajar Pancasila (Pancasila Student Profile) a comprehensive vision of educated, character-driven, and globally competitive graduates (Safitri et al., 2022; Syifauzakia, 2023).

Deep learning, in the pedagogical sense, refers to an approach that emphasizes conceptual understanding, metacognitive reflection, collaborative inquiry, and the application of knowledge to authentic problems as opposed to surface learning, which focuses on rote memorization and passive reception of information (Biggs & Tang, 2011; Anderson, 2018). The Indonesian Ministry of Education (Kemendikbudristek) has increasingly encouraged schools to embrace deep learning as an organizing framework for classroom practice, particularly within the Kurikulum Merdeka that began wide-scale implementation in 2022.

However, research consistently shows that pedagogical transformation at the classroom level is largely dependent on school-level leadership. Principals play a critical role as instructional leaders who establish vision, build capacity, and create enabling organizational conditions for



innovative practice (Hallinger & Heck, 2011; Shi & Lan, 2024). Without strategic and sustained principal management, deep learning tends to remain a policy aspiration rather than an enacted reality.

This study was conducted at SMA Negeri 1 Penajam Paser Utara, a public high school located in the strategic region adjacent to Indonesia's new capital city, Ibu Kota Nusantara (IKN). Preliminary observation in October 2025 indicated that despite a general awareness of deep learning principles, most teachers continued to rely on conventional lecture-based approaches with predominantly cognitive assessment. The school also serves a unique student population that includes regional athletes who frequently miss class due to training and competitions, requiring flexible and adaptive learning strategies. These contextual challenges underline the importance of proactive and responsive principal management.

This study aims to explore and describe how the principal's management at SMA Negeri 1 Penajam Paser Utara operationalizes the deep learning approach across the four classic management functions: planning, organizing, implementing, and evaluating (Terry, 2006; Mulyasa, 2013). By examining this case, the study seeks to contribute an empirically grounded model of educational leadership that integrates instructional vision with practical managerial action.

LITERATURE REVIEW

Principal Management and Instructional Leadership

Educational management encompasses the systematic processes of planning, organizing, implementing, and evaluating educational activities to achieve institutional goals effectively and efficiently (Mulyasa, 2013). Within this framework, the school principal occupies a pivotal role not merely as an administrator but as an instructional leader, strategic manager, innovator, and change agent (Mulyasa, 2013; Susanti et al., 2023).

Instructional leadership theory positions the principal as primarily responsible for shaping the school's learning environment and improving teaching quality. Hallinger and Heck (2011) demonstrate that principals who actively engage in instructional leadership through curriculum management, professional development, and monitoring of teaching produce measurable improvements in student outcomes. This form of leadership requires principals to be pedagogically knowledgeable, data-informed, and responsive to the diverse needs of their school communities.

Transformational leadership, a closely related construct, further emphasizes the principal's



capacity to inspire change, build collective vision, and empower teachers as professional learners (Riski et al., 2021; Wardani & Triwiyanto, 2022). In the context of deep learning implementation, both instructional and transformational dimensions of principal leadership are critical: the former to guide curriculum alignment and pedagogical innovation, and the latter to cultivate a school culture receptive to reflective and collaborative practice.

Deep Learning as a Pedagogical Approach

Deep learning in education — distinct from the artificial intelligence concept of the same name — refers to a pedagogical orientation that promotes lasting understanding, higher-order thinking, and the integration of knowledge into new contexts (Fullan et al., 2018). It is characterized by student engagement in meaningful tasks, metacognitive reflection, real-world application, collaborative inquiry, and problem-solving (Anderson, 2018; Esteban-Guitart & Gee, 2020).

The contrast between deep and surface learning is well-established in educational psychology. While surface learners tend to reproduce content without meaningful engagement, deep learners actively seek to understand, connect ideas, and apply knowledge (Biggs & Tang, 2011). This distinction is especially relevant in the Indonesian policy context, where the Kurikulum Merdeka explicitly prioritizes deep learning competencies aligned with the Profil Pelajar Pancasila: beriman dan bertaqwa (faith and piety), berkebhinekaan global (global diversity), bergotong royong (collaboration), mandiri (independence), bernalar kritis (critical thinking), and kreatif (creativity).

