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Teachers' Perceptions of Deep Learning Pedagogy in Indonesian Primary Schools: Evidence from the Wahidin Sudiro Husodo Cluster

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Abstract

Deep learning pedagogy has recently been promoted as a strategic response to the evolving demands of Indonesian basic education under the Merdeka Curriculum, which emphasizes student-centered learning, meaningful projects, and the cultivation of 21st-century competencies. **Objective:** This study investigates primary school teachers' perceptions of deep learning pedagogy within the Wahidin Sudiro Husodo Cluster, Jumapolo Subdistrict, Karanganyar Regency. **Novelty:** Implications for developing a teacher training model and future research directions are discussed. **Methods:** Using a descriptive survey design, data were collected from 30 teachers across eight schools through a structured questionnaire (Likert scale) and complemented by short interviews and documentation review. The survey assessed three major dimensions: conceptual understanding of deep learning, classroom enactment, and school-level readiness for implementation. **Results:** Findings show that teachers' conceptual understanding reached a "good" level (M = 3.65 on a 1–4 scale), while classroom enactment was "fairly good" (M = 3.40) and readiness for implementation remained "moderate" (M = 3.25). Qualitative evidence indicates that teachers commonly interpret deep learning as meaningful learning and higher-order thinking, yet some still conflate it with general active learning. Teachers reported constraints related to time allocation, learning media availability, class size, and limited technical training, despite acknowledging the relevance of project-based and problem-based learning for deep learning pedagogy. **Conclusions:** The study concludes that deep learning pedagogy is viewed positively but requires systemic support through structured professional development, school leadership facilitation, and practical guidance for authentic assessment and reflective learning routines.

Keywords: Teachers, Deep Learning Pedagogy, Primary Education.

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INTRODUCTION

Indonesia's Merdeka Curriculum has been introduced to strengthen student agency, contextual learning, and character development aligned with the Pancasila Student Profile (Suryaman et al., 2023; Widyastuti et al., 2022). In primary education, the curriculum encourages teachers to design learning experiences that are relevant to students' lives, integrate projects, and foster critical thinking, creativity, collaboration, and communication. These aspirations reflect a global shift from content-heavy instruction toward competency-based learning that prepares students for complex societal and technological challenges (Fullan, 2013; OECD, 2019).

However, national and local evaluations of curriculum implementation commonly reveal a dual reality: while many schools report improvements in student engagement and flexibility in teaching practices, challenges remain significant—particularly teacher readiness, unequal infrastructure, administrative workload, and assessment capacity for non-cognitive outcomes (World Bank, 2020; OECD, 2021). In many primary schools, teachers still require practical support to translate policy and curriculum documents into high-quality classroom practices. Such implementation gaps are not unique to Indonesia; international literature consistently emphasizes that meaningful pedagogical transformation depends on teachers' understanding, beliefs, and sustained professional support (Darling-Hammond et al., 2017).

In this context, deep learning pedagogy has recently gained attention as a promising approach that aligns with the core spirit of the Merdeka Curriculum. Deep learning, as an educational approach, is distinguished from surface learning because it prioritizes conceptual understanding, coherence across ideas, and the ability to apply knowledge in new contexts rather than memorization (Biggs & Tang, 2011; Marton & Säljö, 1976). Students are encouraged to make meaning, engage in reflective thinking, and develop transferable competencies—qualities strongly associated with higher-order thinking and authentic learning (Hattie, 2012).

Within Indonesian discourse, deep learning pedagogy is frequently articulated through three foundational elements: Meaningful Learning, Mindful Learning, and Joyful Learning. Meaningful learning emphasizes connections between new concepts and prior knowledge as well as relevance to real-life contexts (Ausubel, 1968). Mindful learning highlights learners' awareness, attention, and reflective engagement in learning processes, often linked to metacognition and self-regulation (Langer, 2000; Zimmerman, 2002). Joyful learning stresses positive emotions and engaging learning experiences that support motivation and persistence, particularly critical in the primary school years (Fredricks et al., 2004). The integration of these three elements is expected to support holistic development—cognitive, socio-emotional, ethical, and physical—through learning designs that activate thinking, feeling, and doing in balanced ways.

