

Readiness of elementary school teachers in developing lesson plans with deep learning

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Article Info

Article history:

Received : October 25th, 2025

Revised : November 24nd, 2025

Accepted : November 26th, 2025

Keywords:

Readiness; elementary school teachers; lesson plan; deep learning

ABSTRACT

This study aims to analyze the readiness of elementary school teachers in developing deep learning-based lesson plan, especially related to concept understanding, planning learning steps, and designing authentic assessments. The research used a descriptive-qualitative method supported by quantitative data through a four-scale questionnaire. The research subjects consisted of 109 elementary school teachers in East Java and Central Java who were selected purposively. Data was collected through questionnaires and interviews, then analyzed using content analysis techniques. The results of the study showed that the level of teacher readiness was in the good category, with a score of 3.90 in East Java and 3.73 in Central Java. However, most teachers are not able to identify the operational indicators of deep learning, so the lesson plan that is prepared does not fully reflect the principles of concept deepening and knowledge transfer. The main obstacle lies in the preparation of in-depth assessments, where 83% of teachers admit that they have not been able to design assessments that measure students' conceptual understanding. The technical readiness of teachers is influenced by the availability of training, examples of teaching modules, planning time, and school support. The study concluded that teachers' conceptual readiness is quite strong, but requires strengthening technical skills. Training on the design of authentic deep learning teaching modules and assessments is indispensable to improve the quality of lesson plan.



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INTRODUCTION

The transformation of basic education in Indonesia today focuses on improving the quality of learning, with an emphasis on developing high-level thinking skills, deep mastery of concepts, and the ability to relate knowledge in different contexts. One of the approaches that is anticipated to become the pedagogical foundation in the future is deep learning. This approach not only changes the learning pattern from teacher-centered to student-centered, but also requires a thorough reconstruction of learning design that includes planning, teaching strategies, and understanding-based assessments (Irawan & Astuti, 2023; Khakleri & Abdussyukur, 2024). The implementation of deep learning at the elementary school level is a very important strategy, considering that the stage of children's development at that time is a critical period in the formation of concepts, thinking structures, and learning habits that will be the foundation for long-term cognitive development (Hamsah, 2023; Khakleri & Abdussyukur, 2024). Education at this level aims not only to convey information but also to encourage students in understanding and applying their knowledge in a variety of situations. This is in line with the principles of the Merdeka curriculum that support the integration of knowledge and learning experiences to deepen students' understanding (Hapidin et al., 2024; Astuti et al., 2023).

However, the application of deep learning in classroom practice cannot be separated from the quality of the lesson plan made by teachers. The lesson plan in the Independent Curriculum plays an important role not only as an administrative document, but as a "conceptual map" that directs the deepening of concepts and cognitive elaboration strategies. Good assessment is also an integral part, where measurements are made not only on the mastery of facts but also on the depth of students' understanding (Irawan & Astuti, 2023; Maladerita et al., 2021). Effective learning design requires teachers to have a deep understanding of pedagogical theory as well as the ability to formulate authentic

and representative assessments of student competency achievement in the context of deep learning (Warmansyah et al., 2022; Tandiarrang et al., 2023).

Teachers' readiness in developing deep learning-based lesson plan is a very important aspect and is one of the main indicators of the success of pedagogical transformation. Research shows that although many teachers have a positive perception of deep learning, there is a real gap in their technical ability to design learning that conforms to deep learning principles (Suwandayani et al., 2021; Tandiarrang et al., 2023). This leads to conceptual errors where teachers often identify deep learning with other approaches, such as project-based learning, without realizing the essence of conceptual connectivity and the integration of learning experiences that are at the core of deep learning itself (Ghimire, 2022). The obstacles faced in the implementation of deep learning include the lack of teaching modules specifically designed to support this method, the high administrative burden, and the lack of collaboration between teachers. The lack of time and structural support from schools causes serious challenges for teachers in designing quality learning (Putri & Nurhidayati, 2023; Widiatsih et al., 2020). This shows that teacher readiness is not only an individual issue but is a reflection of the readiness of the entire education ecosystem in responding to the needs of the new curriculum (Affandi et al., 2023; Tandiarrang et al., 2023).

