COMPETITOR:
JURNAL PENDIDIKAN KEPELATIHAN OLAHRAGA
e-ISSN: 2657-0734 & p-ISSN: 2085-5389 ‖ Volume 18, Number 2, 2026 ‖ P.2073-2089

Exploring the Experiences of Physical Education Teachers in Implementing Deep Learning in Elementary Schools in Kudus District

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ABSTRACT

This study was motivated by the growing emphasis on implementing deep learning within the Merdeka Curriculum, particularly in Physical Education, Sports, and Health (PJOK), which requires learning to be mindful, meaningful, and joyful. However, the implementation of these principles in elementary school physical education remains varied and context-dependent, especially from the perspective of teachers' experiences. Therefore, this study aimed to explore the experiences of physical education teachers in applying deep learning principles in elementary schools in Kota District, Kudus Regency. This study employed a qualitative descriptive design to examine teachers' conceptual understanding and its implementation in PJOK learning practices. Data were collected from 17 PJOK teachers as primary informants, 17 school principals as key informants, and 3 students as additional informants through semi-structured interviews, direct observations, and documentation. Data analysis followed three stages: data reduction, data display, and conclusion verification. The findings revealed that teachers' understanding of deep learning varied across good, moderate, and limited categories. Of the 17 teachers, 41% demonstrated good understanding, 35% moderate understanding, and 24% limited understanding. Teachers with stronger understanding were able to integrate mindful, meaningful, and joyful principles into instructional practice, while others still interpreted the concept at a basic level. In practice, deep learning principles have begun to be implemented, particularly in creating joyful learning environments and connecting movement activities to students' daily lives, although implementation remains inconsistent and insufficiently systematic. In conclusion, successful implementation of deep learning in PJOK depends not only on curriculum policy but also on teachers' pedagogical competence, reflective practice, and institutional support. Strengthening professional development and structured guidance is essential to improve the sustainability of deep learning implementation.

ARTICLE HISTORY
Received: 2026/03/09
Accepted: 2026/03/23
Published: 2026/05/10

KEYWORDS
Deep Learning;
Physical Education Teachers;
Mindful Learning;
Meaningful Learning;
Joyful Learning.

AUTHORS' CONTRIBUTION
A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

Cites this Article : Anggraeni, R.; Kurniawan, W.R. (2026). Exploring the Experiences of Physical Education Teachers in Implementing Deep Learning in Elementary Schools in Kudus District. **Competitor: Jurnal Pendidikan Kepelatihan Olahraga**. 18 (2), p.2073-2089

INTRODUCTION

Physical Education, Sports, and Health (PJOK) has long been recognized as an integral component of elementary education, contributing not only to students' physical fitness but also to cognitive development, socio-emotional growth, and character formation (Pendidikan & Dan, 2025; Langgeng Hutomo, 2025). In elementary schools,

PJOK serves as a pedagogical space where students develop movement competence, teamwork, discipline, and healthy lifestyle habits that can shape lifelong wellbeing (Bailey et al., 2019; Dyson et al., 2020). Within the Indonesian educational context, the implementation of the Merdeka Curriculum has reinforced the need for PJOK learning to move beyond routine physical activity instruction toward meaningful, active, and student-centered experiences (Mata et al., 2022; Kemendikbud, 2023).

Aligned with this transformation, deep learning has emerged as an important educational approach emphasizing conceptual understanding, critical thinking, creativity, and authentic student engagement (Fullan et al., 2018; Akmal et al., 2025). In educational discourse, deep learning differs fundamentally from surface learning because it encourages students not merely to reproduce information but to connect concepts, reflect critically, and apply understanding in diverse contexts (Biggs & Tang, 2017; Hattie, 2021). Within the Merdeka Curriculum, deep learning is framed through joyful, mindful, and meaningful learning experiences, requiring students to actively construct knowledge through engaging and reflective activities (Mahardika & Jaya, 2025; Afaf Achmad Syahab & Bahriyanto, 2025).

In PJOK, implementing deep learning is particularly significant because the subject naturally combines physical engagement, experiential learning, and social interaction. Through appropriately designed activities, students can learn not only movement skills but also develop problem-solving, tactical understanding, self-regulation, and collaborative competence (Casey et al., 2021; Kirk, 2020). However, the practical implementation of deep learning in PJOK remains challenging. Many learning practices still emphasize mechanical repetition of movement techniques, teacher-centered instruction, and outcome-oriented drills rather than reflective, student-driven learning experiences (Fitriah & Mirianda, 2019; Fitrah et al., 2025).

