JURNAL VARIDIKA
Vol. 37, No. 1, 2025, pp. 178-194
p-ISSN 0852-0976 | e-ISSN 2460-3953
Website: https://journals2.ums.ac.id/index.php/varidika/index

Implementing Deep Learning Approaches in Primary Education: A Literature Review

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Submission Track:
Received:
25 July 2025
Final Revision:
26 August 2025
Available online:
30 August 2025

ABSTRACT

Deep learning in education has often been associated with technology and artificial intelligence, while its pedagogical meaning remains underexplored, particularly in the context of primary education. Although joyful, meaningful, and mindful learning strategies are widely practiced, there is still a lack of systematic reviews that integrate these approaches into a coherent framework of deep learning in the Indonesian context. This gap highlights the need to examine how deep learning can be adapted to foster holistic student development. This study explores the application of deep learning approaches in primary education through a literature review. Utilizing the PRISMA framework, relevant national and international publications from 2014 to 2024 were reviewed and analyzed. The results indicate that while the term deep learning is often linked to technology, its pedagogical dimensions are still underutilized in classrooms. Key obstacles to implementation include limited teacher training, rigid curricula, inadequate facilities, and resistance to change in educational mindsets. Despite these challenges, deep learning offers significant potential to cultivate critical thinking, empathy, collaboration, and lifelong learning in students. The findings are expected to benefit educators, policymakers, and curriculum developers by providing insights into how deep learning approaches can be aligned with student needs and future educational demands. This review also serves as a reference for researchers to design contextually relevant models of deep learning in Indonesian primary schools

Keywords: deep learning; primary education; joyful learning; meaningful learning; mindful learning

DOI: 10.23917/varidika.v37i2.12151

INTRODUCTION

The transformation of education in the 21st century demands a fundamental shift in how teachers teach, and students learn, driven not only by rapid technological advancements but also by the growing need for complex global life skills (Lubis et al., 2022). Primary education, as the foundation for character formation and competence development, plays a crucial role in equipping students to meet these future challenges. In this context, transformative, participatory, and contextually relevant learning approaches are urgently needed (Subiyantoro & Musa, 2024a).

Among the various models, Michael Fullan's Deep Learning framework emphasizing six global competencies known as the 6Cs: Character, Citizenship, Collaboration, Communication, Creativity, and Critical Thinking offer a holistic pedagogical vision (Fullan et al., 2017). However, it is not the only influential approach in the field. Competing models, such as John Hattie's Visible Learning and other

evidence-based instructional frameworks, also provide valuable strategies for enhancing student outcomes. While these models differ in emphasis Hattie's focusing on clarity of learning intentions, feedback, and teacher-student relationships, and Fullan's centering on transformative competencies they share a commitment to improving learning quality through intentional design and reflective practice (Hattie & Donoghue, 2016).

Teachers can implement Deep Learning at the primary education level through learning that is meaningful, joyful, and mindful (Amrullah et al., 2025). This approach aligns with the ideas of Jensen and Nickelsen, who encourage teachers to activate prior knowledge, build emotional connections, utilize multisensory processing, and promote active reflection throughout the learning process (Jensen, 2020). Teachers can create joyful learning experiences through interactive activities that spark student enthusiasm from the beginning. Differentiated learning based on multiple intelligences helps generate a classroom atmosphere that is both joyful and meaningful. By designing instruction that aligns with students' learning styles, the classroom becomes more dynamic and responsive (Anggoro et al., 2022). Research by Mustikawati and Isdaryanti (2024) also showed that a joyful-inquiry approach supported by Android-based games can improve students' engagement and comprehension in science learning. Teachers applying this strategy design activities that are challenging, enjoyable, and exploration-based (Mustikawati & Isdaryanti, 2024). Teachers may also use demonstration-based experiments to stimulate curiosity. Students tend to better understand scientific concepts when they are actively involved in explorative activities presented in fun and engaging ways (Laisya et al., 2024).

In addition to creating a joyful atmosphere, teachers must foster students' full awareness of their learning process. Mindful learning has emerged as an effective strategy to train focus, attention, and self-reflection. A ten-minute daily mindfulness practice has been found to improve academic achievement in reading and science without reducing instructional time. Teachers can simply use structured audio recordings to facilitate mindfulness effectively and efficiently (Putri, 2024).

