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Deep Learning Approach in Education: A Systematic Literature Review on Mindful, Meaningful, and Joyful Learning Models

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ABSTRACT

This study aims to systematically examine instructional models that align with the principles of deep learning, specifically mindful learning, joyful learning, and meaningful learning. A Systematic Literature Review (SLR) was conducted following the PRISMA 2020 guidelines to ensure transparency and methodological rigor. Literature was retrieved from Google Scholar, Scopus, ERIC, and SpringerLink, covering publications from 2020 to 2025. After duplicate removal and multi-stage screening, 35 empirical studies met the inclusion criteria and were analyzed using thematic analysis through open, axial, and selective coding. Inter-rater reliability was established using Cohen's Kappa ($\kappa = 0.82$), indicating substantial agreement. The findings reveal that meaningful learning is the most consistently supported dimension across instructional models, followed by joyful learning, while mindful learning remains less explicitly integrated. Project-Based Learning and Problem-Based Learning emerged as the most comprehensive models, demonstrating alignment across all three dimensions by integrating authentic problem contexts, collaborative engagement, and reflective processes. In contrast, gamified and play-based approaches predominantly support joyful engagement but often lack structured reflective scaffolding. The review suggests that deep learning is most effectively fostered through pedagogical frameworks that intentionally integrate cognitive integration, emotional engagement, and metacognitive awareness. These findings provide a conceptual foundation for developing more balanced and holistic instructional designs aligned with contemporary deep learning principles.

Keywords: *Deep Learning, Instructional Models, mindful, joyful, meaningful.*

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INTRODUCTION

Educational transformation in the twenty-first century increasingly demands learning practices that go beyond surface-level knowledge acquisition and rote memorisation. Learners are expected to develop higher-order thinking skills, self-awareness, emotional engagement, and the ability to apply knowledge meaningfully in real-life contexts. In response to these global demands, the Indonesian government, through the implementation of the Kurikulum Merdeka, has explicitly promoted a deep learning approach as a foundational orientation in classroom practice. This approach emphasises learning that is not only cognitively rich but also emotionally engaging and personally meaningful for students.

Within the Kurikulum Merdeka discourse, deep learning is commonly articulated through three interconnected principles, namely mindful learning, joyful learning, and meaningful learning. Mindful learning highlights learners' awareness, attention, reflection, and metacognitive regulation during the learning process (Flavell, 1979; Langer, 1997). Joyful learning focuses on positive emotions, intrinsic motivation, and active engagement, which are known to broaden learners' cognitive and social capacities (Beck, 1992; Fredrickson, 2001). Meanwhile,

meaningful learning emphasises the integration of new knowledge with prior understanding through authentic and relevant learning experiences, enabling deeper conceptual comprehension and long-term retention (Ausubel, 1968; Novak, 2010). Together, these three principles form a holistic framework that aligns cognitive, affective, and reflective dimensions of learning.

Recent international research provides converging evidence that instructional models integrating structured mindfulness practices into classroom activities can meaningfully enhance mindful learning among primary school students, particularly in terms of sustained attention, interpersonal awareness, and self-regulation. Syntheses of school-based studies indicate that mindfulness-based programs (MBPs) produce moderate improvements in mindfulness outcomes and are associated with gains in attention and overall school adjustment (Mettler et al., 2023). At the level of classroom implementation, a controlled trial conducted in Spain demonstrated that the GrowingUp Breathing program, when embedded within the regular school curriculum, significantly improved students' dispositional mindfulness, emotional regulation, prosocial behavior, and learning engagement, while simultaneously reducing anxiety (García-Rubio et al., 2023). Importantly, mindfulness practices can also be meaningfully integrated into subject-matter instruction. A cluster randomized controlled trial examining contemplative instruction in elementary science education (ages 9–11) showed that mindfulness exercises can be systematically aligned with disciplinary content, with each science lesson designed to incorporate reflective and awareness-based activities that support students' mindful engagement with learning (Shelach Inbar & Tarrasch, 2025).

In the domain of meaningful learning, characterized by the integration of new knowledge into existing cognitive structures and the capacity for transfer, models grounded in authentic contexts provide robust support. Melgarejo et al. demonstrated that implementing a technology-enhanced 5E instructional model (Engage, Explore, Explain, Elaborate, Evaluate), enriched with contextual problems, effectively fostered deep conceptual understanding and long-term retention in physics students (Melgarejo et al., 2024). The Elaborate and Evaluate phases of this model compel learners to connect abstract concepts to real-world phenomena, thereby enhancing relevance. Furthermore, a study by Kuo et al. on interdisciplinary Problem-Based Learning (PBL) reported a significant increase in knowledge transfer skills (Kuo et al., 2019). Learners not only mastered academic content but also successfully applied learned concepts to design innovative solutions for complex socio-ecological problems, providing tangible evidence of achieving applied and meaningful learning.

Concerning joyful learning, typified by positive emotional involvement and intrinsic motivation, this aspect can be systematically cultivated through instructional designs that incorporate elements of play, challenge, and autonomy. Cheng et al. evaluated the impact of a Project-Based Learning (PjBL) model integrated with gamification mechanics—such as badges, leaderboards, and tiered challenges—in language learning (Cheng et al., 2025). The results indicated a marked increase in learning enjoyment, persistence in difficult tasks, and learner curiosity, as the gameful elements created a low-threat, high-support environment. In parallel, Coelho et al. investigated the implementation of a flipped classroom model utilizing in-person, role-play, and simulation-based activities in higher education (Coelho et al., 2025). This study found that the redesigned learning experience drastically reduced academic anxiety while boosting active engagement and learning satisfaction, with students reporting feelings of enthusiasm and excitement during the collaborative problem-solving process.