These challenges become more visible in elementary school settings where teachers often face limitations related to facilities, instructional time, class management, and varying student readiness (Siedentop et al., 2020; Lund & Tannehill, 2022). In Kudus District, particularly in Kota District, elementary school PE teachers are required to implement deep learning within diverse school environments characterized by uneven access to sports facilities, differences in student interests and abilities, and contextual constraints affecting pedagogical practices. These realities raise concerns regarding whether deep learning principles are being translated meaningfully into daily PJOK instruction.

Moreover, while some teachers attempt to foster joyful learning through games and engaging activities, the mindful and meaningful dimensions of deep learning are often insufficiently integrated. Reflection, value reinforcement, and linking learning experiences to students' real-life contexts remain underdeveloped. This indicates a gap between curriculum expectations and practical implementation, making teachers' experiences in implementing deep learning a crucial issue for investigation.

Current literature suggests that deep learning has gained increasing attention as a pedagogical approach supporting 21st-century competencies, including critical

thinking, creativity, communication, and collaboration (Fullan et al., 2018; OECD, 2020; Darling-Hammond et al., 2020). Research has demonstrated that deep learning environments improve students' engagement, conceptual understanding, and transfer of knowledge across contexts (Hattie, 2021; Pellegrino & Hilton, 2019).

Within physical education, pedagogical models such as Teaching Games for Understanding, Sport Education Model, and cooperative learning have been recognized as approaches aligned with deep learning principles (Casey et al., 2021; Dyson et al., 2020; Kirk, 2020). These approaches emphasize active inquiry, tactical awareness, decision making, and reflection, supporting meaningful student participation. Studies have shown that when students engage in problem-based movement tasks and reflective activities, they demonstrate stronger understanding and greater motivation in physical education settings (Goodyear et al., 2021; Casey & MacPhail, 2018).

Recent Indonesian studies have also highlighted efforts to integrate innovative and student-centered practices in PJOK within the Merdeka Curriculum framework (Mata et al., 2022; Mahardika & Jaya, 2025). Professional development initiatives have sought to strengthen teachers' understanding of joyful, mindful, and meaningful learning. Several studies report positive impacts of active and game-based learning on student motivation and learning outcomes (Fitrah et al., 2025; Akmal et al., 2025).

However, research also indicates persistent barriers. Teachers often have insufficient conceptual understanding of deep learning, limited pedagogical support, and difficulties translating abstract principles into classroom practice (Fitriah & Mirianda, 2019; Darling-Hammond et al., 2020). In PE contexts specifically, the practical complexity of managing physical activities, ensuring safety, and facilitating reflection presents additional challenges (Lund & Tannehill, 2022; Siedentop et al., 2020).

Empirical findings suggest that successful implementation depends heavily on teachers' pedagogical beliefs, contextual adaptation, and professional agency (Korthagen, 2017; Opfer & Pedder, 2019). Therefore, understanding teachers' lived experiences is critical for advancing deep learning implementation, particularly in localized educational contexts such as elementary schools in Kudus District.

Despite growing attention to deep learning, significant gaps remain in the literature. First, most studies have examined deep learning primarily through student outcomes, instructional models, or curriculum policy perspectives, with limited focus on teachers' lived experiences in applying deep learning principles in daily teaching practice (Goodyear et al., 2021; Hattie, 2021). Second, within PJOK research, studies have predominantly investigated the effects of learning methods, instructional media, and pedagogical models on students' cognitive, affective, or psychomotor outcomes (Casey et al., 2021; Dyson et al., 2020). Few studies have specifically explored how PE teachers interpret and implement joyful, mindful, and meaningful learning dimensions in practice. Third, the contextual realities of implementing deep learning in elementary school PE where instruction occurs in dynamic, physically active, and often resource-constrained environments remain underexplored. This is particularly evident in Indonesian contexts, where empirical research addressing teachers' experiences under the Merdeka

Curriculum is still limited (Mahardika & Jaya, 2025; Fitrah et al., 2025). Fourth, there is a scarcity of context-specific research examining PE teachers' experiences in local educational settings such as Kudus District. Most prior studies have adopted generalized perspectives and have not sufficiently captured how school conditions, facilities, student diversity, and local educational culture shape deep learning implementation.