Langer (1997) argues that when teachers encourage students to be open to multiple perspectives and aware of variations in learning situations, they help students develop cognitive flexibility. This approach teaches students that mistakes are not failures, but opportunities for growth (Hautamäki et al., 2023). Teachers who integrate mindfulness into instruction foster stronger emotional connections with their students, encourage collaboration, and nurture healthy curiosity (Tao, 2022).

Mindfulness also enhances students' critical literacy skills. Saputro et al. (2023) reported that mindfulness training improves elementary students' creative reading comprehension, as it encourages reflective and holistic reading. Students who engaged in mindful IPAS learning achieved higher learning outcomes compared to those in the control group (Saputro et al., 2023). However, deep learning cannot be achieved without meaningful learning experiences. Teachers must help students link new information

to prior knowledge through conscious exploration and reflection. Meaningful learning occurs when students find the material relevant, applicable, and capable of shaping long-term understanding (Mubarok et al., 2022).

Teachers should design activities that allow students to build understanding through collaboration, reflection, and active participation. Meaningful learning also involves open discussions and project-based activities that help students construct personal meaning from the content (Trumpa et al., 2020). It becomes truly impactful when students are emotionally involved and experience internal transformation through the learning process (Immordino-Yang & Damasio, 2007). Technology and project-based learning can be integrated as part of meaningful learning. When students build and program LEGO robots, they not only grasp technical concepts but also practice collaboration, creative thinking, and reflective evaluation of solutions (Niemelä, 2018). This reinforces the importance of designing contextual and problem-driven learning experiences.

The elements of joyful, mindful, and meaningful learning are inseparable in implementing Deep Learning (Feriyanto & Anjariyah, 2024a). Teachers must integrate these three elements simultaneously so that learning becomes not only enjoyable, but also reflective and impactful. Students become more engaged and focused when teachers create a positive, attentive, and relevant learning environment. Despite its promise, the implementation of Deep Learning still faces many challenges. Some teachers lack a deep understanding of the concept, resulting in superficial changes in methods without a genuine paradigm shift (Mas'ud et al., 2025). Inflexible curricula limited professional development, and education policies overly focused on academic outcomes also hinder effective implementation. These conditions reveal a gap between the ideal concept of Deep Learning and its practical application in the field. Therefore, this study aims to examine the dynamics of Deep Learning implementation in Indonesian primary education. It offers both theoretical and practical insights into how teachers can effectively integrate joyful, mindful, and meaningful learning in the classroom.

METHOD

This study employs a literature review approach aimed at addressing key research questions (RQs) regarding the implementation of deep learning approaches in the context of primary education. The review is intended to identify strategies, challenges, and opportunities related to deep learning practices in early education and to formulate future research directions relevant to the current development of modern education.

The research questions are formulated based on the designated topic focus. The proposed research questions are as follows: RQ1: How is the deep learning approach implemented in primary education based on existing literature? RQ2: What are the benefits and challenges in implementing deep

learning approaches in primary education settings? RQ3: What research gaps can serve as a foundation for future studies?

The data collection process in this study followed the PRISMA framework (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which consists of four stages: identification, screening, eligibility, and inclusion (Supriyono et al., 2024). The PRISMA flow diagram is presented in Figure 1.