However, despite the increasing popularity of deep learning discourse, empirical evidence regarding which learning models most consistently and comprehensively support all three principles remains fragmented. Existing studies often focus on one dimension in isolation, such as joyful learning through gamification, mindful learning through reflective instruction, or meaningful learning through authentic problem-solving tasks. As a result, teachers and curriculum designers may face difficulties in selecting learning models that holistically align with the deep learning orientation promoted by national education policy. This fragmentation also limits the development of cumulative knowledge regarding deep learning–oriented pedagogical practices, particularly within the Indonesian educational context.

Previous studies have highlighted the importance of aligning instructional models with learners' characteristics and learning objectives to achieve optimal learning outcomes (Abate & Mishore, 2024; Hofer & Reinhold, 2025; Rouffet et al., 2023). Nevertheless, a systematic synthesis that maps the alignment between learning models and the three core principles of deep learning—mindful, joyful, and meaningful learning—has not yet been comprehensively conducted. Such a synthesis is essential to provide both theoretical clarity and practical guidance for educators implementing the Kurikulum Merdeka.

Therefore, this study aims to conduct a Systematic Literature Review (SLR) to identify learning models that are aligned with the principles of mindful, joyful, and meaningful learning, and to analyse the extent of their empirical support. By systematically reviewing empirical studies published between 2020 and 2025, this research seeks to construct an integrated conceptual understanding of deep learning–oriented instructional models. The findings of this review are expected to contribute to educational theory by clarifying the relationship between learning models and deep learning principles, and to educational practice by providing evidence-based recommendations for teachers, teacher educators, and curriculum developers in Indonesia.

METHOD

This study employed a Systematic Literature Review (SLR) to synthesise empirical evidence concerning instructional models aligned with the three interconnected principles of deep learning: mindful, joyful, and meaningful learning. The SLR design was selected to ensure a structured, transparent, and replicable process for identifying, evaluating, and integrating findings from prior research. The entire review process followed the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to enhance methodological rigor, transparency, and reporting completeness. A review protocol was developed prior to data collection, outlining the search strategy, inclusion and exclusion criteria, quality appraisal procedures, data extraction framework, and analytical techniques. The review was conducted between February and April 2025.

A comprehensive literature search was carried out across four major academic databases: Google Scholar, Scopus, ERIC, and SpringerLink. These databases were selected because of their extensive indexing of peer-reviewed educational research and their international coverage of instructional design and pedagogical innovation studies. The search was limited to publications from January 2020 to January 2025 to capture contemporary empirical developments related to the implementation of deep learning within the Kurikulum Merdeka framework and broader global discourse. A structured Boolean search strategy was applied by combining keywords representing mindful learning, joyful learning, meaningful learning, and instructional models. The primary search string combined variations of "mindful learning" or "mindfulness-based teaching," "joyful learning" or "gamification" or "play-based learning," "meaningful learning" or "authentic learning" or "problem-based learning" or "project-based learning" or "inquiry-based learning," together with "instructional model" or "teaching strategy." Filters were applied to include only peer-reviewed journal articles published in English or Indonesian.

The initial search yielded 412 records, distributed across Google Scholar (218), Scopus (74), ERIC (56), and SpringerLink (64). All references were exported into Mendeley reference management software to facilitate organization and duplicate removal. A total of 67 duplicate entries were identified and removed, leaving 345 unique articles for the screening phase. Titles and abstracts were independently reviewed to determine their relevance to instructional models supporting at least one dimension of deep learning. During this screening stage, 221 articles were excluded because they focused on artificial intelligence deep learning, did not discuss instructional models, or were not aligned with mindful, joyful, or meaningful learning principles. As a result, 124 articles advanced to full-text assessment.

Full-text eligibility screening was conducted to ensure strict adherence to predefined inclusion criteria. Studies were included if they were peer-reviewed empirical research articles published between 2020 and 2025, written in English or Indonesian, conducted in formal educational settings, and explicitly implemented or analysed instructional models connected to at least one deep learning dimension. In addition, included studies were required to report

measurable learning outcomes, whether cognitive, affective, behavioural, or metacognitive. Articles were excluded if they were theoretical papers without empirical data, conference proceedings, dissertations, book chapters, or inaccessible full texts. During this eligibility phase, 89 articles were excluded due to insufficient methodological transparency, lack of measurable indicators, or absence of explicit alignment with deep learning constructs. Ultimately, 35 empirical studies met all criteria and were included in the final synthesis.

To ensure methodological quality and credibility, each of the 35 selected studies underwent a structured appraisal process using criteria adapted from the Mixed Methods Appraisal Tool (MMAT, 2018 version) and the Critical Appraisal Skills Programme (CASP) checklist. Each study was evaluated based on clarity of research objectives, appropriateness of design, adequacy of sampling strategy, transparency of data collection procedures, validity and reliability of instruments, robustness of analysis, and coherence between findings and conclusions. Each criterion was scored on a three-point scale ranging from unclear to fully adequate. Only studies achieving at least 70 percent of the maximum possible quality score were retained in the final synthesis. Quality assessment was conducted independently by two reviewers to minimize subjective bias.

Following study selection and quality appraisal, a structured data extraction matrix was developed in Microsoft Excel to ensure consistent documentation across studies. Extracted variables included author and year of publication, country and educational level, research design, type of instructional model implemented, specific deep learning dimension addressed, operational indicators of mindful, joyful, and meaningful learning, key findings, and reported effect sizes where available. This matrix enabled systematic comparison and cross-study analysis while preserving traceability of each data source.

