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Literature Review

Literature Study: Teachers' Perceptions of Policy Analysis of Deep Learning Strategies in Improving Learners' Critical Thinking

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Abstract
The rapid development of information and communication technology has driven a transformation in the educational paradigm, one of which is through the implementation of deep learning-based learning strategies. Deep learning not only increases the effectiveness of the learning process, but also has great potential in developing students' critical thinking skills, which are key competencies in facing the challenges of the 21st century. However, the successful implementation of this strategy is greatly influenced by teachers' perceptions and attitudes towards the innovation. This literature study aims to examine in depth teachers' perceptions of deep learning policy and strategy implementation, the factors that influence these perceptions, and the implications for developing learners' critical thinking skills. The analysis shows that teachers' positive perceptions, supported by adequate training, adequate facilities, and systematic support, can improve the readiness and effectiveness of implementing deep learning strategies in learning. In contrast, negative perceptions and resistance to change are the main obstacles that need to be overcome through comprehensive interventions. The results of this study emphasize the importance of paying attention to perceptual aspects and supporting factors in order to increase the success of technology-based pedagogical innovations

Keywords
teacher perception; policy analysis; learning strategy; deep learning

Introduction
In the context of modern education, the main challenge faced is how to prepare learners to be able to compete and adapt to rapid global developments. Critical thinking skills are one of the main competencies that must be developed in the learning process, given their role in helping learners analyze, evaluate, and make decisions independently. Along with technological advancements, deep learning-based pedagogical approaches are starting to be looked at as an effective strategy in developing these abilities.

Quality education is an important foundation in the digital age. Technological developments and the need for critical thinking competencies demand a deeper learning approach. The concept of *deep learning* in education, which emphasizes conceptual understanding, exploration, and problem-solving, has emerged as a solution to improve the quality of education. However, its implementation in Indonesia still faces challenges such as educators' readiness and limited infrastructure. Therefore, it is important to explore how *deep learning* strategies can be effectively integrated into the education system (Kadarismanto, 2025).

Deep learning in the context of education does not simply refer to artificial intelligence, but also to a learning approach that encourages deep understanding, critical thinking, and better problem-solving skills compared to conventional learning methods (Sariman, 2023). This concept emphasizes learning based on deep understanding, more complex analysis, and reflective ability in absorbing and applying knowledge. In the era of digital disruption and the Industrial Revolution 4.0, this approach is crucial to prepare a generation that is able to think analytically, adaptively, and innovatively (Sariman, Huda, & Afif, 2021).

Research in education shows that deep learning-based learning methods can improve long-term memory, conceptual understanding, and higher-order thinking skills. In contrast to surface learning, which only focuses on memorization and repetition, deep learning allows students to explore concepts more comprehensively, build connections between concepts, and apply them in various situations. This learning model is in line with constructivist theory, which emphasizes that effective learning occurs when individuals actively build their own understanding through experience and interaction with the environment. Therefore, the implementation of deep learning in the education system is not only an academic trend but also a fundamental need in creating an adaptive and innovative learning environment (Kadarismanto, 2025).

The success of implementing a *deep learning* strategy depends on how teachers perceive and respond to the innovation. As the main actors in the learning process, teachers' views and attitudes will determine the extent to which this method can be adopted optimally. A positive attitude towards *deep learning* generally encourages more optimal implementation, while a negative attitude or resistance to change can actually be a significant obstacle. In addition to individual perceptions, successful implementation is also influenced by other supporting factors, such as the availability of professional training, adequate technological facilities, and support from educational institutions. Therefore, an in-depth literature review is needed to reveal how teachers' perceptions are formed, what are the factors influence them, and to what extent they contribute to the development of students' critical thinking skills through *deep learning* approaches.

This study aims to provide a comprehensive overview of various research and theories related to teachers' perceptions of deep learning strategy policies and practices, as well as their implications for improving learners' competencies. Thus, it is hoped that the results of this study can be the basis for designing policies and training programs that are more effective in integrating technology and pedagogic innovation in the process of teaching and learning activities.