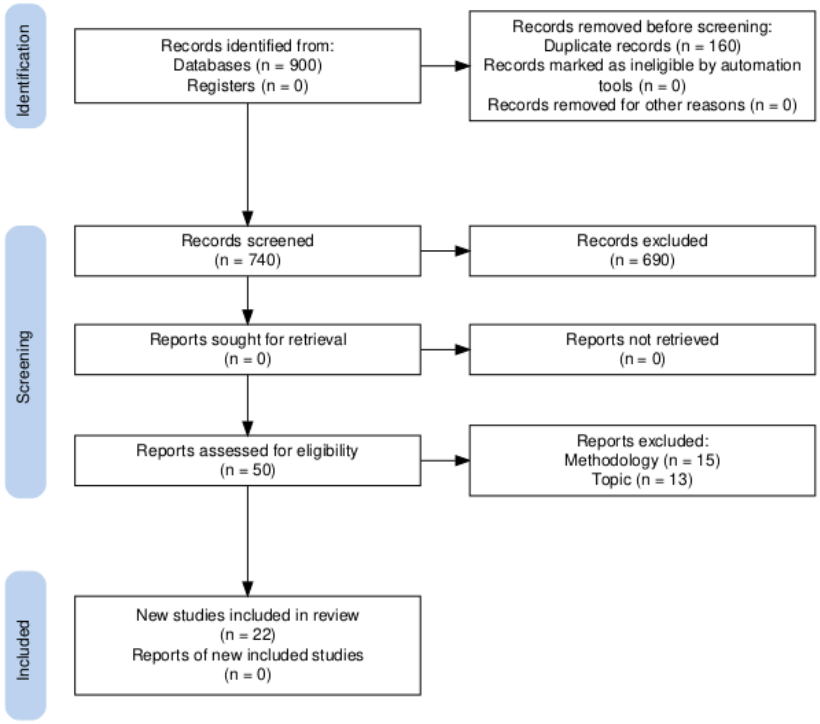

Figure 1. PRISMA Flow Diagram of the Article Selection Process

Identification

The identification stage was carried out through a literature search across various online databases such as Google Scholar, ERIC, Scopus, and ScienceDirect. The databases selected in this review were Google Scholar, ERIC, Scopus, and ScienceDirect. These sources were chosen to ensure both breadth and depth of coverage in the literature search. Google Scholar was included because it provides the widest coverage of academic sources, including journal articles, conference proceedings, and institutional repositories, which reduces the risk of missing relevant studies (Haddaway et al., 2015). ERIC (Education Resources Information Center) was selected as it is a specialized database for education research, making it particularly relevant to the focus on primary education and learning approaches. Scopus was used because it is one of the largest multidisciplinary citation databases, known

for its rigorous indexing standards and comprehensive coverage of peer-reviewed journals (Burnham, 2006). Finally, ScienceDirect was included due to its strong focus on high-quality journals in education, psychology, and social sciences published by Elsevier, which are highly relevant to the context of deep learning and pedagogy. The identification stage was carried out through a literature search across online databases such as Google Scholar, ERIC, Scopus, and ScienceDirect. The search strategy applied the PICO framework to ensure systematic keyword selection. The Population (P) focused on primary school students (including "elementary school" OR "madrasah ibtidaiyah"). The Intervention (I) included deep learning approach, joyful learning, mindful learning, and meaningful learning. The Comparison (C) considered traditional learning OR conventional methods. The Outcome (O) targeted student engagement, learning outcomes, and meaningful learning experiences. The search was limited to articles published between 2014 and 2024 in Indonesian and English to ensure comprehension and contextual relevance. This process initially yielded 900 articles from the databases, with no additional records from registry sources. All search results were then checked to avoid duplication. To avoid duplication, all retrieved records were first imported into Mendeley Reference Manager, which automatically detects and highlights duplicate entries based on title, DOI, and publication year. This initial process was then cross-checked manually to ensure accuracy. In addition, we referred to widely used systematic review tools such as EndNote and Covidence, which are recommended in systematic review protocols for duplicate removal and study management (Bramer et al., 2016).These steps ensured that the dataset used in this review was free from duplication and aligned with the PRISMA guidelines. resulting in the removal of 160 articles.

Screening

In the screening stage, the remaining 740 articles were examined based on their titles and abstracts to assess their relevance to the research topic. This process ensured that the articles explicitly addressed the deep learning approach in the context of primary education. Articles that did not meet the initial criteria or were outside the scope of the study were excluded, leading to the elimination of 690 articles at this stage. Consequently, 50 articles were deemed suitable for further review in the eligibility stage.

Eligibility

The eligibility stage involved a full-text review of the 50 articles that passed the screening process. This comprehensive analysis aimed to ensure that the content of the articles met the inclusion criteria, particularly in terms of relevance to the implementation of deep learning in primary education. From this process, 15 articles were eliminated due to methodological weaknesses, such as inappropriate

research design or insufficient data. Additionally, 13 articles were excluded because their topics were not relevant, for example, those discussing secondary education or focusing on technical aspects of deep learning in artificial intelligence unrelated to pedagogy.