The analytical procedure combined qualitative thematic analysis with quantitative descriptive synthesis. The qualitative analysis followed a three-stage coding process consisting of open coding, axial coding, and selective coding. During open coding, explicit indicators related to mindful learning (such as awareness, attention regulation, reflection, and metacognition), joyful learning (positive emotions, engagement, intrinsic motivation), and meaningful learning (authentic context, knowledge integration, transfer of learning) were identified in each study. In the axial coding stage, related codes were grouped into broader analytical categories representing patterns of instructional alignment. During selective coding, cross-category relationships were examined to identify overarching themes and determine which instructional models demonstrated comprehensive or partial support for integrated deep learning principles.

Quantitative synthesis was conducted when numerical data were reported in the primary studies. Frequency distributions and percentages were calculated to determine the prevalence of specific instructional models and their alignment with deep learning dimensions. For experimental and quasi-experimental studies providing pre-test and post-test data, effect sizes were calculated using Cohen's d to estimate the magnitude of instructional impact. These calculations were performed using SPSS Version 26, enabling standardized interpretation of intervention effects.

To enhance analytical reliability, two independent coders conducted the coding process separately. Inter-rater reliability was calculated using Cohen's Kappa (κ) to determine the level of agreement beyond chance. The resulting κ value of 0.82 indicated substantial agreement between coders. Any discrepancies were discussed through structured consensus meetings until full agreement was achieved. Although the study did not involve human participants, ethical standards were maintained by ensuring accurate citation of all sources, transparent reporting of procedures, and faithful representation of original findings. All methodological steps, including search strings, screening procedures, coding frameworks, and reliability measures, are explicitly documented to enable replication by future researchers seeking to reproduce or extend this review.

The complete study selection process, including identification, screening, eligibility assessment, and final inclusion, is presented in Figure 1 following the PRISMA 2020 guidelines.

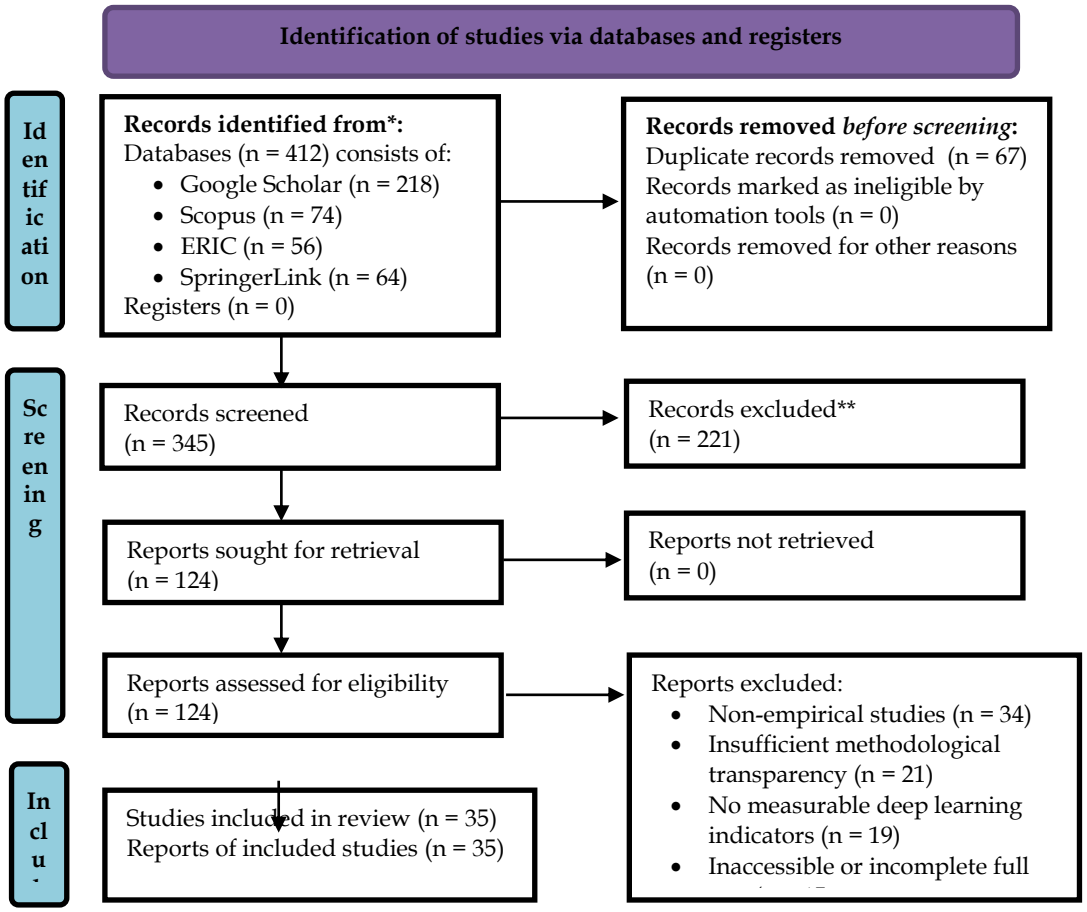

Figure 1. PRISMA 2020 flow diagram illustrating the identification, screening, eligibility assessment, and inclusion

As shown in Figure 1, the progressive reduction from 412 identified records to 35 included studies reflects the strict application of predefined inclusion criteria and quality appraisal standards, reinforcing the methodological robustness of this review.

RESULT AND DISCUSSION

The systematic review included 35 empirical studies that met all inclusion criteria and passed the methodological quality appraisal. Although these studies represent diverse instructional contexts and pedagogical approaches, a clear pattern emerges in how instructional models are distributed across the three dimensions of deep learning: mindful, joyful, and meaningful learning. This distribution not only reflects variation in instructional practices but also reveals underlying theoretical tendencies that shape how deep learning is operationalized in contemporary research.

