Volume 4 Number 1 (2026)
January-June 2026
Page: 334-343

ISSN: 3031-2884
EDUJAVARE PUBLISHING
https://edujavare.com/index.php/edujavare

Implementation of Deep Learning as A Strategy to Improve the Quality of Learning in the Outermost Regions

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Article history Submitted: 2026/04/01; Revised: 2026/04/25; Accepted: 2026/05/23

Abstract

This study examines the implementation of deep learning as a strategy to improve the quality of learning at SMA Negeri 1 Lobalain and SMA Negeri 2 Lobalain, Rote Ndao Regency, East Nusa Tenggara. Using a qualitative approach with a multi-site case study design, this research focuses on the principal's strategic management in the formulation, implementation, and evaluation of deep learning. Data were collected through observation, in-depth interviews, and document study, The findings indicate that the success of deep learning implementation is largely determined by the principal's strategic management encompassing vision-mission setting, teacher capacity building, academic supervision, infrastructure provision, and continuous evaluation. Key supporting factors include leadership commitment, teacher competence, and collaborative culture, while limited teacher understanding and inadequate infrastructure remain as barriers. This study offers strategic recommendations for schools in disadvantaged, frontier, and outermost regions (3T areas) in implementing deep learning in accordance with Permendikdasmen Number 13 of 2025.

Keywords

Deep Learning, Strategic Management, School Principal, Quality Improvement, 3t Regions

INTRODUCTION

National education is currently faced with a fundamental need to improve the quality of learning that is not only oriented towards the mastery of concepts, but also on the development of critical thinking skills and problem-solving skills. Along with the rapid advancement of science and digital technology, students are required to have

critical, creative, and adaptive thinking skills. However, in reality, the learning process in schools is still dominated by conventional methods (lectures) that emphasize memorization rather than the development of critical thinking.

Data from the 2022 PISA results released by the Ministry of Education, Culture, Research, and Technology show a worrying condition: only one percent of Indonesian students are able to answer questions that require the ability to analyze and evaluate (*Higher Order Thinking Skills*), while 99 percent are still in the basic ability of remembering and understanding (*Lower Order Thinking Skills*)). Similar conditions are found in SMA Negeri 1 Lobalain and SMA Negeri 2 Lobalain, where the learning process is still dominated by the conventional approach of *teacher centers* and in-depth learning policies have not been outlined in the Education Unit Curriculum (KSP).

Responding to these conditions, the government through Permendikdasmen Number 13 of 2025 and Permendikdasmen Number 1 of 2026 affirmed the policy commitment to deep *learning* as a transformative approach that must be implemented in all education units in Indonesia. Deep learning emphasizes three main principles, namely meaningful, *mindful*, and *joyful*, where students do not just memorize information, but are able to understand concepts in their entirety and relate knowledge to daily life. However, the implementation of deep learning in education units still faces various challenges, including a lack of understanding and skills of teachers and limited support resources. The success of its implementation does not depend entirely on the ability of teachers, but is also influenced by the strategic role of the principal as a learning leader who is able to formulate, implement, and evaluate strategies effectively. This study aims to examine the principal's strategy in implementing deep learning as an effort to improve the quality of learning, especially in 3T areas (disadvantaged, outermost, and remote).

Deep learning is an approach that is oriented towards developing comprehensive understanding, not just memorizing information. According to Fullan et al. (2013), deep learning is a learning process that is more oriented towards the development of six global competencies (6Cs), namely: Character, Citizenship, Collaboration, Communication, Creativity, and Critical Thinking. This concept is relevant to the direction of the goals of National Education as mandated in Law Number 20 of 2003 concerning the National Education System. Feriyanto and Anjariyah (2024) explain that the three principles of

deep learning—*meaningful learning*, *mindful learning*, and *joyful learning*—complement each other in strengthening student involvement, critical thinking skills, and deep understanding of the concepts learned. Fullan, Langworthy, et al. (2014) add that deep learning supports holistic education by developing students' emotional intelligence, social responsibility, and attitude growth.

In the context of Indonesian policy, Permendikdasmen Number 13 of 2025 emphasizes that deep learning is not a new curriculum, but an approach that fundamentally changes the way of teaching and the way of learning. This approach emphasizes aware, meaningful, and encouraging learning activities, where students are able to understand concepts in their entirety, relate knowledge to daily life, and achieve deep conceptual understanding.