Included

The final stage was inclusion, in which all articles meeting the eligibility criteria were incorporated into the final analysis. A total of 22 articles were selected as the primary sources in this literature review and were thematically analyzed according to discussion themes such as learning strategies, the role of teachers, student learning outcomes, and challenges in implementing deep learning in primary education. No additional study reports outside the initial search results were included. The entire literature selection process is visualized in the PRISMA Diagram to ensure transparency and traceability of the research methods. This methodological approach is expected to contribute theoretical and practical insights into the development of deep, contextual, and meaningful learning at the primary education level.

Table 1. Inclusion and Exclusion Criteria Used in the Literature Selection

Inclusion Criteria	Exclusion Criteria
Articles discussing deep learning approaches in the context of primary education	Articles focusing on deep learning as technology (machine learning/AI) without pedagogical relevance
Studies relevant to primary schools or equivalent institutions	Studies focusing on secondary or higher education without relevance to primary education
Articles written in Indonesian or English	Articles written in languages other than Indonesian or English
Scientific publications: indexed journals, conference proceedings, theses, or academic books	Non-scientific materials such as blogs, opinion pieces, or news articles
Articles with full-text access for comprehensive analysis	Articles available only in abstract or preview format

RESULTS & DISCUSSION

Result

Implementation of Deep Learning Approaches

A bibliometric analysis of keywords relevant to the research topic was conducted using VOSviewer software, aiming to map the relationships among terms found in scientific publications related to the concept of deep learning, particularly in the context of primary education involving joyful

learning, mindful learning, and meaningful learning approaches. The visualization of the keyword network analysis is presented in Figure 2.

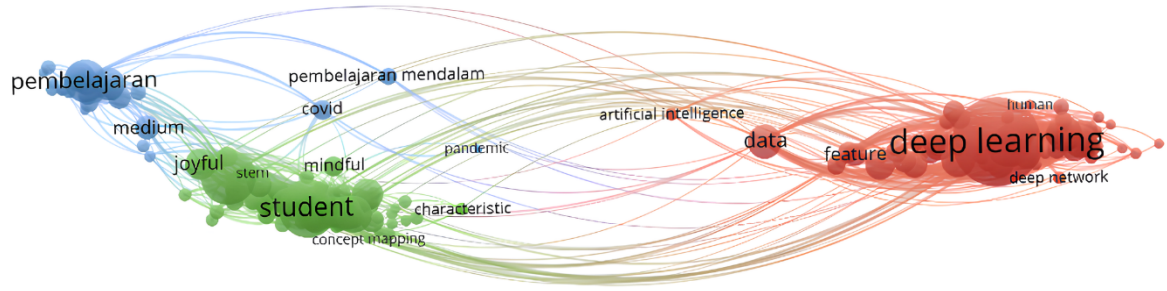

Figure 2. Keyword Network Visualization in VOSviewer

The visualization results show that the most dominant keyword with the highest connection strength is “deep learning,” followed by “student” and “pembelajaran” (learning). Each of these forms its own thematic cluster. The keyword “deep learning” forms a red cluster and is connected to terms such as “data,” “feature,” “deep network,” “human,” and “artificial intelligence.” This indicates that in international literature, the term is still predominantly used within the framework of artificial intelligence and data processing technology, rather than in a pedagogical sense.

In contrast, the keyword “student” forms a green cluster, interconnected with terms such as “joyful,” “mindful,” “STEM,” “characteristic,” “concept mapping,” and “deep learning.” This cluster more accurately reflects the domain of reflective and participatory pedagogy, which is the central focus of humanistic and holistic learning approaches. Meanwhile, the keyword “pembelajaran” (learning) forms a blue cluster, closely associated with “medium,” “COVID,” and “deep learning,” representing the dynamics of education during the pandemic and reinforcing the urgency of innovation in teaching strategies at the primary education level.

Interestingly, although “deep learning” appears as a central keyword, there is no direct link found between it and terms like “joyful learning,” “mindful learning,” or “meaningful learning.” This fact suggests that global literature still predominantly positions deep learning within the technological context, rather than as a contextual pedagogical approach emphasizing meaning, experience, and students’ awareness of the learning process.