Despite the conceptual appeal, deep learning pedagogy at the primary level faces practical barriers. Infrastructure limitations, digital resource gaps, and teachers' uneven experiences with training can hinder implementation (OECD, 2019; World Bank, 2020). Moreover, teachers may interpret deep learning as synonymous with active learning, project-based learning, or the use of technology, even though deep learning pedagogy is fundamentally about the depth and quality of students' meaning-making processes (Biggs & Tang, 2011). This conceptual ambiguity can weaken consistent enactment and assessment.

Therefore, understanding teachers' perceptions is crucial because perceptions shape teachers' willingness to innovate, their classroom decisions, and their engagement with professional learning (Pajares, 1992). This study focuses on the Wahidin Sudiro Husodo Cluster in Jumapolo, Karanganyar Regency, as a case that represents an active cluster with ongoing teacher collaboration through teacher working groups (KKG). The cluster context

offers an appropriate setting to explore how teachers interpret deep learning pedagogy, the perceived benefits for learning processes, the experienced constraints, and the readiness factors at both the teacher and school levels.

This study aims to analyse the implementation-related perceptions of deep learning pedagogy among primary school teachers and identify impacts, challenges, and opportunities emerging from its adoption. Specifically, the study seeks to: (1) explore teachers' understanding of deep learning pedagogy; (2) identify perceived potential impacts on teaching and learning processes; (3) identify challenges perceived by teachers; (4) assess teachers' readiness to adopt deep learning pedagogy; and (5) provide an empirical foundation for further research and training model development.

METHODS

This study employed a descriptive quantitative design using a survey approach, complemented by qualitative inputs from short interviews and document analysis. The descriptive design was intentionally selected to systematically capture and represent teachers' perceptions as they naturally occur, without manipulation or experimental intervention. Such an approach is particularly appropriate for perception studies, as it enables the identification of patterns, tendencies, and variations across respondents while maintaining ecological validity. The integration of qualitative data serves as a complementary strategy to enrich interpretation, allowing deeper insights into contextual meanings behind the quantitative findings.

The research was conducted in the Wahidin Sudiro Husodo Primary School Cluster, located in Jumapolo Subdistrict, Karanganyar Regency, Central Java, Indonesia. This cluster was purposively selected because it represents an active professional learning community (KKG) where teachers regularly engage in collaborative activities related to curriculum implementation. Data collection was carried out within the broader research timeline from February to December 2025, encompassing preparation, instrument development, data collection, analysis, and reporting stages. This extended timeframe ensured methodological rigor and adequate data triangulation.

The population consisted of all primary school teachers affiliated with the Wahidin Sudiro Husodo Cluster. A purposive sampling technique was employed to ensure the relevance and adequacy of respondents in relation to the research objectives. The inclusion criteria were: (1) active teachers in Grades 1–6; (2) prior participation in Merdeka Curriculum training or related professional development; and (3) willingness to participate voluntarily. Based on these criteria, a total of 30 teachers from eight primary schools were selected and completed the survey questionnaire. Additionally, a subset of participants was involved in short interviews to provide richer explanations and support the interpretation of survey findings. This sampling strategy ensured that participants possessed sufficient exposure and contextual understanding of deep learning pedagogy.

The primary data collection instrument was a structured questionnaire designed to measure teachers' perceptions of deep learning pedagogy across three key dimensions: (1) Conceptual Understanding (e.g., knowledge of meaningful, mindful, and joyful learning); (2) Classroom Enactment (e.g., implementation of PBL, PjBL, and discovery learning strategies aligned with deep learning principles); (3) Implementation Readiness (e.g., motivation, participation in training, technological readiness, and institutional support).

All items were rated using a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree), intentionally avoiding a neutral midpoint to encourage more decisive responses. In

addition, several open-ended questions were included to capture teachers' perspectives, suggestions, and contextual challenges, thereby strengthening the depth and explanatory power of the data.

Validity and Reliability. Content validity was established through expert judgment involving two scholars in primary education and curriculum studies, ensuring alignment between items and theoretical constructs. Instrument reliability was assessed using Cronbach's alpha coefficient, with a minimum acceptable threshold of $\alpha > 0.70$, indicating satisfactory internal consistency. The final reliability coefficients were calculated and reported in the results section.