Strategic management is the foundation for school principals in achieving educational goals effectively and sustainably. David (2017) defines strategic management as a combination of art and science in formulating, implementing, and evaluating various cross-functional decisions aimed at helping organizations achieve set goals. This definition emphasizes three main dimensions: formulation, implementation, and evaluation of strategies that take place continuously as a cycle. Wheelen and Hunger (2008) view strategic management as a set of managerial decisions and actions that determine the long-term performance of an organization, including the analysis of the internal and external environment, strategy formulation, strategy implementation, and evaluation and control. Fadhli (2020) emphasized that school principals who are able to implement strategic management effectively will be better equipped to recognize challenges and opportunities, then formulate them into responsive, systematic, and adaptive measures.

METHODS

This study uses a qualitative approach with a multi-site case study type of research. The qualitative approach was chosen because this research aims to understand, describe, and analyze in depth the principal's strategy in the implementation of deep learning as it is in the field. According to Moleong (2017), qualitative research intends to understand the phenomenon of what the research subject experiences holistically in a special natural context.

The research was carried out at SMA Negeri 1 Lobalain and SMA Negeri 2 Lobalain, Rote Ndao Regency, East Nusa Tenggara Province, which were chosen purposively because they were in the 3T area and faced real challenges in the implementation of deep learning. Data sources include principals, vice principals for curriculum, and teachers in both schools, as well as official school documents such as KSP, lesson plans, academic supervision programs, and workshop activity reports.

Data collection was carried out through three main techniques: passive participatory observation, semi-structured interviews, and documentation studies. Data analysis uses the Miles, Huberman, and Saldana model which consists of four cycle components: data collection, data condensation, data presentation, and conclusion drawing or verification. Data validity tests are carried out through triangulation of sources, techniques and time, *member checks*, transferability, dependability, and confirmability.

RESULTS AND DISCUSSION

Results

Deep Learning Implementation Formulation Strategy

The findings of the study show that the formulation strategy includes three main steps taken by the principal. First, the establishment of a learning vision and mission that explicitly reflects a commitment to deep learning. Second, the analysis of internal and external conditions through a SWOT approach that includes mapping teacher competencies, the availability of facilities, and the support of school committees. Third, the preparation of programs and action plans outlined in the School Work Plan and Budget (RKAS), including curriculum policies that place in-depth learning in the Education Unit Curriculum (KSP).

Deep Learning Implementation Strategy

The results of the study identified five critical implementation strategies carried out by school principals, as presented in the following table:

Strategi	**Deskripsi**
Kepemimpinan Instruksional	Kepala sekolah aktif mengarahkan dan membimbing perancangan pembelajaran bermakna

Penguatan Kapasitas Guru	Pelatihan dan workshop pedagogis untuk meningkatkan pemahaman guru tentang PM
Supervisi Akademik	Pemantauan kinerja mengajar guru secara rutin dengan umpan balik konstruktif
Penyediaan Sarana-Prasarana	Optimalisasi anggaran dan kemitraan untuk memenuhi kebutuhan infrastruktur digital
Pengembangan Budaya Sekolah	Membangun ekosistem kolaborasi, refleksi, dan inovasi di antara semua elemen sekolah

Deep Learning Evaluation Strategy

The results of the study showed that the evaluation was carried out through four mechanisms: (1) a review of the strategy basis using SWOT analysis and a review of KSP documents; (2) measuring learning performance through structured classroom supervision with in-depth learning observation rubrics; (3) taking corrective action through monthly evaluation meetings involving all stakeholders; and (4) continuous reflection involving principals, teachers, and students.

Supporting and Inhibiting Factors

The results of the study identified the main supporting factors which include: the commitment and leadership of the principal, the competence and readiness of teachers, the availability of facilities and technology, and the culture of collaboration and reflection. The inhibiting factors found include: limited teachers' understanding of the pedagogical concept of deep learning, low digital skills of teachers, limited supporting infrastructure, lack of learning supervision, heterogeneity of students' abilities, and unequal access to technology. This condition is increasingly crucial in 3T areas such as Rote Ndao Regency, where school principals are required to be creative and innovative in maximizing available resources.