Policy analysis is social research that is carried out systematically and compiled in order to find out the substance of a policy that can be clearly known. Policy, according to the term, can be translated as political programs, regulatory decisions, conferences, provisions, strategic plans, and other understandings. The thought of educational policy analysis is a concept of procedure in producing data information in education as a direction as an alternative tool for policy formulation in making diplomatic decisions in overcoming educational problems. Thus, education analysis is an applied social science conceptualized in the design of a substantial framework of education policy that aims to explain the problems that will be answered by policies and problems that will arise due to the implementation of policies that have been made (Wardani, 2022).

In Indonesia, the Deep Learning Curriculum Policy was introduced by the Minister of Primary and Secondary Education (Mendikdasmen), Abdul Mu'ti, who emphasized that deep learning, as part of educational development, plays a crucial role in creating meaningful learning experiences. He stated that "the first gateway to deep learning is attention, which involves the five human senses and encourages curiosity based on learners' abilities, experiences, and prior knowledge" (Mu'ti, 2025).

Mendikdasmen Mu'ti also emphasized that every individual has a different way of learning. Therefore, there are three main principles in the application of *Deep Learning* that educators need to apply.

1. *Mindful:* The learning process should be done with full awareness. In the classroom, a teacher needs to respect each student and provide space for them to find effective ways of learning.
2. *Meaningful:* Learning should provide deep meaning and benefit to students. The material taught should be applicable to real life and provide development for each individual.
3. *Joyful:* Joyful learning makes students feel valued for the discoveries and understanding they achieve. This creates a sense of pride and enthusiasm to keep learning.

However, the successful implementation of this strategy is highly dependent on the readiness and perception of teachers as the main implementers in the field. According to Fullan (2010), teachers' attitudes and perceptions towards pedagogical innovation are the main factors that influence the level of adoption and successful implementation of changes in the learning process. Teachers who have positive perceptions tend to be more open, innovative, and able to utilize technology optimally, while teachers who have negative perceptions tend to reject or be reluctant to adapt to these changes. Therefore, understanding teachers' perceptions towards deep learning strategies is crucial in ensuring the success of technology-based education transformation.

In the context of education in Indonesia, the implementation of the Deep Learning Curriculum may provide an opportunity to improve the quality of education at the secondary level. However, achieving this goal requires a deep understanding of how teachers perceive and respond to this curriculum change. This research is expected to contribute to the development of better education policies and is expected to provide insights for policymakers, educational institutions, and educators in designing more effective curriculum implementation strategies. By understanding teachers' perceptions, it is expected that policies taken can be more relevant and in accordance with the needs in the field (Juarminson, 2024).

On the other hand, according to Hendrianty (2024), 21st-century education demands that teachers not only deliver material but also shape students' deep and reflective ways of thinking. Elementary school teachers have a strategic role in shaping students' mindsets from an early age. For this reason, teachers need to have a deep learning mindset - an attitude that is open, reflective, and ready to face complex learning challenges. This mindset can be built through pedagogical approaches such as constructive disorientation, critical reflection, and aesthetic experience. Unfortunately, many teachers have neither the understanding nor the systematic training to build this mindset.

Most teachers demonstrated a good understanding of the concept of the Deep Learning Curriculum. They recognize the importance of this approach in improving student understanding and encouraging critical thinking skills. However, some teachers were less familiar with the specific implementation of the curriculum. Teachers generally have a positive view of the implementation of the Deep Learning Curriculum. They believe that this curriculum can increase students' engagement in the learning process and help them understand the material more deeply. Some teachers mentioned that students show greater interest when learning with this approach.

Teachers' positive views of the Deep Learning Curriculum reflect the belief that this approach can increase student engagement and motivation. Research by Johnson (2021) shows that a curriculum that focuses on deep understanding can improve student learning outcomes. This is evident from the experiences of some teachers who reported increased student participation in class discussions.

However, it is important to remember that this positive outlook must be balanced with teachers' readiness to face the challenges.

Some previous studies also show that teachers' perceptions of deep learning strategies are still diverse. Research by Susanti et al. (2020) stated that most teachers in junior high schools do not fully understand the concept of deep learning, and often equate it with rote-based learning. This ignorance stems from the lack of training based on modern pedagogical approaches in teacher training.

Meanwhile, Firmansyah (2021) found that teachers who have experience participating in professional development programs such as the Mobilizing Teacher Program or Merdeka Curriculum training tend to show a more positive and enthusiastic attitude in implementing deep learning. They understand that learning is not only oriented towards basic cognitive achievements, but also the process of internalizing concepts by students.