Data were collected through multiple techniques to enhance data triangulation and credibility, including: (1) an online questionnaire administered via Google Forms; (2) short semi-structured interviews with selected teachers and school leaders to obtain in-depth perspectives; (3) documentation review, including training records, curriculum implementation reports, and cluster-level activity archives. The combination of these methods enabled the study to capture both measurable trends and contextual realities, thereby strengthening the overall robustness of the findings.

Quantitative data were analyzed using descriptive statistical techniques, including mean scores, percentages, and standard deviations, to identify trends in teachers' perceptions across the three measured dimensions. To facilitate interpretation, mean scores were categorized into qualitative levels (e.g., low, moderate, good).

Qualitative data from open-ended responses and interviews were analyzed using a thematic analysis approach, involving data reduction, coding, categorization, and narrative interpretation. This process aimed to identify recurring themes, explain quantitative patterns, and uncover contextual factors influencing teachers' perceptions. The integration of quantitative and qualitative findings provided a more comprehensive and nuanced understanding of deep learning pedagogy implementation.

RESULTS AND DISCUSSION

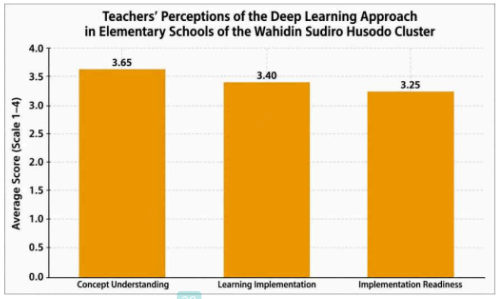
General Description of Research Location

This research was conducted at the Wahidin Sudiro Husodo Elementary School Cluster in Jumapolo District, Karanganyar Regency, which comprises several public and private elementary schools in the area. This cluster is one of the active clusters in implementing KKG (Teacher Working Group) activities and learning innovations. The majority of teachers in this cluster have academic qualifications of at least a Bachelor's degree in Elementary School Teacher Education (PGSD), with teaching experience ranging from 5 to more than 20 years. This condition makes the Wahidin Sudiro Husodo Cluster a good representative for assessing teacher perceptions and readiness in implementing deep learning approaches in elementary schools.

Respondent Characteristics

The number of respondents in this study was 30 teachers from eight elementary schools in the Wahidin Sudiro Husodo Cluster. Based on the characteristics of the respondents, the following description was obtained:

Table 1. Teacher Perceptions of the Deep Learning Approach



The following bar chart illustrates teachers' perceptions of the Deep Learning approach at Gugus Wahidin Sudiro Husodo Elementary School in Jumapolo District. It can be seen that conceptual understanding received the highest score (3.65), followed by learning application (3.40), and readiness for implementation (3.25). The results of the questionnaire analysis are shown in the following table 2:

Table 2. Questionnaire Analysis Results

Aspect of Perception	Average Score	Category
Understanding of Deep Learning Concepts	3.65	Good
Application in Learning	3.40	Fairly Good
Readiness for Implementation at School	3.25	Fair
Overall Average	**3.43**	**Fairly Good**

(Likert scale 1–4: 1 = Disagree, 2 = Somewhat Disagree, 3 = Agree, 4 = Strongly Agree)

Based on the table above, it can be concluded that teachers have a fairly good perception of the deep learning approach, although aspects of implementation and readiness still require improvement.

Qualitative Findings (Interviews and Observations)

Interviews with several teachers provided additional insights that enriched the quantitative findings. In general, some teachers understood deep learning as meaningful learning and higher-order thinking; however, not all were able to clearly distinguish it conceptually from active learning. Teachers also recognized the importance of fostering students' critical, collaborative, and reflective thinking skills, yet they encountered practical challenges related to lesson planning, time constraints, and the limited availability of instructional media. Furthermore, while some teachers had attempted to implement strategies such as Project-Based Learning (PjBL) and Problem-Based Learning (PBL) that align with deep learning principles, their application remained inconsistent across classrooms. In this context, support from school principals, along with collaboration among teachers through the

Teacher Working Group (KKG), was perceived as essential for strengthening both understanding and effective implementation of deep learning pedagogy.

Discussion

Teachers' Understanding of Deep Learning

The results of the study indicate that most teachers understand deep learning as learning oriented toward higher-order thinking skills (HOTS) and students' in-depth conceptual understanding. This finding is consistent with Ference Marton and Roger Säljö (1997), who argue that deep learning involves learners' active engagement in constructing meaning, integrating ideas, and relating new knowledge to prior understanding, rather than relying on rote memorization. Such an orientation reflects a shift from surface-level acquisition to cognitively demanding processes that support transfer and long-term retention.