Discussion

Deep Learning Implementation Formulation Strategy

Strategy formulation is a fundamental stage in the strategic management cycle of school principals. Based on literature review and findings in the field, the formulation strategy includes three main steps. First, the establishment of a learning vision and mission that explicitly reflects a commitment to deep learning. Fullan, Langworthy, et al. (2014) emphasized that a strong vision is a compass for all school residents in directing efforts to improve the quality of learning, and is supported by the findings of Izdihar and Kusumawati (2026) that the establishment of a clear learning vision can strengthen and improve the quality of learning. Second, the analysis of internal and external conditions through a SWOT approach that includes mapping teacher competencies, the availability of facilities, and the support of school committees. Syafiuddin et al. (2023) found that strategy formulation through SWOT analysis can help educational institutions face challenges and improve quality. Third, the preparation of programs and action plans outlined in the School Work Plan and Budget (RKAS), including curriculum policies that place in-depth learning in the Education Unit Curriculum (KSP).

Deep Learning Implementation Strategy

Strategy implementation is the process of translating plans into concrete actions. David (2014) emphasized that this stage requires the ability of school principals to manage school resources, motivate teachers, and build a safe and comfortable organizational culture. Sasmita et al. (2025) found that the successful implementation of deep learning is influenced by three main factors: the principal's instructional leadership commitment, sustainable teacher capacity development, and the creation of a conducive learning environment. The principal's instructional leadership is the link between the strategy that has been designed and the implementation of learning at the classroom level. Hallinger and Murphy (1985) define instructional leadership as the act of a principal to establish a teaching and learning process with the primary goal of improving students' academic achievement. Izdihar and Kusumawati (2026) corroborate that school principals play a role in encouraging the application of deep learning through transformational and instructional leadership.

Deep Learning Evaluation Strategy

Evaluation is an inseparable component of the strategic management cycle. In the context of the implementation of deep learning, the evaluation carried out by the principal serves to ensure that the implementation runs as planned, identify obstacles, and formulate corrective actions. David (2017) establishes three fundamental activities in strategy evaluation: reviewing internal and external factors, measuring organizational performance, and taking corrective actions. Evaluation is carried out through four mechanisms: (1) review of the strategy basis using SWOT analysis and review of KSP documents; (2) measuring learning performance through structured classroom supervision with in-depth learning observation rubrics; (3) taking corrective action through monthly evaluation meetings involving all stakeholders; and (4) continuous reflection involving principals, teachers, and students. Wheelen and Hunger (2008) refer to this process as *evaluation and control*, in which actual performance is periodically compared with expected performance, and non-conformities are followed up with corrective actions.

Supporting and Inhibiting Factors

The success of the implementation of deep learning is significantly influenced by supporting and inhibiting factors. The main supporting factors include: the commitment and leadership of the principal, the competence and readiness of teachers, the availability of facilities and technology, and the culture of collaboration and reflection. Hendri Budimana et al. (2026) emphasized that the success of the implementation of deep learning is strongly supported by the role of school principals in managing and directing the educational process systematically and sustainably. On the other hand, the inhibiting factors that need to be anticipated include the limited understanding of teachers' understanding of the pedagogical concept of deep learning, the low digital ability of teachers, the limitation of supporting infrastructure, and the lack of learning supervision. Firanda et al. (2026) added that the limitations of digital facilities and uneven access to technology, the heterogeneity of students' abilities, and the limited competency development training are obstacles to learning optimization.

Andi Nur Isnayanti et al. (2025) found that the implementation of deep learning faces the main obstacle in the form of lack of teacher readiness and limited educational

facilities and infrastructure, including adequate technology and facilities. This condition is increasingly crucial in 3T areas such as Rote Ndao Regency, where school principals are required to be creative and innovative in maximizing available resources.

CONCLUSION

The implementation of deep learning as a strategy to improve the quality of learning requires comprehensive and sustainable strategic management by school principals. Referring to the strategic management framework of Fred R. David and Wheelen and Hunger, principals need to carry out three main dimensions in a synergistic manner: strategy formulation (determination of vision-mission, SWOT analysis, preparation of programs in RKAS and KSP), implementation of strategies (instructional leadership, teacher capacity building, academic supervision, provision of facilities, and development of school culture), and evaluation of strategies (review, performance measurement, corrective actions, and continuous reflection).

The success of the implementation of deep learning, especially in 3T areas, is highly dependent on the ability of school principals to optimize supporting factors and mitigate inhibiting factors strategically. Based on the findings of previous research, several strategic recommendations can be put forward: (1) school principals need to explicitly pour out in-depth learning policies in KSP as an operational foundation; (2) strengthening teacher capacity through training, *coaching*, and professional learning communities needs to be programmed in an ongoing manner; (3) collaboration with the education office and external partners is important to overcome infrastructure limitations in the 3T area; and (4) a data-based evaluation system needs to be built in a structured manner to ensure accountable and sustainable implementation.

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