Furthermore, according to Hattie (2009), the success of the teaching and learning process is strongly influenced by the quality of the relationship between teachers and learners, as well as teachers' perceptions of the effectiveness of the methods used. In the context of deep learning, teachers' positive perception will encourage them to be more creative and innovative in designing deep learning experiences. This is important because this strategy requires a paradigm shift from traditional to more active and technology-based learning, which, of course, requires an open attitude and mental readiness from educators.

On the other hand, the challenges faced in implementing deep learning strategies are not only related to perceptual aspects, but also related to contextual factors such as inadequate technological infrastructure in some areas, as well as the readiness of learners in dealing with these changes. According to Zhao (2012), the success of pedagogical innovation is greatly influenced by the social and cultural environment in which the learning process takes place. Therefore, the success of this strategy depends not only on teachers' perceptions and readiness, but also on systemic support from the entire education ecosystem.

In today's digital era, rapid technological changes require the education system to be adaptable and innovative. According to Mishra and Koehler (2020), in their study on technology and pedagogy, technology integration must be based on strong pedagogical principles in order to positively impact the learning process. They emphasize that the use of technology is not enough as a support tool, but must be combined with teaching strategies that encourage deep understanding, such as deep learning. This approach enables learners to develop higher-order thinking skills relevant to 21st-century needs.

In addition to perception and competence, experts from the field of digital education, such as Selwyn (2021), highlight the importance of paying attention to the social and cultural context in which learning takes place. He argues that the successful implementation of deep learning depends not only on the readiness of individual teachers but also on technological infrastructure, educational policies, and the involvement of the entire school community. Therefore, a holistic approach that takes into account these factors is key to ensuring the success and sustainability of technology-based pedagogical innovations.

In the context of education, recent experts assert that deep learning is not only a pedagogical strategy, but also an approach capable of developing learners' high competencies to face the challenges of the 21st century. According to Schunk (2022), in his research on deep learning, deep learning encourages learners to develop analysis, synthesis and evaluation skills through active and meaningful learning experiences. He emphasized that this approach demands the active role of learners and the involvement of teachers in facilitating the process effectively.

In addition, digital education experts such as Zhao (2023) argue that deep learning in the digital era should be integrated with advanced technologies such as artificial intelligence and machine learning to create personalized and adaptive learning experiences. According to him, these technologies enable the customization of materials and difficulty levels according to the needs of each learner, thus supporting the development of competencies thoroughly and deeply. Zhao added that the use of these technologies should be in line with pedagogy that focuses on conceptual understanding and the development of higher-order thinking skills.

Furthermore, according to a report from UNESCO (2023), the implementation of deep learning in various countries shows that its success is strongly influenced by the readiness of technological infrastructure and the competence of teachers in utilizing the technology optimally. UNESCO emphasizes that this strategy must be supported by adequate policies and continuous professional training programs in order to overcome various challenges in the field and ensure that all learners can access meaningful and deep learning experiences.

Method

This research adopted a qualitative literature-based approach as its primary methodological framework. A literature study involves a structured and critical examination of existing academic works to gather, assess, and integrate knowledge in order to build a thorough understanding of a specific research issue. This approach is particularly suitable when the research aims to explore concepts, theoretical perspectives, empirical evidence, and policy-related discussions without relying on direct fieldwork or experimental procedures (Creswell, 2014; Snyder, 2019).

The data sources for this study included peer-reviewed journal articles, scholarly books, official government policy documents, and reports published by reputable international organizations addressing teachers' perceptions, deep learning strategies, education policy analysis, and the enhancement of learners' critical thinking skills. Both national and international publications were reviewed to ensure comprehensive coverage and diverse viewpoints. Only sources that were relevant to the research objectives, academically credible, and thematically aligned were selected for analysis.

Data analysis was carried out through a qualitative thematic analysis process. This process consisted of several key stages: (1) systematically organizing and classifying the selected literature, (2) identifying recurring patterns, themes, and central concepts related to teachers' perceptions, implementation challenges, enabling factors, and policy implications of deep learning, and (3) examining the relationships among these themes to generate meaningful interpretations. Qualitative literature analysis is effective in revealing patterns, meanings, and trends across studies, making it especially appropriate for investigating perception-driven and policy-focused issues in education (Xiao & Watson, 2019).