Tabel 1. Instructional Models and Their Alignment with the Dimensions of Deep Learning

Deep Learning Dimension	Learning Models Identified	Empirical studies	%	Key Characteristics Supporting the Dimension	Summary of Evidence
Mindful Learning (5 studies)	Mindfulness-Based Teaching;	1	2,86%	Awareness, focused attention, reflection, metacognitive regulation	Models foster mindful learning by encouraging learners to reflect, monitor their thinking, regulate learning strategies, and become consciously engaged in the learning
	Mindful Movement Program (MMP);	1	2,86%		
	Mindful Co-Regulation;	1	2,86%		

Deep Learning Dimension	Learning Models Identified	Empirical studies	%	Key Characteristics Supporting the Dimension	Summary of Evidence
	Metacognitive Instruction.	2	5,71%		process. Mindfulness emerges both through explicit practices (e.g., journaling, guided reflection) and implicitly through inquiry- and project-oriented tasks.
Joyful Learning (8 studies)	Game-Based Learning;	3	8,57%	Positive emotions, intrinsic motivation, curiosity, engagement	These models promote joyful learning through playfulness, creativity, immersion, and challenge. Game elements, creative exploration, and narrative experiences enhance enjoyment, motivation, and students' willingness to engage deeply with learning activities.
	JEMPITA Model;	1	2,86%		
	Play-Based Learning;	1	2,86%		
	VR/AR-Based Learning;	2	5,71%		
	Storytelling Learning	1	2,86%		
Meaningful Learning (9 studies)	Discovery Learning;	3	8,57%	Authenticity, relevance, conceptual linkage	Meaningful learning is supported through real-world problems, authentic tasks, and opportunities for learners to connect new knowledge with prior understanding, resulting in deeper conceptual comprehension and long-term retention.
	Contextual Teaching and Learning;	4	11,43%		
	Fink's Significant Learning Model;	1	2,86%		
	Concept Mapping Instruction	1	2,86%		
Integrated Mindful–Joyful–Meaningful Learning (13 studies)	Project-Based Learning;	5	14,29%	Reflection, engagement, authenticity, collaboration, inquiry	These models demonstrate strong simultaneous alignment with all three dimensions. They integrate reflective processes (mindful), emotional engagement and creativity (joyful), and real-world relevance (meaningful), making them the most comprehensive for fostering deep learning.
	Problem-Based Learning;	4	11,43%		
	Inquiry-Based Learning;	2	5,71%		
	Experiential Learning;	1	2,86%		
	STEAM Learning	1	2,86%		

A quantitative analysis of instructional model frequency shows that Project-Based Learning (n = 5; 14.29%) (Chandra et al., 2025; Pandey et al., 2025; Tang et al., 2026; S. Wang, 2022; Y. Wang et al., 2023; Wurdinger et al., 2007) and Problem-Based Learning (n = 4; 11.43%) (Dolmans et al., 2016; Epm et al., 2025; Mukund, 2022; Yeo, 2008) are the most frequently implemented models. This dominance suggests that deep learning is predominantly interpreted through constructivist and inquiry-driven paradigms. These models emphasize authentic problem solving, collaboration, and learner autonomy, which naturally align with deep learning principles. However, their prominence also indicates that deep learning is often enacted through

existing pedagogical frameworks rather than through explicitly designed deep learning models. In this sense, deep learning appears to be embedded within, rather than redefining, current instructional practices.

The presence of Contextual Teaching and Learning (n = 4; 11.43%) (Giamellaro et al., 2022; Hudson & Whisler, 2007; Selvianiresa & Prabawanto, 2017; J. Wang & Liu, 2025) and Discovery Learning (n = 3; 8.57%) (Honomichl & Chen, 2012; Stoffová, 2020; Wada et al., 2019, 2020) further reinforces the centrality of meaningful learning as the dominant entry point for deep learning implementation. These models prioritize relevance, real-world application, and conceptual understanding, reflecting a strong alignment with constructivist learning theory. While this indicates a solid cognitive foundation, it also suggests that deep learning is frequently reduced to meaningful knowledge construction, potentially overlooking its reflective and affective dimensions.

In contrast, models associated with joyful learning, such as Game-Based Learning (n = 3; 8.57%) (Ayyal Awwad, 2025; Fishman et al., 2021; Misra et al., 2021; Ninaus et al., 2019) and VR/AR-Based Learning (n = 2; 5.71%) (AlGerafi et al., 2023; Kristanti et al., 2025; Masopust et al., 2025; Sachdeva et al., 2025), demonstrate a growing emphasis on engagement, motivation, and immersive experience. This trend reflects an increasing recognition of the role of positive emotions in supporting learning processes. However, their relatively moderate representation indicates that emotional engagement is often treated as a supporting mechanism rather than as a core dimension of deep learning. As a result, joyful learning tends to enhance participation without necessarily ensuring deeper cognitive integration or reflective awareness.

A more critical gap is observed in the limited representation of explicitly mindful-oriented models, including Mindfulness-Based Teaching, Mindful Movement Program, and Mindful Co-Regulation (each n = 1; 2.86%) (Bloise et al., 2016; Clark et al., 2015; Coatsworth et al., 2014; Levendusky & Crippen, 2025; Whitesman & Mash, 2016). Despite the theoretical importance of metacognitive regulation and reflective awareness, these models remain marginal within empirical research. This suggests that mindful learning is still underdeveloped as an independent instructional focus. Instead, reflective processes are often embedded implicitly within broader inquiry-based models rather than being intentionally structured. This implicit integration may limit the depth of learners' metacognitive development, as reflection is not always systematically scaffolded.

