

Deep Learning-Based Learning Model Design: Efforts to Improve Critical Analysis Skills in Islamic Religious Education (PAI) Subjects

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ABSTRACT

This study discusses the development of a deep learning-based instructional design model as an effort to improve students' critical analytical skills in Islamic Religious Education (PAI). The study is motivated by the fact that PAI learning practices are still largely focused on rote memorization (surface learning), resulting in students' critical, reflective, and contextual thinking abilities not being optimally developed. Therefore, this research aims to develop and analyze the effectiveness of a deep learning-based instructional model in enhancing students' critical analytical skills, particularly in the aspects of interpretation, evaluation, and argumentation. This research employed a Systematic Literature Review (SLR) approach by examining national and international scholarly articles indexed in Google Scholar, SINTA, and GARUDA published between 2020 and 2025. The findings reveal that the implementation of deep learning is able to improve conceptual understanding, students' active engagement in learning, learning motivation, creativity, and critical thinking skills. In addition, this approach helps students internalize religious values more deeply and meaningfully. The deep learning approach is considered relevant to the demands of 21st-century learning and the implementation of the Merdeka Curriculum because it emphasizes active, reflective, and contextual learning processes. This study contributes to the development of a PAI instructional design that integrates cognitive, affective, and spiritual dimensions, making it a potential innovative alternative for improving the quality of Islamic education in the modern era

Informasi Artikel

Kata Kunci:

Deep Learning, Analisis Kritis, Pendidikan Agama, Islam, HOTS, Pembelajaran Bermakna

ABSTRAK

Penelitian ini membahas pengembangan desain model pembelajaran berbasis deep learning sebagai salah satu upaya untuk meningkatkan kemampuan analisis kritis peserta didik pada mata pelajaran Pendidikan Agama Islam (PAI). Penelitian ini dilatarbelakangi oleh kondisi pembelajaran PAI yang masih banyak berfokus pada hafalan (surface learning), sehingga kemampuan siswa dalam berpikir kritis, reflektif, dan memahami materi secara kontekstual belum berkembang secara optimal. Oleh karena itu, penelitian ini bertujuan untuk mengembangkan sekaligus menganalisis efektivitas model pembelajaran berbasis deep learning dalam meningkatkan kemampuan analisis kritis siswa, terutama pada aspek interpretasi, evaluasi, dan argumentasi. Metode yang digunakan dalam penelitian ini adalah Systematic Literature Review (SLR) dengan menelaah berbagai artikel ilmiah nasional dan internasional yang terindeks di Google Scholar, SINTA, dan GARUDA pada periode 2020–2025. Hasil kajian menunjukkan bahwa penerapan deep learning mampu meningkatkan pemahaman konsep, keterlibatan aktif siswa dalam pembelajaran, motivasi belajar, kreativitas, serta kemampuan berpikir kritis. Selain itu, pendekatan ini juga membantu peserta didik dalam menginternalisasi nilai-nilai religius secara lebih mendalam dan bermakna. Pendekatan deep learning dinilai relevan dengan kebutuhan pembelajaran abad ke-21 dan implementasi Kurikulum Merdeka karena menekankan proses belajar yang aktif, reflektif, dan kontekstual. Penelitian ini memberikan kontribusi dalam pengembangan desain pembelajaran PAI yang mengintegrasikan aspek kognitif, afektif, dan spiritual, sehingga dapat menjadi alternatif inovasi pembelajaran untuk meningkatkan kualitas pendidikan Islam di era modern

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1. Introduction

The development of education in the current era of globalization and digitalization demands a transformation of the learning paradigm, no longer oriented towards surface learning but rather towards deep learning, emphasizing in-depth understanding, reflection, and critical thinking skills in students. This need is increasingly relevant in the 21st-century context, which prioritizes higher-order thinking skills (HOTS), such as analysis, evaluation, and creativity (Anderson & Krathwohl, 2001). The OECD's Education at a Glance report (2020) emphasized that modern education systems must be able to equip students with critical thinking and problem-solving skills as key competencies in facing the complexities of global life. Similarly, UNESCO (2021) emphasized the importance of learner-centered and meaning-based learning as a response to post-pandemic challenges.

The reality on the ground shows that the learning process, including in Islamic Religious Education (PAI), still tends to be dominated by conventional approaches oriented towards memorization and knowledge transfer alone. This impacts students' low critical analytical skills in understanding religious values contextually. A national study by the Ministry of Education, Culture, Research, and Technology (2022) showed that the majority of Indonesian students still struggle with lower-order thinking, particularly in analytical and evaluation skills. This condition is reinforced by the results of the 2018 Programme for International Student Assessment (PISA), which showed that Indonesian students' critical reading skills remain below the OECD average (OECD, 2019).