To further identify temporal developments and current research trends, a cluster analysis based on the publication periods of the articles was carried out and visualized in Figure 3. This visualization displays the distribution of keywords over time, with a color gradient ranging from blue (2018) to yellow (2021).

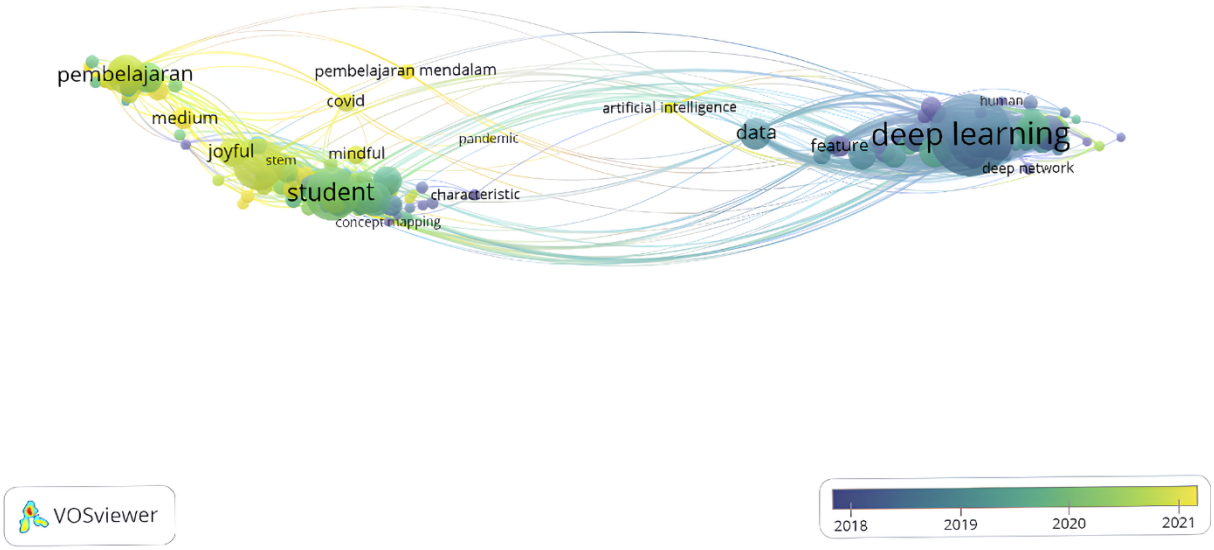

Figure 3. Keyword Distribution Over Time

Based on the visualization, keywords such as “deep learning,” “data,” and “feature” are marked with dark blue and green colors, indicating that research on these topics emerged earlier around 2018-2019. Meanwhile, keywords such as “joyful,” “student,” “mindful,” and “deep learning” (in pedagogical context) appear in bright yellow, indicating that these topics are relatively new and have started to gain popularity in recent years, particularly between 2020 and 2021.

These findings reveal a shift in research focus from purely technological approaches toward more humanistic learning paradigms. The results of this analysis confirm that pedagogical approaches based on joyful, mindful, and meaningful learning have not yet been widely linked to the term deep learning in international academic publications. This highlights a conceptual gap (research gap) that can be addressed by further studies, particularly within the context of Islamic primary education.

Thus, this study provides an original contribution by repositioning the meaning of deep learning not merely as a component of artificial intelligence but as a comprehensive pedagogical approach that integrates students’ cognitive, affective, and spiritual dimensions.

Furthermore, the cluster analysis based on the year of publication was conducted again using VOSviewer’s overlay visualization to track the temporal development of terms related to the topic. The overlay analysis, presented in Figure 3, illustrates the dominant years of keyword appearance in the literature between 2018 and 2021. Blue indicates older keywords (typically appearing in 2018–2019), while yellow represents newer keywords (appearing around 2020–2021).

From this visualization, it was found that the keywords “deep learning,” “data,” and “feature” appeared earlier and have dominated the literature since 2018. These three keywords form a distinct

cluster oriented toward artificial intelligence development, particularly in the context of data processing and neural networks. On the other hand, keywords such as "student," "mindful," and "characteristic" began to appear more significantly in 2019, indicating a shift in research direction toward educational contexts and learner characteristics.