When the distribution is examined across deep learning dimensions, the integrated category—comprising models that simultaneously support mindful, joyful, and meaningful learning—accounts for the largest proportion (n = 13; 37.14%). This indicates a growing shift toward holistic instructional designs that attempt to combine cognitive, emotional, and reflective processes. However, the fact that this category does not dominate the majority of studies suggests that full integration remains inconsistent. Deep learning, therefore, is more frequently implemented in partial forms rather than as a fully integrated framework.

At the dimensional level, meaningful learning remains the most prominent single dimension (n = 9; 25.71%), followed by joyful learning (n = 8; 22.86%), and mindful learning (n = 5; 14.29%). This imbalance highlights a critical issue in the current landscape of deep learning research. While instructional models effectively promote relevance and engagement, they less consistently foster reflective awareness and metacognitive regulation. Consequently, learners may experience rich and engaging learning environments without fully developing the capacity to consciously regulate and reflect upon their learning processes.

To provide a clearer visual representation of the proportional distribution of deep learning dimensions across the reviewed studies, Figure 2 illustrates the comparative prevalence of integrated, meaningful, joyful, and mindful learning.

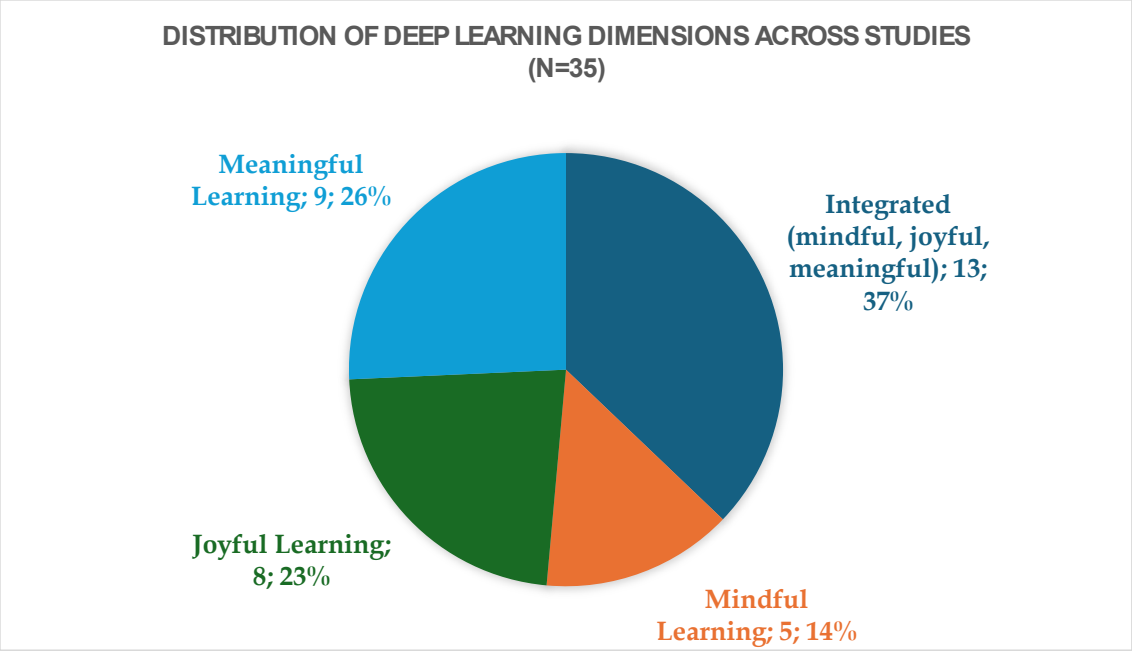

Figure 2. Distribution of Deep Learning Dimensions Across Reviewed Studies

As illustrated in Figure 2, the integrated dimension represents the largest proportion, indicating a growing shift toward holistic instructional approaches. However, the relatively smaller proportion of mindful learning highlights an imbalance in current pedagogical practices, where reflective awareness is less explicitly emphasized compared to cognitive and affective engagement.

The dominance of project-based and problem-based approaches within both the frequency distribution and the integrative category further underscores their central role in shaping deep learning practices. These models function as de facto frameworks for deep learning, as they naturally integrate multiple dimensions of learning. However, their widespread adoption also raises an important question: whether deep learning is being conceptualized as a distinct pedagogical paradigm or merely as an extension of existing constructivist approaches.

Overall, the findings suggest that deep learning is currently operationalized through a combination of constructivist, experiential, and engagement-oriented pedagogies, with varying degrees of integration across dimensions. While meaningful and joyful learning are relatively well represented, mindful learning remains less explicitly addressed, indicating a gap between theoretical expectations and practical implementation. This imbalance points to the need for more intentional instructional designs that explicitly integrate metacognitive and reflective processes within existing pedagogical frameworks.

To provide a structured synthesis of these findings, Table 1 presents the classification of instructional models, their defining characteristics, and their alignment with the three dimensions of deep learning. Beyond serving as a descriptive summary, the table highlights the underlying imbalance in the current research landscape and reinforces the argument that achieving holistic deep learning requires more deliberate integration across cognitive, emotional, and reflective domains.

DISCUSSION

The findings of this study reveal a fundamental pattern in how deep learning is currently understood and implemented within instructional design. Rather than being treated as a fully integrated pedagogical paradigm, deep learning appears to be operationalized through existing instructional models—particularly those rooted in constructivist and inquiry-based traditions. This indicates that deep learning, in practice, is not yet a distinct instructional framework but is

instead embedded within familiar pedagogical approaches such as project-based and problem-based learning.