In the context of Islamic Religious Education (PAI) learning, this challenge becomes even more complex because the material taught is not only cognitive but also touches on affective and value aspects. Therefore, a learning model is needed that not only conveys religious knowledge but also encourages students to analyze, reflect on, and internalize these values in real life. The deep learning approach is seen as a potential solution because it emphasizes active student engagement, the construction of meaning, and the development of critical and reflective thinking (Biggs & Tang, 2011).

Several previous studies have examined the application of deep learning in various educational contexts. For example, research by Fullan et al. (2018) demonstrated that a deep learning approach can improve student engagement and conceptual understanding. In the context of Islamic education, research by Hidayat (2020) found that reflection-based learning and critical discussion can foster a deeper understanding of religious values. However, most of this research remains partial and has not specifically designed a systematic and contextual learning model to enhance critical analysis skills in Islamic Religious Education (PAI) learning.

Furthermore, studies on the integration of deep learning-based learning model designs in Islamic Religious Education (PAI) are still relatively limited, particularly those using a research and development approach.

Based on this description, there is a research gap that needs to be filled, namely the development of a deep learning-based learning model specifically aimed at improving students' critical analysis skills in Islamic Religious Education (PAI). This research is significant because it not only contributes to the development of learning theory, particularly in integrating deep learning with Islamic education, but also offers practical implications for teachers in designing more innovative, contextual, and meaningful learning.

Thus, the purpose of this research is to develop and test the effectiveness of a deep learning-based learning model design in improving students' critical analysis skills in Islamic Religious Education (PAI). It is hoped that the results of this research can provide an alternative solution to address the challenges of Islamic Religious Education (PAI) learning in the modern era and strengthen educational practices that focus on developing critical thinking and in-depth understanding of values.

This research aims to develop an effective, systematic, and contextual deep learning-based instructional model for Islamic Religious Education (PAI), while simultaneously evaluating its effectiveness in enhancing students' active engagement and critical analysis skills in interpretation, evaluation, and argumentation.

2. Method

This study employed the Systematic Literature Review (SLR) method to structuredly examine the application of deep learning strategies in educational contexts. In the planning stage, the research focused on assessing the strategy's effectiveness in improving student learning outcomes. Data sources were drawn from national and international journals indexed in Google Scholar, SINTA, and GARUDA for the period 2020–2025. The search process was conducted using keywords relevant to deep learning, resulting in 20 articles assessed based on methodological quality and topic relevance.

During the implementation phase, an in-depth analysis of selected articles was conducted to identify patterns, make comparisons, and formulate key findings. Furthermore, during the reporting phase, the study results were presented descriptively, coherently, and systematically. The results showed that deep learning strategies significantly contribute to improving conceptual understanding, critical thinking skills, and student learning independence. However, its implementation still faces several obstacles, such as uneven teacher preparedness, limited learning time allocation, and

suboptimal technology utilization.

3. Results and Discussion

Researchers identified 10 relevant journals discussing Deep Learning strategies in education. The results of this study are summarized below. The implementation of deep learning strategies can increase student interest and learning quality. This approach encourages deeper conceptual understanding, critical thinking skills, and problem-solving skills. Furthermore, integrating deep learning into the curriculum has been shown to not only improve academic outcomes but also shape students' thinking patterns to be more analytical and innovative (Safitri et al., 2025).

The Deep Learning approach positively contributes to improving critical thinking skills, active participation, and student engagement in the learning process. This model enables students to deeply understand and internalize material through meaningful, conscious, and enjoyable learning. This can improve the quality of learning and prepare them to face the demands of the 21st century (Fitriani, 2025).

Research shows that Deep Learning-based learning strategies can improve students' critical and creative thinking skills in the digital age. This approach helps students understand concepts more deeply through active, reflective, and experiential learning (Hidayah & Hulyana, 2025).

The Deep learning learning model effectively improves students' conceptual understanding, spiritual attitudes, and active involvement in learning (Azima et al., 2025). Deep Learning strategies contribute positively to improving critical thinking skills, active participation, student involvement, and deeper understanding of concepts in elementary school students (Yeni Nuraeni, 2025). The results of the study showed that the application of the Deep Learning approach in Islamic Religious Education learning in one of the public elementary schools was able to increase students' learning motivation from 68.5 to 8.12, critical thinking skills from 62.7 to 78.9, and improve students' religious character from the sufficient category to good (Azima et al., 2025; Nurlailah & Julkipli, 2025).