The novelty of this research lies in the in-depth analytical focus on teachers' readiness in compiling deep learning-based lesson plans, delving further than just teachers' perception or literacy of this method. This focus is very important considering that learning design is the starting point that determines the quality of the learning process and outcomes. Without planning based on concept depth, deep learning implementations may fail and become just a variation of methods without substance (Diana et al., 2023; Dahal, 2023). Thus, this study aims to analyze the level of readiness of elementary school teachers in compiling deep learning-based lesson plans, as well as identify weaknesses in technical and conceptual aspects, uncover structural and pedagogical barriers, and formulate the professional development needs to improve the quality of learning design (Tandiarrang et al., 2023; Kaloka et al., 2023). It is hoped that the results of this research will make a meaningful contribution to education policy, training design, and more integrated pedagogical interventions in supporting the implementation of deep learning in elementary schools.

METHOD

This study uses a case study research type to analyze in depth the readiness of elementary school teachers in developing deep learning-based lesson plan. The case study was chosen because it allows researchers to intensively examine the phenomenon of lesson plan readiness in different real-world contexts, namely in two regions East Java and Central Java. This approach provides space to understand the conditions, dynamics, and factors that affect teachers' ability to comprehend teaching tools more comprehensively. The research subjects consisted of 109 elementary school teachers who were determined purposively based on their involvement in the preparation of the Independent Curriculum teaching tools and their experience participating in socialization or training related to deep learning.

The research data were collected through two main techniques: a four-scale questionnaire and a semi-structured interview. The questionnaire was used to measure the level of teacher readiness in the dimensions of concept understanding, planning learning steps, and the ability to design authentic assessments. Meanwhile, interviews were used to delve deeper into technical constraints, professional needs, and teachers' interpretations of deep lesson plan practices. Data was analyzed using content analysis, including the process of unitizing, coding, reducing, inferring, and narrating, while questionnaire data was analyzed descriptively through the calculation of average scores. The validity of the data is ensured through triangulation of methods by comparing the results of questionnaires and interviews to ensure the consistency of findings and strengthen the validity of interpretations regarding teachers' readiness to prepare deep learning-based lesson plans.

RESULTS AND DISCUSSION

The findings of the study show that the readiness of elementary school teachers in developing deep learning-based learning lesson plan is in the good category, but has not reached the level of conceptual and technical maturity needed to implement deep learning in its entirety. Although teachers have a very positive perception of the importance of deep learning, the significant gaps between perception, literacy, and technical readiness confirm that teacher readiness is not a linear function of

positive attitudes, but is a complex construct influenced by the interaction between pedagogical competence, assessment knowledge, and school structural factors.

Table 1. Research Data Recapitulation

Measured Aspects	Key Findings	Data Indicators
Teacher Readiness Score (Region)	Teacher readiness is in the good category, but has not yet reached conceptual and technical maturity.	- East Java: 3.90 - Central Java: 3.73
Conceptual Understanding of Deep Learning	Misconceptions are still high. Teachers often confuse deep learning with PjBL and HOTS.	78% of teachers experience misconceptions of concepts.
The Ability to Formulate Deep Learning Steps	Many teachers only focus on physical/collaborative activities; not yet on knowledge construction, concept analysis, and metacognitive reflection.	Low technical readiness (qualitative data from interview results).
Ability to Design Authentic Assessments	It is the biggest drawback. Teachers have difficulty making assessments that measure the depth of concepts.	83% of teachers are not yet able to design authentic assessments.
Differences in Regional Readiness	East Java teachers are better prepared because of better access to learning communities and school support.	- East Java: higher readiness level -Central Java: being at "entry-level readiness"
Inhibiting Factors	Barriers come from teachers and the school ecosystem.	- Minimal training - No sample modules available - High administrative burden - Limited planning time
Supporting Factors	Structural support increases teacher readiness.	- Active learning community - Teaching modules available - Principal support

Conceptually, the data revealed that the prevalence of deep learning misconceptions where 78% of teachers still mix deep learning, project-based learning, and HOTS shows that teachers do not have adequate mental representation to distinguish the unique characteristics of deep learning, such as elaborative processing, conceptual interconnection, and transfer of knowledge to new situations. This condition shows that teachers are still at the surface-level pedagogical understanding, so the learning design they have prepared has not been able to accommodate the deepening of concepts that are at the core of the deep learning approach. These findings are in line with international studies that state that teacher misconceptions are one of the main barriers to the adoption of new pedagogies (Backlund & Hugo, 2018; Rashid & Jaidin, 2014), as well as justifying the argument that pedagogical literacy is the strongest predictor of the quality of learning design.