A key insight emerging from the results is that the three dimensions of deep learning—mindful, joyful, and meaningful learning—are not equally represented in instructional practices. Meaningful learning serves as the dominant entry point, suggesting that deep learning is most often interpreted through the lens of cognitive engagement, authenticity, and knowledge construction. This reflects a tendency among educators and researchers to prioritize learning that is relevant and contextually grounded. However, this cognitive emphasis also reveals a limitation: deep learning risks being reduced to "learning that is meaningful" without fully addressing how learners become aware of, regulate, and emotionally engage with their learning processes.

At the same time, the presence of joyful learning across several instructional models indicates a growing recognition of the importance of engagement, motivation, and positive emotional experience in learning. Yet, this dimension often functions as a supporting mechanism rather than a core design principle. Joyful learning enhances participation and interest, but it is not always systematically linked to deeper conceptual understanding or reflective awareness. This suggests that emotional engagement is frequently instrumentalized—used to make learning more attractive—rather than conceptualized as an essential component of deep learning itself.

More critically, the findings highlight a persistent underrepresentation of mindful learning. Reflective awareness, metacognitive regulation, and conscious engagement—elements that are central to deep learning theory—are rarely positioned as explicit instructional goals. Instead, they tend to be embedded implicitly within broader learning activities. This implicitness creates a gap between theoretical expectations and practical implementation. Learners may engage in complex tasks and authentic problem solving, yet without structured opportunities to reflect on their thinking, their learning remains procedurally rich but metacognitively shallow.

Another important finding is the emergence of integrative instructional models that simultaneously address mindful, joyful, and meaningful dimensions. These models suggest a gradual shift toward more holistic approaches to learning. However, their partial dominance indicates that such integration is not yet the norm. Deep learning, therefore, is more frequently implemented in fragmented forms rather than as a fully coherent system. This fragmentation reflects a transitional phase in educational practice, where the idea of deep learning is gaining recognition but has not yet been fully translated into consistent instructional design.

Taken together, these findings suggest that the current landscape of deep learning is characterized by strong cognitive and experiential components, moderate emotional engagement, and limited explicit attention to reflective awareness. This imbalance implies that while learners are increasingly exposed to authentic and engaging learning environments, they are not consistently supported in developing the metacognitive capacities necessary for sustained and transferable learning. As a result, deep learning, in its fullest sense, remains only partially realized.

The patterns identified in this study can be more deeply understood when interpreted through established learning theories, particularly those of Ausubel, Langer, and Fredrickson, which collectively represent cognitive, metacognitive, and affective dimensions of learning.

The strong dominance of meaningful learning aligns closely with Ausubel's theory of meaningful learning, which emphasizes the importance of connecting new knowledge to existing cognitive structures (Agra et al., 2019; Bryce & Blown, 2024; McClelland, 2018; Tian et al., 2020). Instructional models such as project-based and problem-based learning inherently facilitate this process by situating learning within authentic contexts and encouraging learners to actively construct understanding. The findings suggest that contemporary instructional practices are highly consistent with Ausubel's principles, particularly in their emphasis on relevance, prior knowledge activation, and conceptual integration. However, Ausubel also stresses the need for deliberate instructional support to ensure meaningful connections are formed. The results of this study indicate that while authenticity is widely implemented, structured conceptual scaffolding is not always explicitly designed, which may limit the depth of cognitive integration.

In contrast, the limited representation of mindful learning highlights a gap when viewed through Langer's theory of mindful learning. Langer conceptualizes learning as a process of active distinction-making, openness to novelty, and awareness of multiple perspectives (Bordunos et al., 2025; Bosma et al., 2025; Davenport & Pagnini, 2016; Fox Lee, 2019). Mindful learning requires learners to engage consciously with content, question assumptions, and reflect on their thinking processes. The findings suggest that while some instructional models implicitly support these processes, they rarely do so in a structured and intentional manner. This indicates that current instructional practices may promote activity and engagement without necessarily fostering cognitive flexibility and reflective awareness. From Langer's perspective, this represents a form of "mindless learning," where learners participate in complex tasks but rely on routine or automatic thinking rather than active awareness.

The role of joyful learning in the findings can be effectively interpreted through Fredrickson's Broaden-and-Build Theory of Positive Emotions (Finucane & Whiteman, 2007; Isgett & Fredrickson, 2015; Kushkiev, 2019; Low et al., 2016; Reschly et al., 2008; Rhee, 2006). According to this theory, positive emotions such as joy, interest, and curiosity broaden individuals' cognitive processes and enhance their capacity to build knowledge and skills. The presence of game-based, immersive, and narrative instructional models reflects an increasing alignment with this theoretical perspective. These models create emotionally engaging environments that encourage exploration and sustained participation. However, Fredrickson's theory also implies that positive emotions are a means to an end rather than an end in themselves. They create conditions for deeper learning but do not guarantee it. The findings of this study support this interpretation, as joyful learning appears to enhance engagement but does not consistently lead to reflective or meaningful learning unless integrated with other dimensions.

When viewed collectively, these three theoretical perspectives suggest that deep learning is inherently multidimensional, requiring the integration of cognitive structure (Ausubel), reflective awareness (Langer), and emotional engagement (Fredrickson). The imbalance observed in the findings indicates that current instructional practices tend to emphasize cognitive and affective components while underdeveloping the reflective dimension. This partial alignment suggests that deep learning is being approached as a combination of separate elements rather than as an integrated system.

Furthermore, the prominence of constructivist and inquiry-based models suggests that deep learning is currently anchored within constructivist theory. While constructivism provides a strong foundation for meaningful learning, it does not inherently guarantee mindfulness or emotional engagement. The findings therefore point to the need for a theoretical expansion beyond traditional constructivism toward a more integrative framework that explicitly incorporates metacognitive and affective processes.