Interestingly, keywords such as "joyful," "pembelajaran" (learning), and "pembelajaran mendalam" (deep learning in the pedagogical sense) show bright yellow tones, suggesting that these topics are more recent trends in academic literature. This implies that approaches like joyful learning, mindful learning, and meaningful learning as components of deep learning strategies have not been extensively studied and are only beginning to receive academic attention in the past two to three years.

These findings indicate a clear conceptual gap between the technological meaning of deep learning and the pedagogical understanding of deep learning as a learning process. They reinforce the urgency of promoting pedagogical interpretations of deep learning that genuinely integrate cognitive, affective, and spiritual dimensions into meaningful learning experiences.

The deep learning approach at the elementary school level is rarely mentioned explicitly in research literature, both nationally and internationally. Nevertheless, the fundamental elements of this approach namely joyful, meaningful, and mindful learning have in fact been widely implemented in elementary education practices in Indonesia. Ministerial Regulation No. 13 of 2025 explicitly describes deep learning as an approach that is dignified, emphasizing the creation of a learning environment that is conscious, mindful, meaningful, and joyful (Kemendikdasmen, 2025). In other words, although the term "deep learning approach" is still seldom used in elementary school studies, the government encourages the integration of these three principles into the basic curriculum. Recent literature reviews indicate that the combination of these aspects can enhance student engagement and conceptual understanding at the elementary level.

Primary education is a critical foundation for shaping students' character, skills, and knowledge. The learning approach used at this level significantly influences students' motivation, conceptual understanding, and attitudes toward learning. Two approaches that have recently gained attention are meaningful learning and joyful learning (Hafifzoh et al., 2023).

Table 2. Implementation of Deep Learning Approaches in Primary Education

Learning Approach	Example Implementation	Sources
Joyful Learning	Inquiry-based activities, Android-based educational games	Mustikawati & Isdaryanti (2024)
Mindful Learning	Daily 10-minute mindfulness practice, reflective reading	Putri (2024); Saputro et al. (2023)
Meaningful Learning	Project-based learning, gamification, real-world context	Mubarok et al. (2022); Polman et al. (2021)

Meaningful learning refers to learning activities that help students better remember and internalize material by linking new information with prior knowledge. According to Donas, cited by Kholifah, meaningful learning includes three main learning modes: receptive mode (listening, observing, reviewing), guided discovery (finding concepts or procedures with teacher support), and independent discovery (self-directed learning). For receptive mode learning to be meaningful, students must possess strategies for meaningful learning, tasks must align with their prior knowledge, and be appropriate for their intellectual development.

The implementation steps include setting core learning objectives, conducting initial assessments (student ability, motivation, learning styles), selecting materials based on student characteristics, preparing core concepts, using advance organizers, simplifying core ideas with concrete examples, and evaluating learning processes systematically. Feriyanto and Deka (2024a) emphasize that meaningful learning helps students grasp context and relevance. Polman et al. (2021) also highlight its role in enhancing critical thinking and problem-solving.

Examples include project-based learning (PBL), which motivates deep engagement through real-world contexts and challenges. Gamification also supports meaningful learning by creating interactive scenarios. For instance, gamified philosophy lessons using game-based software enhance relevance and enjoyment (Feriyanto & Anjariyah, 2024a)

According to Ausubel, meaningful learning is student-centered and psychologically grounded. It helps bridge abstract content with concrete experiences, responding to classroom realities where students often struggle with traditional explanations (Ramos-Vallecillo et al., 2024). It activates critical reasoning and supports both students and teachers in creating long-term, accessible learning experiences.

Alongside meaningfulness, joyful learning is also strongly encouraged at the primary level. Joyful learning is a fast, effective, and enjoyable learning method that balances left and right brain functions. Materials are presented in an engaging and efficient manner to maintain students' attention and interest (Hartini, 2020). According to Rahmat (2025), positive emotional experiences help students connect more deeply with content, improving retention and application.

Teacher strategies include checking in with students, using small-group challenges, and encouraging peer appreciation. For difficult subjects like mathematics, joyful learning can turn abstract concepts into enjoyable games, using educational tools to foster understanding and eliminate fear (Sutini, 2022).