In the technical aspect, the limitations of teachers in compiling learning flows that systematically develop students' deep understanding shows that the capacity to design the learning trajectory has not been fully formed. Many teachers still focus learning activities on physical or collaborative activities, not on the process of knowledge construction, concept analysis, or metacognitive reflection which are essential indicators of deep learning. This inability not only reflects a weak understanding of concepts, but also shows the absence of technical competence to integrate pedagogical strategies in the structure of teaching modules, especially in the formulation of learning objectives, core activities, and differentiation of learning experiences.

The most critical aspect is found in the ability to design assessments. With 83% of teachers stating that they do not understand how to prepare an authentic assessment that measures the depth of student understanding, it can be seen that assessment capacity is the main bottleneck in teachers' readiness to prepare deep learning-based lesson plans. Assessment is a fundamental component of learning design, as demonstrated by the principle of Backward Design, which makes assessment the foundation of lesson plan. When teachers are unable to design deep understanding-based assessments such as analytical rubrics, investigative projects, conceptual reflections, or performative portfolios. Thus, the learning design will return to the content mastery paradigm, not deep understanding. This

confirms that the quality of assessment determines the quality of the lesson plan, and that without assessment literacy reform, the implementation of deep learning in the classroom will not move beyond the superficial level.

In addition to conceptual and technical factors, teacher readiness is also strengthened or weakened by structural factors at the school level. Obstacles such as large student ratios, time constraints, lack of deep learning teaching tools, and administrative burdens show that teacher readiness is not just a matter of individual capacity, but is greatly influenced by institutional readiness. Teachers in East Java show higher readiness because they have access to learning communities, examples of teaching modules, and school support, while teachers in Central Java are at the stage of "entry level readiness" which requires conceptual reinforcement before they can master technical skills. Thus, teacher readiness must be understood as a systemic phenomenon, not just a personal attribute.

These findings also underscore the gap between design intention and design capability. Teachers understand the value of deep learning, but have not been able to construct a lesson plan that consistently encourages deepening of concepts. The unity between perception (willingness), literacy (knowledge base), and technical readiness (design competency) has not been formed synergistically. This explains why perception scores are so high, but the quality of learning design does not reflect the in-depth approach it should be. This phenomenon is in line with previous research that emphasizes that curriculum innovation needs to be supported by pedagogical competencies and support systems to be implemented in accordance with the complexity of learning demands (Santoso, 2024; Ridwan et al., 2022).

Overall, this discussion shows that the readiness of elementary teachers in preparing deep learning-based lesson plans still requires systematic and structured intervention. Readiness will not increase automatically through concept socialization training, but requires deep professional learning that focuses on reconstructing teachers' pedagogical literacy, developing technical capabilities in learning design and assessment, and strengthening a school ecosystem conducive to innovative practices.

CONCLUSION

This study concludes that the readiness of elementary school teachers in developing deep learning-based lesson plan is at a promising level but has not reached adequate conceptual and operational maturity. Although teachers show a very positive perception of the urgency and benefits of deep learning, their readiness is still limited by weak pedagogical literacy and technical skills in designing authentic learning objectives, flow of activities, and assessments that are aligned with deep learning principles. The difference in readiness scores between East Java (3.90) and Central Java (3.73) reflects the variation in access to training, learning communities, and school structural support that play a significant role in shaping teacher capacity in learning design. Conceptual difficulties shown by 78% of teachers who are not able to distinguish deep learning from PjBL or HOTS as well as the inability to design authentic assessments (83% of teachers) are critical factors that hinder the realization of lesson plans that really encourage the deepening of concepts and knowledge transfer. Thus, teachers' readiness in compiling deep learning lesson plans does not only depend on positive willpower and perception, but is a systemic construct determined by knowledge, skills, and support of the school ecosystem.

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