In this sense, the results of this study contribute to a reconceptualization of deep learning—not as a singular instructional approach, but as a dynamic interaction between meaning, awareness, and emotion. This interpretation provides a theoretical basis for developing more balanced instructional models that intentionally integrate all three dimensions, rather than relying on implicit or partial alignment.

The findings of this study resonate with and extend prior research examining the relationship between mindful, joyful, and meaningful learning within the broader framework of deep learning. Existing literature consistently emphasizes that deep learning is a multidimensional construct shaped by cognitive, affective, and metacognitive processes; however, the present study provides a more nuanced understanding by highlighting the imbalance in how these dimensions are operationalized in instructional practice.

In relation to mindful learning, previous research has identified mindfulness as a significant predictor of deep learning, particularly in technology-enhanced environments. For instance, (Santosa et al., 2026) found that mindful learning, alongside meaningful and joyful learning, contributes to deep learning outcomes, although its influence varies depending on the learning context. The current findings partially align with this perspective but reveal a critical divergence: while mindfulness is theoretically acknowledged as essential, it remains

underrepresented as an explicit instructional focus. This suggests that, unlike prior studies that position mindfulness as a central driver of deep learning, contemporary instructional models tend to embed mindfulness implicitly rather than design it as a structured pedagogical component. This discrepancy highlights a gap between theoretical emphasis and practical implementation.

Regarding joyful learning, prior studies underscore the importance of positive emotional engagement in fostering deeper understanding and sustained learning. (Scipio et al., 2026) argue that pedagogies of joy can enhance learners' sensemaking processes, particularly in STEM education, by creating environments that affirm learner identity and engagement. Similarly, (Zhou & Zhang, 2025) demonstrate that integrating the ARCS motivation model within flipped classroom settings significantly improves students' intrinsic motivation and deep learning outcomes. The findings of the present study are consistent with these perspectives in recognizing the growing role of engagement-oriented instructional models, such as game-based and immersive learning. However, this study further suggests that joyful learning is often positioned as a facilitative condition rather than a core structural component of deep learning. In other words, while prior research highlights the transformative potential of joy, current instructional practices tend to utilize it primarily as a means to enhance participation rather than as an integral dimension of deep learning.

In the context of meaningful learning, the findings strongly align with established literature emphasizing the importance of relevance, prior knowledge, and conceptual integration. (Ghazali, 2025) highlights that meaningful learning environments enable learners to connect new knowledge with existing cognitive structures, thereby enhancing retention and application. Similarly, (Hermida, 2014) emphasizes the role of higher-order thinking and authentic learning experiences in facilitating deep learning. The present study reinforces these arguments by demonstrating that meaningful learning remains the most dominant and consistently implemented dimension across instructional models. However, it also extends prior work by suggesting that this dominance may inadvertently lead to a reductionist interpretation of deep learning, where it is equated primarily with cognitive depth while overlooking reflective and affective dimensions.

The interplay between these three dimensions has also been explored in previous studies, particularly in relation to environmental and interactional factors. Li (Li et al., 2024) found that learner characteristics, learning environments, and interaction patterns significantly influence deep and meaningful learning in blended contexts. Similarly, (Sergis & Sampson, 2019) argue that deeper learning emerges from the integration of multiple dimensions, including cognitive engagement, collaboration, and self-regulation. The present study supports these findings but adds a critical insight: while integrative models are increasingly recognized, their implementation remains inconsistent. The partial dominance of integrative instructional models suggests that the field is in a transitional phase, moving toward holistic approaches but not yet achieving full conceptual and practical integration.

Furthermore, recent studies have begun to explore the role of emerging technologies and innovative pedagogical models in enhancing deep learning. For example, (Remmiya Rajan, 2025) highlights the potential of AI-driven learning environments to support deep learning by enhancing personalization, engagement, and well-being. Similarly, (Aryana et al., 2026) introduce the JEMPITA model as an innovative framework that integrates joyful and meaningful learning to enhance motivation and learner-centered instruction. While these studies point toward promising directions, the current findings suggest that such innovations are still fragmented and have not yet been widely adopted across educational contexts.

Taken together, the comparison with prior studies indicates that while the theoretical foundations of deep learning are well established, their translation into instructional practice remains uneven. Previous research tends to conceptualize deep learning as an integrated construct, whereas the current study reveals that its implementation is often partial and dimensionally imbalanced. This divergence underscores the need for a more deliberate and systematic integration of mindful, joyful, and meaningful learning within instructional design.

In this sense, the present study contributes to the literature by bridging the gap between theoretical ideal and practical reality. It highlights not only the alignment between current findings and prior research but also the inconsistencies that persist in how deep learning is enacted in educational settings. This provides a foundation for advancing both theoretical refinement and pedagogical innovation in future research.

More importantly, this study offers a novel contribution by moving beyond the dominant tendency to treat mindful, joyful, and meaningful learning as parallel or co-existing constructs. Instead, the findings suggest that these dimensions operate in a hierarchical and interdependent relationship, where meaningful learning often functions as the foundational layer, joyful learning acts as an engagement amplifier, and mindful learning serves as a regulatory and transformative mechanism. This reconceptualization shifts the discourse from a static three-component model toward a more dynamic system of deep learning processes.

Furthermore, this study introduces an integrative analytical lens that distinguishes between explicit and implicit alignment of instructional models with deep learning dimensions. While prior studies tend to assume that the presence of inquiry, engagement, or authenticity automatically reflects deep learning, the present findings demonstrate that many instructional practices only partially embody deep learning principles, particularly in the absence of structured metacognitive engagement. This distinction provides a more precise framework for evaluating the depth of learning beyond surface-level indicators.