The roots of joyful learning go back to Ki Hajar Dewantara's "Among" system, which recognizes the value of play in child development. Ramadhani et al. (2024) describe four phases: preparation (mental readiness and expectation-setting), delivery (engaging, contextual teaching), practice (student reflection and playful exploration), and reflection (reviewing learning outcomes with students). Joyful

learning enhances creativity, student engagement, and supports positive school and teacher reputation. Institutional support is key for sustainable implementation.

Mindful learning stems from the concept of mindfulness, emphasizing full awareness during learning. It encourages focus without distraction or judgment, enhancing comprehension, concentration, and memory (Wijayanti et al., 2025). Rusdiyana defines mindful learning as active, self-regulated engagement, driven by clear goals and intrinsic motivation (Rusdiyana, 2025).

Students are taught to reflect on their cognitive processes, which improves metacognitive skills and lifelong learning capacity (Prawiyogi & Rosalina, 2025). Purwoko (2025) adds that mindful learning promotes full attention and adaptive strategy evaluation. It also aids in filtering relevant information and inhibiting unnecessary distractions (Milaré et al., 2021).

Mindful activities include recognizing learning goals, success indicators, and continuous self-development (Nasution et al., 2024). Lee et al. suggest practices like guided breathing, body scans, and visual imagination to help students self-regulate emotions (Lee et al., 2023). Zulyadaini & Kasiono recommend mindful awareness practices (MAPs), experiential learning, and encouraging cognitive flexibility through open-ended questioning and perspective comparison (Zulyadaini & Kasiono, 2025).

Benefits and Challenges in Implementing Deep Learning in Primary Schools

The deep learning approach combines awareness, meaningfulness, and enjoyment, offering a transformative model for education in Indonesia. Benefits include deeper reflection, contextual understanding (Muntu, 2024), and increased motivation (Maharani et al., 2025). It fosters empathy and social awareness through real-world analysis, promotes collaboration (Mutmainnah et al., 2025), critical thinking, and problem-solving (Wijaya et al., 2025).

Table 3. Benefits and challenges of implementing deep learning approaches in primary education

Benefits	Sources	Challenges	Sources
Enhances student engagement & motivation	Maharani et al. (2025)	Lack of teacher training & readiness	Ramadan et al. (2025)
Strengthens critical thinking & problem-solving	Polman et al. (2021)	Rigid curriculum	Mas'ud et al. (2025)
Promotes empathy, collaboration, & social skills	Mutmainnah et al. (2025)	Limited facilities & infrastructure	Hasanah et al. (2024)
Builds independence & lifelong learning habits	Muntu (2024)	Resistance to pedagogical innovation	Subiyantoro & Musa (2024)

Deep learning enhances curiosity and lifelong learning motivation. It builds student responsibility and independence, essential for future readiness. However, challenges include time limitations in school schedules, insufficient teacher training, traditional teaching habits, limited

infrastructure, and resistance to pedagogical shifts (Ramadan et al., 2025). Teachers often struggle to integrate deep learning principles into lesson plans and differentiate instruction to meet diverse student needs. To provide a clear overview, the benefits and challenges are summarized in Table 3.

Research Gaps and Directions for Future Studies

The findings of this literature review reveal several research gaps that can serve as a foundation for future investigations. First, most international publications still associate the term deep learning with artificial intelligence, data, and neural networks, rather than with pedagogical approaches that emphasize joyful, meaningful, and mindful learning (Feriyanto & Anjariyah, 2024). This indicates a lack of conceptual clarity in positioning deep learning as a holistic educational framework.

Second, there is a scarcity of contextual studies in Indonesian primary education. While elements of joyful, meaningful, and mindful learning have been implemented in classrooms, few studies explicitly connect these practices to Fullan's deep learning framework. Comparative studies between general primary schools and Madrasah Ibtidaiyah are particularly limited, despite their potential to highlight cultural and spiritual dimensions in learning (Hasanah, 2025).

Third, most studies identified are short-term or theoretical in nature, with limited use of longitudinal or classroom ethnographic approaches. Future research should employ design-based or action research methods to provide deeper insights into the long-term effects of deep learning on students' character, collaboration, and critical literacy development (Subiyantoro & Musa, 2024).