Research on deep learning implementation emphasizes that school ecology the norms, relationships, and structures within a school significantly mediates its effectiveness (Anderson, 2018; Lin et al., 2019). This positions the school principal as a key ecological architect, whose management decisions shape whether deep learning principles can be systematically integrated into daily instructional practice.

Management Functions in Educational Leadership

The classical management functions of planning, organizing, implementing, and controlling (POAC) provide a foundational framework for analyzing principal management practices (Terry, 2006). In the context of educational innovation such as deep learning: planning involves setting strategic direction and aligning curriculum with learning philosophy; organizing involves structuring human resources and collaborative mechanisms to support the innovation;



implementing involves translating plans into actual pedagogical practice with appropriate supervision and support; and evaluating involves using data and feedback to assess implementation quality and drive continuous improvement (Mulyasa, 2013; Satori & Komariah, 2014).

The application of evidence-based decision making and distributed leadership within these functions further enhances the effectiveness of educational management. Distributed leadership where leadership responsibilities are shared among the principal, vice principals, teachers, and other stakeholders is particularly associated with sustainable school improvement (Nitte & Boka, 2024). This aligns with the concept of learning organizations (Senge, 1990), in which schools continuously improve through shared reflection, collaboration, and professional development.

RESEARCH METHODS

This study employed a qualitative approach with a case study design (Yin, 2018). Case study methodology was selected because the research sought an in-depth, contextual understanding of the principal's management practices at a specific school, with attention to the complex organizational and pedagogical dynamics involved in deep learning implementation.

The research was conducted at SMA Negeri 1 Penajam Paser Utara, East Kalimantan, from October 2025 to February 2026. This school was purposively selected due to its ongoing efforts to implement the deep learning approach within the Kurikulum Merdeka framework, and its unique contextual characteristics including a diverse student population with a significant proportion of regional athletes.

Participants were selected through purposive sampling. Key informants included: (1) the school principal as the primary subject; (2) the vice principal for curriculum affairs; (3) four subject teachers from different disciplines; (4) two members of the school committee; and (5) four students from different grade levels and backgrounds, including two student athletes. Data were collected through three methods: in-depth interviews using semi-structured protocols, non-participant observation of school management activities and classroom learning processes, and documentation review including school policy documents, lesson plans, teacher professional development records, and evaluation reports.

Data analysis followed Miles, Huberman, and Saldaña's (2014) interactive model, consisting of three concurrent activities: data condensation (reduction), data display, and conclusion drawing and verification. Credibility was established through prolonged engagement, triangulation of data sources and methods, and member checking. Dependability and



confirmability were ensured through audit trails and transparent documentation of the analytical process.

RESULTS AND DISCUSSION

Planning: Integrating Deep Learning into Strategic School Management

The findings reveal that the principal's planning for deep learning implementation was neither reactive nor incidental, but constituted a structured strategic process embedded within the school's broader educational planning architecture. The principal explicitly integrated deep learning principles into the School Operational Curriculum (Kurikulum Operasional Sekolah/KOS), which served as the primary policy document guiding instructional direction.

Planning began with a comprehensive needs analysis and contextual mapping of the student population. Notably, the school's significant proportion of student athletes who regularly miss class due to training schedules and inter-regional competitions emerged as a critical contextual factor that shaped the planning strategy. The principal, in collaboration with the vice principal and curriculum team, designed a differentiated planning framework that incorporated flexible learning pathways to ensure educational equity. This reflects what Rahmadani (2025) terms the principle of pedagogical differentiation as a quality management strategy.

The planning process also demonstrated strong alignment between institutional vision, national curriculum policy, and operational implementation a practice consistent with the concept of strategic alignment (Jonison et al., 2024). Lesson design templates were restructured to incorporate project-based learning, formative assessment cycles, contextual relevance, and student reflection signaling a genuine pedagogical shift rather than merely cosmetic curriculum change.