Another key novelty lies in identifying the "fragmentation phenomenon" in current deep learning practices, where instructional models tend to emphasize one or two dimensions while neglecting others. By systematically mapping this imbalance, the study advances a more critical understanding of why deep learning remains inconsistently implemented despite its strong theoretical foundation. This insight opens new directions for designing instructional models that intentionally integrate cognitive, affective, and metacognitive dimensions rather than relying on incidental overlap.

Taken together, these contributions position this study not merely as a descriptive synthesis of existing models, but as a conceptual advancement that reframes deep learning as a structured, multi-layered, and design-sensitive construct. This perspective lays the groundwork for the development of next-generation instructional models—such as integrative or hybrid frameworks—that explicitly operationalize the interplay between mindfulness, joy, and meaningfulness in a coherent and measurable way

The findings of this study carry significant implications across pedagogical practice, academic discourse, and educational policy, particularly in advancing a more coherent and integrated understanding of deep learning as a multidimensional construct.

From a practical perspective, the study underscores the need for instructional design that moves beyond partial or implicit alignment with deep learning principles. Educators should not assume that the use of inquiry-based, project-based, or contextual learning models automatically leads to deep learning. Instead, instructional practices must be intentionally designed to integrate all three dimensions—mindful, joyful, and meaningful learning—in a structured and balanced manner. This implies the incorporation of explicit metacognitive scaffolding, such as reflective prompts, self-monitoring activities, and guided evaluation, to strengthen the mindful dimension that is currently underrepresented. At the same time, emotional engagement strategies should not merely serve as motivational tools but should be deliberately connected to conceptual understanding and reflective processes. In this sense, effective teaching requires a shift from activity-oriented design toward process-oriented design, where cognitive, affective, and metacognitive elements are systematically interwoven.

At the academic level, this study contributes to the ongoing discourse by challenging the prevailing assumption that deep learning dimensions function as parallel constructs. The identification of a hierarchical and interdependent relationship among meaningful, joyful, and mindful learning invites a reconceptualization of deep learning frameworks. Future theoretical development should therefore focus on modeling deep learning as a dynamic system rather than a static taxonomy. This includes the need to develop more precise operational definitions and measurement instruments that can capture the depth and interaction of these dimensions in real

learning contexts. Moreover, the distinction between explicit and implicit alignment introduced in this study provides a new analytical lens for evaluating instructional models, which can be further refined and validated in subsequent research.

From a policy standpoint, the findings highlight the importance of aligning curriculum design, teacher professional development, and assessment systems with a holistic conception of deep learning. Educational policies should move beyond emphasizing content mastery and cognitive outcomes alone, and instead incorporate indicators of metacognitive awareness and emotional engagement as essential components of learning quality. Teacher training programs, in particular, should equip educators with the capacity to design learning experiences that foster reflection, agency, and meaningful engagement. This is especially relevant in the context of contemporary curriculum reforms that advocate for student-centered and competency-based learning, where deep learning is positioned as a key objective but is often insufficiently operationalized in practice.

In terms of future research, several directions emerge from the limitations and contributions of this study. First, there is a need for empirical studies that test the proposed hierarchical and integrative model of deep learning across diverse educational contexts and subject domains. Such studies could employ mixed-methods approaches to capture both the structural relationships among dimensions and the lived experiences of learners. Second, further research is needed to develop and validate instructional models or frameworks that explicitly integrate mindful, joyful, and meaningful learning in a coherent design. This includes exploring how scaffolding strategies can be systematically embedded to enhance metacognitive engagement. Third, future studies should investigate the role of emerging technologies—such as artificial intelligence, adaptive learning systems, and immersive environments—in supporting the integration of deep learning dimensions.

Finally, this study opens an important avenue for bridging theoretical advancement with pedagogical innovation. By positioning deep learning as a structured and design-sensitive construct, future research can move toward developing scalable and contextually adaptable models that not only align with theoretical principles but also respond to the practical realities of classroom implementation. In doing so, the field can progress from fragmented adoption toward a more unified and impactful realization of deep learning in education.

CONCLUSION

Taken together, the findings of this study underscore that deep learning cannot be adequately understood or implemented through fragmented or partial instructional approaches. While current educational practices demonstrate substantial alignment with meaningful learning and, to a lesser extent, joyful engagement, they still fall short in systematically fostering mindful learning as a core regulatory and transformative process. This imbalance reveals that deep learning, in many contexts, remains operationalized as a set of loosely connected dimensions rather than a fully integrated pedagogical system. By reconceptualizing the relationship among meaningful, joyful, and mindful learning as hierarchical and interdependent, this study advances a more coherent and dynamic understanding of deep learning that moves beyond conventional parallel models.

At the same time, the study highlights a critical need for intentional instructional design that explicitly integrates cognitive, affective, and metacognitive dimensions. The distinction between explicit and implicit alignment offers a more precise lens for evaluating the depth of learning, emphasizing that authentic tasks and engaging activities alone are insufficient without structured opportunities for reflection and self-regulation. These insights not only refine the theoretical foundation of deep learning but also point toward the necessity of developing integrative instructional frameworks that can translate these principles into consistent classroom practice.

Ultimately, this study positions deep learning as a design-sensitive construct that requires deliberate orchestration of meaning, engagement, and awareness. The implications extend beyond classroom practice to inform curriculum development, teacher professional learning, and future research directions aimed at achieving a more holistic realization of deep learning.

Building on these insights, the following section presents the main conclusions of the study, summarizing its key contributions while outlining the broader prospects for advancing deep learning theory and practice.

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