The relatively strong conceptual understanding demonstrated by teachers suggests the presence of emerging professional awareness and epistemic alignment with contemporary pedagogical paradigms. In particular, this aligns with the principles embedded in Indonesia's Merdeka Curriculum, which emphasizes student agency, contextual learning, and competency development, as well as the Pancasila Student Profile, which promotes holistic competencies including critical thinking, collaboration, and ethical awareness. It also resonates with the broader orientation of the Impact Curriculum, which prioritizes meaningful learning experiences that generate real-world impact.

However, while this conceptual alignment is encouraging, it should be interpreted cautiously. Prior research consistently shows that conceptual understanding does not automatically translate into pedagogical enactment. Teachers may endorse deep learning principles at a theoretical level but encounter difficulties when operationalizing them into classroom practices, particularly in designing authentic tasks, facilitating inquiry-based learning, and conducting formative assessment of higher-order thinking. Therefore, the findings suggest that teachers in the Wahidin Sudiro Husodo Cluster are positioned at an important transitional stage—moving from awareness toward implementation—but still require sustained professional support to bridge the gap between understanding and practice.

In this sense, the study not only confirms alignment with established learning theory but also highlights a critical implication: strengthening deep learning pedagogy requires not merely conceptual clarity, but also structured professional development, collaborative learning communities, and practical pedagogical scaffolding that enable teachers to consistently enact deep learning in diverse classroom contexts.

Implementation of the Deep Learning Approach in Learning

In terms of implementation, teachers have demonstrated meaningful efforts to integrate deep learning principles through the use of innovative instructional models such as Problem-Based Learning (PBL), Project-Based Learning (PjBL), and Discovery Learning. These approaches are theoretically aligned with deep learning because they encourage inquiry, problem-solving, and the construction of knowledge through authentic tasks. However, the findings reveal that structural constraints—particularly limited instructional time, inadequate learning facilities, and large class sizes—continue to hinder the optimal and consistent enactment of these strategies. Such constraints indicate that the challenge of implementing deep learning is not merely pedagogical, but also systemic and contextual.

These results reinforce the perspective of Randy Garrison and Terry Anderson (2011), who emphasize that the success of deep learning depends on the presence of a collaborative, interactive, and reflective learning environment. Within this framework, meaningful learning emerges when cognitive presence, social presence, and teaching presence are effectively integrated. This implies that teachers are required to move beyond the traditional role of knowledge transmitters and instead function as facilitators who design learning experiences, scaffold student thinking, and foster dialogue and reflection.

Nevertheless, the current findings suggest a partial enactment of this ideal. While teachers have begun adopting appropriate instructional models, the supporting conditions necessary for sustaining deep learning—such as manageable class sizes, adequate resources, and sufficient time for inquiry-based processes—are not yet fully in place. Consequently, there is a risk that these models are implemented at a procedural level without fully achieving the intended depth of learning.

Therefore, strengthening the implementation of deep learning pedagogy requires not only teacher initiative but also institutional and systemic support, including improved resource allocation, flexible time structures, and continuous professional development. Without addressing these enabling conditions, the potential of PBL, PjBL, and Discovery Learning to foster genuine deep learning may remain underutilized.

Readiness for Implementation in Schools

Teachers' readiness for implementing deep learning remains in the "adequate" category, suggesting that while foundational awareness and willingness are present, the capacity for consistent and high-quality enactment is not yet fully developed. This condition highlights the need for systematic strengthening of teacher competencies through sustained professional development programs, including targeted training, structured mentoring, and active engagement in professional learning communities. Such efforts are essential to move teachers beyond initial understanding toward confident and effective classroom implementation.

The findings also reveal a dynamic interplay between enabling and constraining factors. On the one hand, teachers' intrinsic motivation to innovate emerges as a critical driving force, indicating a positive disposition toward pedagogical change. On the other hand, several structural barriers continue to limit progress, including insufficient technical training, increasing administrative workload, and limited access to digital learning facilities. These challenges suggest that readiness is not solely an individual attribute but is deeply shaped by the broader institutional and policy environment in which teachers operate.