Teacher professional development was incorporated as a core planning component, including In-House Training (IHT), collaborative curriculum planning workshops, and peer coaching sessions. This reflects the principal's understanding that deep learning requires not only curriculum redesign but a transformation in teacher pedagogical beliefs and practices.

These findings align with the theoretical framework of evidence-based planning (Hidayah et al., 2025) and transformational leadership (Alwi, 2025), where the principal builds a shared vision and co-creates institutional direction with key stakeholders. The broad stakeholder engagement during planning including teachers, the school committee, students, and parents is also consistent with the unfreezing phase of Lewin's change management model, creating readiness for paradigm shift toward deep learning.



Organizing: Building Collaborative Structures for Deep Learning

The organizing phase demonstrated that the principal chose to leverage and strengthen existing organizational structures rather than create entirely new units. The vice principal for curriculum affairs was repositioned as the primary coordination hub for deep learning implementation, supported by a strengthened quality assurance team and internal subject-area teacher working groups (MGMP).

A distinctive feature of the organizational approach was the adoption of distributed leadership principles (Nitte & Boka, 2024). Rather than centralizing instructional decisions in the principal's office, teachers were recognized as co-designers and co-implementers of the deep learning program. This empowerment of teachers reflected a deliberate strategy to build professional ownership and pedagogical commitment.

Internal MGMP (Musyawarah Guru Mata Pelajaran / Subject Teacher Forum) sessions functioned as institutional spaces for collaborative curriculum design, lesson study, and reflective practice transforming the school into a learning organization (Senge, 1990; Alwi, 2025). The school quality assurance team provided a structural mechanism for monitoring implementation consistency and feeding evaluation outcomes back into the planning cycle.

Communication channels including formal meetings, digital platforms, and informal discussions were actively maintained to reduce resistance and sustain motivation. This reflects what Prabowo and Algifari (2024) identify as the critical role of organizational communication in change management within educational institutions.

External collaboration with the school committee and district-level supervisors also formed part of the organizing strategy, ensuring legitimacy and resource support for the deep learning initiative. This outward-facing organizational approach aligns with the school-based management model (Nabila et al., 2020), in which external accountability and community partnership reinforce internal quality efforts.

Implementing: Transforming Classroom Practice through Leadership Support

The implementation phase constituted the most visible dimension of principal management, where strategic planning and organizational structures translated into actual changes in classroom learning experiences. The data demonstrate a meaningful and observed shift from teacher-centered to student-centered pedagogy, characterized by increased use of project-based learning, contextual case studies, group discussions, formative assessment, and structured reflection activities.



The principal's role during implementation was characterized by active academic supervision conducting classroom observations, providing constructive feedback, and facilitating peer lesson observation cycles. This form of instructional supervision, grounded in the instructional leadership model (Hallinger & Heck, 2011), served both a monitoring and developmental function, creating a culture of professional growth rather than inspection.

A notable finding concerns the accommodation of student athletes. The principal instituted flexible instructional arrangements including asynchronous learning options, extended project timelines, and individualized catch-up mechanisms ensuring that students' extracurricular commitments did not compromise their educational access or outcomes. This approach reflects responsive leadership (Mulyawati, 2025) and the principle of educational equity embedded in the deep learning philosophy.

Implementation outcomes were documented across multiple dimensions: increased student participation and engagement in classroom discussions; improved quality of written reflections demonstrating higher-order thinking; enhanced teacher capacity in designing contextually relevant learning activities; and parent reports of improved student self-discipline and intrinsic motivation. These outcomes resonate with Fullan et al.'s (2018) framework connecting deep learning to both academic and character outcomes.

Challenges encountered during implementation including variation in teacher readiness, time constraints, and initial student resistance to unfamiliar learning modes were addressed through differentiated professional support, collaborative problem-solving in MGMP forums, and sustained principal encouragement. This adaptive response to implementation challenges exemplifies continuous improvement management and the learning organization ethos.

Evaluating: Systematic, Participatory, and Improvement-Oriented Assessment

Evaluation in this study's context was not confined to summative assessment of student academic performance. Rather, the principal established a comprehensive evaluation system that examined the quality of instructional processes, teacher professional growth, student engagement, character development, and alignment with the Profil Pelajar Pancasila competency framework.