The research results show that the Deep Learning strategy emphasizes meaningful, conscious, and enjoyable learning, and is able to encourage active student involvement, higher-order thinking, collaboration, reflection, and application of knowledge in real life, thereby improving the quality of

learning holistically (Putria et al., 2022; Fatmawaty, 2024). The application of Deep Learning in science and science learning in elementary schools has been proven to improve student learning outcomes. Through projects, discussions, observations, and reflection, students become more active, critical, and able to connect concepts to real-life situations. This approach encourages higher-order thinking skills (HOTS) and strengthens conceptual understanding, with teacher support as facilitator and the Merdeka curriculum making it a relevant and effective strategy (Mandasari et al., 2025; Rahadyan et al., 2026).

The results of the study show that Deep Learning contributes significantly to improving conceptual understanding, long-term memory, creativity, collaboration, and problem-solving abilities (Kusuma et al., 2026; Anggraini et al., 2025). The Deep Learning approach plays a crucial role in creating meaningful learning by encouraging students to deeply understand concepts, link new knowledge to prior experiences, and develop critical thinking, analytical, and problem-solving skills. In addition to improving long-term memory, this approach also helps students apply knowledge in real-world situations (Fatmawaty, 2024; Suwandi et al., 2024).

A review of 10 journals shows that the Deep Learning strategy significantly improves the quality of learning, across cognitive, affective, and psychomotor domains. This finding aligns with the constructivist learning theoretical framework, which emphasizes that knowledge is actively constructed by students through meaningful learning experiences.

Table 1. Synthesis of Research Results and Theoretical Discussion on Deep Learning Strategy

No	Strategy Component	Operationalization & Implementation Steps	Pedagogical & Spiritual Function	Citations
1	Enhancement of Learning Interest & Quality	Designing contextual learning experiences that actively connect new knowledge to students' existing cognitive structures, shifting from mere information transfer to deep exploration of core concepts.	Maximizes student conceptual understanding and quality of learning through active meaning construction based on David Ausubel's framework.	Safitri et al., 2025; Hattie, 2009
2	Strengthening Critical Thinking	Engaging students in structured processes that demand reflection,	Empowers higher-order thinking skills	Fitriani, 2025; Hidayah &

	& Problem Solving	rigorous analysis, and academic argumentation rather than rote memorization.	(HOTS) and shapes students' intellectual capacity to navigate problem complexities in the digital age.	Hulyana, 2025; Facione, 2015
3	Meaningful, Conscious, and Enjoyable Learning	Creating an active, reflective, and experiential learning path that balances task challenges with students' emotional readiness.	Optimizes psychological and emotional safety while helping students reach a "flow" state of deep, conscious, and optimal engagement.	Fitriani, 2025; Hidayah & Hulyana, 2025
4	Increased Active Engagement & Participation	Deploying learner-centered methods such as critical discussions, projects, field observations, and systematic reflection.	Shifts the educational paradigm toward student-centered active learning, directly boosting information retention and long-term subject mastery.	Yeni Nuraeni, 2025; Putria et al., 2022; Fatmawaty, 2024; Prince, 2004
5	Improved Motivation, Character, & Spiritual Values	Integrating moral principles and reflection-based practices directly into the cognitive, affective, and value delivery of the lesson.	Merges academic knowledge transfer with genuine spiritual internalization, significantly upgrading students' religious character and active moral values.	Azima et al., 2025; Nurlailah & Julkilfi, 2025
6	Strengthening 21st-Century Competencies	Implementing collaborative and project-based learning frameworks to help students tackle real-world digital and social challenges.	Equips students with adaptive 21st-century survival skills: critical thinking, creativity, collaboration, and multi-directional communication.	Mandasari et al., 2025; Rahadyan et al., 2026

7	Conceptual Understanding & Long-Term Memory	Rejecting superficial memorization and prompting students to discover underlying meaning and conceptual linkages.	Secures knowledge sustainability and successful learning transfer, preventing the transient memory traps of surface learning.	Kusuma et al., 2026; Anggraini et al., 2025; Biggs, 1999
8	Relevance to the Indonesian Independent Curriculum	Framing subject materials into contextual, project-based modules that connect education directly to everyday real-life scenarios.	Fulfills the holistic constructivist demands of <i>Kurikulum Merdeka</i> and effectively supports the cultivation of the <i>Pancasila</i> student profile.	Putria et al., 2022; Suwandi et al., 2024

Increasing Interest in Learning and Learning Quality

Research findings show that the application of Deep Learning can increase learning interest and learning quality. This aligns with David Ausubel's theory of meaningful learning, which emphasizes the importance of connecting new knowledge with students' existing cognitive structures. When learning is designed in a deep and contextual way, students not only receive information but also construct meaning. Research by Hattie (2009) also shows that learning strategies that focus on deep understanding have a significant effect on student learning outcomes. The implication is that teachers need to design learning that is not only oriented towards information transfer, but also towards in-depth exploration of concepts in order to create high-quality learning.