These results are consistent with the study by Muhtar and Dallyono (2021), which emphasizes that the success of deep learning transformation depends heavily on institutional support, enabling school policies, and capacity-building systems. In this regard, improving teacher readiness requires a more integrated approach that combines individual professional development with organizational support mechanisms, such as leadership facilitation, reduced administrative burden, and equitable access to technological resources. Without such systemic alignment, efforts to implement deep learning pedagogy risk remaining fragmented and only moderately effective.

Implications of Research Findings

The findings of this study suggest that the effective implementation of a deep learning approach in elementary schools requires a comprehensive and systemic strategy that integrates

teacher capacity, pedagogical design, collaboration, and institutional support. First, strengthening teacher capacity must be prioritized through structured, continuous, and practice-oriented professional development, enabling teachers to move beyond conceptual understanding toward consistent pedagogical enactment. Such training should not be episodic, but sustained and aligned with classroom realities, allowing teachers to internalize deep learning principles and apply them effectively.

Second, deep learning needs to be intentionally embedded in instructional planning, particularly through the integration of project-based, differentiated, and reflective learning approaches. These models provide a pedagogical foundation for fostering higher-order thinking, student agency, and meaningful engagement, which are central to deep learning. However, their effectiveness depends on careful alignment between learning objectives, activities, and assessment practices.

Third, collaboration among teachers emerges as a critical factor, particularly in designing authentic and cognitively demanding assessments that encourage students to think critically and reflectively. Professional collaboration—such as through teacher working groups—enables the sharing of best practices, co-construction of learning designs, and collective problem-solving, thereby strengthening the overall quality of implementation.

Finally, the role of institutional support is significant. Supportive school policies and proactive leadership from principals are essential in creating an enabling environment, particularly in terms of allocating sufficient instructional time, reducing administrative constraints, and providing access to relevant learning resources and technologies. Without such systemic support, the implementation of deep learning risks remaining partial and unsustainable. these findings underscore that deep learning pedagogy is not merely a classroom-level innovation, but a whole-school transformation that requires alignment between teachers' competencies, instructional practices, collaborative culture, and institutional structures.

Overall, the research results indicate that teacher perceptions of the deep learning approach in the Wahidin Sudiro Husodo Cluster in Jumapolo District are quite good. Teachers have an adequate understanding of the concepts and principles of deep learning, but still need improvement in practical implementation and school readiness. With the support of training and collaboration among teachers, the deep learning approach can be an effective strategy for realizing meaningful learning that fosters critical, creative, and reflective thinking skills in elementary school students.

CONCLUSION

This study found that teachers in the Wahidin Sudiro Husodo Cluster generally hold positive perceptions of deep learning pedagogy, reflected in a strong level of conceptual understanding, fairly good classroom enactment, and a moderate level of implementation readiness. Teachers widely acknowledge that deep learning supports meaningful learning, fosters critical thinking, and contributes to the development of competencies aligned with the Merdeka Curriculum. However, the transition from understanding to consistent practice remains constrained by several structural challenges, particularly limited access to sustained professional training, high administrative workload, restricted instructional time, and inadequate learning resources. These barriers indicate that while the pedagogical orientation is promising, its implementation is not yet fully institutionalized.

Taken together, the findings highlight the need for a more integrated and systemic approach to ensure sustainable adoption. Strengthening school-based support systems is

essential, including the development of a structured and continuous teacher training model that is closely aligned with classroom realities. In this context, cluster-level collaboration through the Kelompok Kerja Guru (KKG) should be reinforced as a professional learning community where teachers can share best practices, co-design lesson plans, and collaboratively develop authentic assessment strategies. Additionally, school leaders play a critical role in enabling implementation by allocating sufficient time, reducing non-instructional burdens, and ensuring access to relevant learning resources and technologies.

Accordingly, this study recommends the provision of cluster-based professional development programs that emphasize practical lesson exemplars and authentic assessment aligned with deep learning principles. It also underscores the importance of strengthening KKG as a collaborative platform and encouraging principals to actively support reflective teaching and collegial planning. For future research, more robust designs—such as mixed-methods or intervention-based studies—are needed to examine the impact of deep learning pedagogy not only on instructional practices but also on student learning outcomes and character development, thereby providing stronger empirical evidence for large-scale implementation.

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