This methodological framework enables a comprehensive and in-depth exploration of teachers' views on deep learning strategies and how these perceptions shape the effectiveness of education policy implementation aimed at fostering learners' critical thinking skills. Through the synthesis of findings from diverse scholarly sources, this study offers evidence-based insights that may support policymakers, educational institutions, and practitioners in developing more effective and contextually responsive deep learning strategies.

Results

This research analyzes the teachers' perception of deep learning strategy policy analysis in improving participants' critical thinking from various relevant literature. Some of the findings of this study are as follows:

The research results by Kadarismanto (2025) show that the positive impact of deep learning in the form of conceptual understanding, namely, deep learning, is able to increase students' understanding of learning concepts in more depth and improve students' ability to think critically and generate creative ideas. However, there are challenges in the form of many teachers and lecturers who are not ready or accustomed to deep learning-based learning methods, and limited infrastructure. Supporting facilities, such as uneven access to technology and internet networks, are the main obstacles in the implementation of this approach as a whole.

Research results by Sari (2025) show that deep learning in the context of education does not only refer to artificial intelligence technology, but also to pedagogical approaches that encourage meaningful, reflective, and student-centered learning. There are three main dimensions in this approach:

- Meaningful Learning - students connect new knowledge to previous experience and knowledge.
- Mindful Learning - students learn mindfully, pay attention to the learning process, and develop metacognitive awareness.
- Joyful Learning - students learn with enthusiasm and positive emotional engagement.

The results of the study by Juarminson (2024) stated that most teachers understand the concept of deep learning curriculum well, especially regarding its benefits in improving student understanding and critical thinking, the majority of teachers have a positive perception of this curriculum, and students are more active and interested in the learning process. The challenges of implementation are the lack of in-depth training, limited resources (technology, learning media), so he recommends intensive and practical training for teachers, facilitating collaboration between teachers, and providing tools and policies that support the implementation of the curriculum.

The results of research by Suwandia (2024) state that the advantages of the deep learning model are improving critical thinking skills, learning motivation, and student engagement, enabling contextual, reflective, and fun learning. Implementation challenges are limited infrastructure (access to technology and the internet), unprepared teachers, and a lack of training; the curriculum is still too rigid and emphasizes memorization. Recommended strategies and recommendations are Continuous improvement of teacher training, Development of education technology in remote areas, Support for a more flexible curriculum, and collaboration with communities and parents to strengthen the learning ecosystem.

The results of research by Hendrianty (2024) state that the application of the concept of deep learning in basic education, especially at the elementary school level, is a transformative approach and is relevant to the challenges of 21st century education. Deep learning does not only emphasize the mastery of information, but rather on deep meaning, critical reflection, collaboration, and perspective change. Important elements in the development of a deep learning mindset include constructive disorientation, critical reflection, social learning, and aesthetic experience. Strategies such as problem-based projects, collaborative learning, and structured reflection have proven to be effective in facilitating the deep learning process. The role of the teacher is crucial in creating a learning environment conducive to deep learning. Teachers are not only tasked with delivering the material, but also as facilitators who are able to build self-awareness, encourage critical reflection, create constructive disorientation in a positive way, and build collaborative learning communities. In addition, support for the development of students' creativity, critical thinking skills, and reflective awareness can be strengthened through the integration of art and mindfulness in the learning process. This allows students to develop a more holistic understanding and form more complex and adaptive thinking. Consistent implementation of this approach, supported by progressive education policies, will have a significant impact on improving the quality of education in Indonesia.

Research results by Wathon (2024) state that elementary school teachers have a strategic role in shaping students' mindset from an early age. For this reason, teachers need to have a deep learning mindset, namely an open, reflective attitude, and be ready to face complex learning challenges. This is related to the implementation of the Merdeka Curriculum and the Deep learning Curriculum, which show several important findings that can provide an in-depth understanding of the impact of these two curricula in the field. First, the implementation of Merdeka Curriculum in the schools studied shows a positive impact on student creativity. The Deep learning curriculum still successfully contributes positively to the development of students' digital skills, which are proven to increase in the use of digital devices and learning support applications. This shows that despite the barriers, technology still has a significant impact on students' digital skills. The integration between Merdeka Curriculum and the Deep learning Curriculum also shows positive results. Evaluation and assessment in these two curricula need to be adapted to the characteristics of more innovative learning, so that teachers can develop more relevant evaluation instruments. The social and psychological impacts of these two curricula also show positive results.