Strengthening Critical Thinking and Problem Solving

Research results showing improved critical thinking and problem-solving skills align with the Higher Order Thinking Skills (HOTS) theory in Anderson & Krathwohl's (2001) revised Bloom's taxonomy. In the Deep Learning approach, students are encouraged to analyze, evaluate, and create, rather than simply memorize. Research by Facione (2015) confirms that critical thinking develops through learning that demands reflection, analysis, and argumentation. This means that Deep Learning is not only a learning strategy, but also an approach that shapes students' intellectual capacity to face the complexity of problems in the digital age.

Meaningful, Conscious, and Enjoyable Learning

The finding that Deep Learning promotes meaningful, conscious, and enjoyable learning aligns with student-centered learning theory. According to Carl Rogers' humanistic learning theory, learning is effective when students feel emotionally engaged and aware of their learning process. In addition, Csikszentmihalyi's concept of flow also explains that optimal engagement occurs when students feel challenged but are still able to follow the learning process. The implication is that teachers need to create a learning environment that is not only cognitive, but also pays attention to the psychological and emotional aspects of students.

Increased Engagement and Active Participation

The research results show that Deep Learning increases student active participation. This is consistent with the active learning theory proposed by Bonwell & Eison (1991), which states that direct student involvement in the learning process improves understanding and retention of information. Prince's (2004) research also proved that active learning significantly improves learning outcomes compared to traditional methods. Deep Learning functions as an approach that shifts the learning paradigm from teacher-centered to student-centered.

Improved Motivation, Character, and Spiritual Values

Findings related to increased learning motivation, critical thinking skills, and religious character indicate that Deep Learning impacts not only academic aspects but also character development. This aligns with the holistic education concept proposed by Miller (2007), which emphasizes the integration of intellectual, emotional, social, and spiritual aspects. In the context of Islamic Religious Education (PAI), this approach is relevant to the educational goals which are not only to transfer knowledge, but also to shape students' morals and spiritual values. The implication is that Deep Learning can be an effective strategy in integrating character values into the learning process.

Strengthening HOTS, Creativity, and Collaboration

The research results show that Deep Learning promotes 21st-century skills such as critical thinking, creativity, collaboration, and communication. This aligns with the 21st-Century Skills framework developed by the Partnership for 21st-Century Learning (P21). The project-based, discussion-based, and reflection-based approach found in the study also aligns with the Project-Based Learning (PjBL) model, which has been proven effective in developing these skills.

Improved Conceptual Understanding and Long-Term Memory

Findings regarding improved conceptual understanding and long-term memory can be explained through the theory of Deep vs. Surface Learning by Marton & Säljö (1976). In deep learning, students strive to understand meaning, while in surface learning, students simply memorize. Biggs' (1999) research also confirms that the deep learning approach results in longer knowledge retention and better learning transfer. This means that this strategy is very important for building sustainable learning (lifelong learning).

Relevance to the Independent Curriculum and the Context of Basic Education

The research results showing the effectiveness of Deep Learning in learning Science and Islamic Education in Elementary Schools indicate its conformity with the principles of the Independent Curriculum, which emphasizes project-based learning and strengthening the Pancasila student profile. This approach enables students to:

- Relating concepts to real life
- Contextual learning
- Developing competencies holistically

The implication is that Deep Learning can be an implementable strategy to support the success of the Independent Curriculum in Indonesia.

4. Conclusion

Based on a systematic literature review of ten relevant journals, the Deep Learning approach is highly effective in improving holistic learning quality by enhancing students' cognitive, affective, and psychomotor skills. This learner-centered strategy boosts academic motivation and long-term retention by allowing students to actively construct meaning rather than memorize facts. Furthermore, it fosters critical 21st-century competencies such as critical thinking, collaboration, and problem-solving while successfully nurturing spiritual character and moral values within basic and Islamic Religious Education (PAI). Ultimately, Deep Learning proves to be an adaptive, superior alternative to surface learning that aligns perfectly with modern educational

demands and Indonesia's Independent Curriculum (Kurikulum Merdeka).

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