The evaluation mechanisms employed included: structured academic supervision with observation protocols and feedback sessions; analysis of lesson plans and instructional materials by the curriculum team; student feedback through questionnaires and guided reflection activities; and periodic participatory reviews involving the school committee and parents. This multi-source,



multi-method evaluation approach reflects the principles of authentic assessment (Muttaqin & Nurwati, 2021) and Total Quality Management in education (Suryani, 2020).

A particularly significant finding was the principal's consistent use of evaluation outcomes as direct inputs for instructional decision-making what educational management scholars term evidence-based decision making (Ratiningsih et al., 2022). Evaluation findings systematically informed revisions to lesson plan templates, adjustments to instructional methods, identification of professional development needs, and refinement of school policies regarding flexible learning arrangements.

Student voice was actively incorporated through structured reflection protocols and regular feedback channels, instantiating the principle of student agency in quality assurance (Mustadi et al., 2016). This participatory dimension of evaluation contributed to a school culture of democratic accountability and shared responsibility for learning outcomes.

The evaluation process followed a PDCA (Plan-Do-Check-Act) cycle (Nurhayati & Rahmat, 2023), ensuring that assessment was not an endpoint but an iterative engine of improvement. This cyclical quality management approach positioned deep learning implementation as a long-term institutional commitment rather than a time-bound project, enhancing its sustainability and impact.

Cross-Cutting Themes: Context, Culture, and Sustainability

Beyond the four management functions, the analysis reveals several cross-cutting themes that illuminate the broader conditions enabling effective deep learning management.

First, contextual responsiveness proved essential. The school's location in the Penajam Paser Utara regency a region undergoing rapid social and economic transformation as the support zone for Indonesia's new capital, IKN Nusantara created both urgency and opportunity for educational quality improvement. The principal's awareness of this macro-context shaped strategic planning choices and reinforced the relevance of 21st-century competency development for students who will live and work in a fundamentally changing regional environment.

Second, the cultivation of a reflective school culture emerged as a foundational achievement of the principal's management. The shift from compliance-oriented to inquiry-oriented professional practice among teachers did not happen automatically but was actively constructed through deliberate leadership choices: encouraging risk-taking in lesson design, celebrating innovative practice, and modeling reflective inquiry in leadership communication.

Third, sustainability was deliberately designed into the management system. By



embedding deep learning principles into official curriculum documents, aligning professional development with deep learning competencies, and institutionalizing evaluation mechanisms that generate improvement data, the principal ensured that the initiative was not dependent on individual champions but was anchored in organizational structures and routines.

CONCLUSION

This study demonstrates that the successful implementation of a deep learning approach in a public secondary school requires coherent, strategic, and sustained principal management across all four management functions. The case of SMA Negeri 1 Penajam Paser Utara illustrates how a principal can operationalize a national curriculum philosophy in this case the deep learning orientation of Kurikulum Merdeka through concrete managerial action that builds capacity, aligns structures, supports teachers, and continuously refines practice.

Planning that is evidence-based, contextually sensitive, and strategically aligned with national policy creates the institutional foundation for deep learning. Organizing that empowers teachers as professional co-designers and distributes leadership responsibilities across the school builds the collective capacity to sustain innovation. Implementation that is supported by active academic supervision, differentiated professional development, and inclusive instructional arrangements ensures equitable access to deep learning for all students. Evaluation that is comprehensive, participatory, and oriented toward continuous improvement transforms assessment data into catalysts for pedagogical growth.

The findings contribute to educational management theory by presenting an integrated model of principal-led deep learning implementation that is simultaneously theoretically grounded and practically actionable. For school leaders, the study affirms that instructional leadership effectiveness lies not in technical know-how alone, but in the ability to build vision, mobilize collective capacity, and maintain unwavering focus on the quality of learning experiences for all students.

Future research is recommended to: (1) examine the long-term sustainability of deep learning programs across principal transitions; (2) investigate student-level deep learning outcomes using validated instruments alongside qualitative approaches; and (3) explore how deep learning management models can be scaled across schools in regions undergoing rapid social change, such as the IKN development corridor.



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