Turmuzi (2025) reveals that the integration of deep learning in education is able to provide a more in-depth learning experience through the use of adaptive systems, virtual mentoring, gamification approaches, and the use of immersive technologies such as VR and AR. This innovation encourages increased personalization, learner engagement, and learning effectiveness. However, its implementation is still faced with a number of obstacles, such as limited infrastructure, low levels of digital literacy among educators, and the absence of adequate regulations regarding the ethical use of AI. Therefore, optimizing deep learning requires strategic efforts that include digital infrastructure development, teacher capacity building, relevant policy development, partnerships with the technology sector, and continuous implementation evaluation. If implemented properly, this approach has the potential to change the face of education to be more responsive, inclusive, and data-driven.

The results of research by Wardani (2022) state that education policy analysis is a strategic instrument in formulating effective, responsive, and equitable policies. Through a systematic process that includes problem identification, data collection, alternative formulation, and implementation evaluation, policy analysis enables the formulation of more targeted solutions. This approach must consider internal and external factors, such as institutional strengths, structural weaknesses, strategic opportunities, and policy challenges. By optimally performing the functions of allocation, inquiry, and communication, policy analysis can provide a scientific and rational basis for decision-making, while preventing the dominance of political interests in the education policy-making process. Therefore, the application of objective and data-based policy analysis is essential in creating a fair, adaptive, and sustainable education system.

The research results by Khotimah (2025) stated that the deep learning approach succeeded in increasing student activeness, deep understanding of PAI material, and reflective ability in linking religious values with daily life. The teacher acts as a facilitator and guide who actively creates a collaborative and conducive learning atmosphere. Implementing this approach requires infrastructure support, teacher training, and contextualized learning modules. Challenges that arise include time constraints, variations in student abilities, and the need for creative and innovative learning media.

The research results by Sumarto (2025) state that the results identified key elements in the deep learning curriculum that support character building: Integration of Character Values: Character values are integrated into each subject, not as a separate addition. Collaborative Learning: Cooperation between students builds empathy and social responsibility. Self-Reflection: Opportunities for students to reflect on learning experiences and how they relate to character values. Problem-Based Learning: Students solve real problems, develop problem-solving and critical thinking skills, and apply ethical values. Use of Technology: Technology is used to facilitate collaborative learning, information access, and self-reflection

Discussion

The results of this literature study confirm that deep learning-based learning strategies have great potential in developing students' critical thinking skills, especially if supported by positive teacher perceptions. The successful implementation of deep learning-based learning strategies is highly dependent on teachers' perceptions and readiness, which is influenced by training, policies, and supporting infrastructure. Teachers who understand the concept of deep learning tend to be better able to apply this approach effectively in learning practices. This model emphasizes meaningful, mindful, and joyful learning, all of which are proven to increase student engagement and deep understanding.

However, successful implementation is highly dependent on teacher readiness and adequate institutional support. The term deep learning in education refers to a pedagogical approach that emphasizes meaningful, reflective and student-centered learning. This concept encourages students not to simply remember information, but to understand, analyze, and apply it in a real context. The main challenges found include limited professional training, a lack of technological infrastructure, and a lack of adaptive curriculum integration. Teacher perception is a key factor that can accelerate or hinder the adoption of this strategy. Therefore, structured training programs, progressive education policies, and facility support are important elements in creating a learning environment conducive to deep learning approaches.

Conclusion

Based on the results of the study, it can be concluded that the way teachers perceive the policy and implementation of deep learning strategies greatly influences the success in encouraging students' critical thinking skills. Teachers who have a strong understanding and open attitude towards this approach tend to be more successful in creating a learning process that is deep, reflective, and relevant to students' lives. However, the effectiveness of deep learning implementation depends not only on teachers but also on the availability of training, supportive policies, and adequate educational infrastructure. Therefore, an integrated and comprehensive effort is needed in the formulation and implementation of educational policies, so that the transformation towards more meaningful and sustainable learning can be optimally achieved.

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