Fourth, there is a lack of contextually relevant instructional models. Current studies rarely propose integrated models tailored to Indonesia's cultural and religious settings. Developing such models would contribute to the localization of deep learning practices in primary education (Nafi'ah & Faruq, 2025). Finally, research on teacher readiness and institutional support remains limited. Factors such as professional development, curriculum flexibility, and leadership support are crucial for sustainable implementation but have not been adequately addressed in the literature (Hasanah, 2025). These research gaps open opportunities for future studies not only to evaluate the effectiveness of joyful, meaningful, and mindful learning strategies but also to design innovative models, tools, and policies that can strengthen the implementation of deep learning in Indonesian primary schools.

Discussion

Implementation of Deep Learning in Indonesian primary schools should be examined in relation to other established pedagogical frameworks. While Fullan's Deep Learning emphasizes transformative competencies, models such as Hattie's Visible Learning prioritize measurable instructional impact, and Project-Based Learning (PBL) fosters student autonomy through authentic tasks (Fullan et al., 2017;

Hattie & Donoghue, 2016). From a comparative perspective, Deep Learning has the potential to combine the strengths of both retaining the evidence-based rigor of Visible Learning while embracing the experiential depth of PBL. This positions Deep Learning not merely as an alternative model but as an integrative approach capable of addressing the multi-dimensional needs of 21st-century learners (Nafi'ah & Faruq, 2024). The bibliometric analysis revealed that international literature still associates "deep learning" predominantly with artificial intelligence, with limited emphasis on its pedagogical dimensions. This gap has practical implications: teachers and policymakers in Indonesia may overlook the holistic learning potential of Deep Learning due to prevailing technological interpretations. The emergence of keywords such as "joyful," "mindful," and "meaningful" in recent years signals a shift toward more human-centered education, offering momentum for Indonesia to lead in contextualizing Deep Learning for primary education (Subiyantoro & Musa, 2024).

In terms of classroom practice, Deep Learning requires a shift in instructional design—from content delivery toward co-creation of knowledge between teachers and students. This demands that teachers integrate emotional engagement (joyful), cognitive depth (meaningful), and metacognitive regulation (mindful) into lessons. Institutional support is equally crucial, as schools need flexible timetables, supportive leadership, and continuous professional development to sustain these practices. Without systemic support, Deep Learning risks being reduced to isolated strategies rather than a coherent educational philosophy. From a policy perspective, Indonesia's Permendikdasmen No. 13 of 2025 provides a regulatory framework that explicitly calls for dignified education aligned with mindful, meaningful, and joyful learning. However, cultural and contextual adaptation remains essential. In regions where religious or community values strongly influence education, Deep Learning must be tailored to reflect these values while maintaining its core competencies (Irsad, 2016). This is particularly relevant for Islamic elelementary school and other faith-based schools, where integration of spiritual dimensions with cognitive and social competencies can produce more holistic outcomes (Ramadhani et al., 2021).

While the benefits of Deep Learning are well-documented ranging from increased engagement to improved critical thinking its implementation is hampered by rigid curricula, limited resources, and teacher unfamiliarity. Addressing these challenges requires a strategic, multi-layered approach that includes building teacher capacity not only in the philosophy of Deep Learning but also in practical integration strategies, ensuring curriculum flexibility to allow thematic and interdisciplinary projects that embody joyful, meaningful, and mindful principles, and fostering collaborative networks where educators can share innovations and address implementation challenges collectively (Hasanah et al., 2024).

Future Research Directions

Future research should compare general primary schools and Madrasah Ibtidaiyah (MI) to explore how religious values influence deep learning. Development of culturally relevant deep learning models is essential. Longitudinal studies on character development, classroom ethnographies, school leadership roles, and instructional material effectiveness are also needed. Design-based and action research methods are recommended to co-create applicable solutions with educators, ensuring practical impact in real classrooms.

CONCLUSION

The integration of joyful, meaningful, and mindful learning within the framework of deep learning in primary education offers a comprehensive approach to student development. This study affirms the potential of deep learning to enhance not only academic achievement but also students' emotional, social, and spiritual competencies. Despite its promise, successful implementation requires addressing practical challenges including time constraints, teacher readiness, and limited resources. Therefore, future research and professional development should focus on equipping educators with the tools and strategies needed to adopt this holistic approach effectively. With supportive policies and school cultures, deep learning can become a transformative force in shaping lifelong learners in Indonesia's primary education landscape

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