This study addresses these gaps by focusing explicitly on the experiences of physical education teachers in implementing deep learning in elementary schools, emphasizing the local context of Kudus District and the practical enactment of joyful, mindful, and meaningful learning.

Based on the identified problems and gaps, this study aims to explore the experiences of physical education teachers in implementing deep learning in elementary schools in Kudus District. Specifically, this research seeks to examine: (1) how teachers understand and apply deep learning principles in PJOK; (2) challenges teachers encounter during implementation; and (3) strategies teachers use to create joyful, mindful, and meaningful learning experiences.

The novelty of this study lies in several aspects. First, unlike prior studies emphasizing student outcomes or instructional interventions, this study centers on teachers' lived experiences as the primary focus of inquiry. Second, it conceptualizes deep learning in PJOK through the integrated dimensions of joyful, mindful, and meaningful learning, providing a more comprehensive analytical framework. Third, it contributes context-specific evidence from elementary schools in Kudus District, offering localized insights often absent in broader educational research. Fourth, this study contributes to strengthening the discourse on deep learning implementation in practical physical education settings within the Merdeka Curriculum framework.

The findings are expected to contribute theoretically to the development of deep learning pedagogy in physical education and practically to inform teacher professional development, curriculum implementation, and policy support for meaningful PJOK learning in elementary schools. In conclusion, the implementation of deep learning in elementary school physical education represents an important but complex educational challenge. Although curriculum policy emphasizes joyful, mindful, and meaningful learning, practical implementation remains shaped by contextual constraints, pedagogical readiness, and teacher agency. Existing literature has not sufficiently explored PE teachers' experiences in enacting deep learning, particularly within localized Indonesian contexts. Therefore, this study is positioned to address an important gap by investigating how physical education teachers in Kudus District experience, interpret, and implement deep learning in practice, while offering new insights for strengthening meaningful physical education in the era of the Merdeka Curriculum.

METHODS

This study employed a qualitative descriptive research design to explore the experiences of Physical Education, Sports, and Health (PJOK) teachers in implementing

deep learning in elementary schools in Kota District, Kudus Regency. A qualitative descriptive approach was selected because it enables an in-depth and contextual understanding of participants' experiences, perceptions, and practices within natural educational settings, particularly when investigating pedagogical phenomena that are socially constructed and context dependent (Mays & Pope, 2019; Creswell & Poth, 2018). This design is appropriate for examining how teachers interpret and enact the principles of deep learning namely mindful, meaningful, and joyful learning within daily PJOK instructional practices. Furthermore, qualitative descriptive inquiry provides flexibility for capturing rich empirical accounts while maintaining close alignment with practical educational realities (Sandelowski, 2017; Merriam & Tisdell, 2019).

This research was conducted in selected elementary schools in Kota District, Kudus Regency, Central Java, Indonesia. The research population consisted of PJOK teachers working in elementary schools implementing the Merdeka Curriculum. The study subjects were determined purposively to obtain information-rich cases relevant to the research objectives (Patton, 2020). The primary informants were PJOK teachers as the main actors in implementing deep learning. To enrich and validate the findings, school principals were included as key informants to provide perspectives related to institutional support, curriculum implementation, and school-level policies, while students served as additional informants to capture learning experiences from the learner perspective.

School selection was based on several inclusion criteria: (1) schools had fully implemented the Merdeka Curriculum; (2) schools had permanent PJOK teachers actively teaching; (3) PJOK teachers had a minimum of five years of teaching experience; and (4) teachers held formal teaching certification. These criteria were used to ensure that informants possessed sufficient pedagogical experience and exposure to curriculum innovation relevant to deep learning implementation (Ali Akbar, 2024). Purposive sampling is widely recognized in qualitative inquiry as appropriate for identifying participants who can provide credible and meaningful data regarding a specific phenomenon (Palinkas et al., 2015).

Data collection was conducted using three complementary techniques: semi-structured interviews, direct classroom and field observations, and documentation review. Semi-structured interviews were used to explore teachers' perceptions, experiences, challenges, and strategies in implementing deep learning principles in PJOK instruction. This format allowed consistency across participants while also providing flexibility to probe emerging themes during the interview process (Ishtiaq, 2019; Kallio et al., 2016). Interviews were conducted individually with each informant, recorded with permission, and transcribed verbatim for analysis.

Direct observations were undertaken during PJOK learning sessions to examine how joyful, mindful, and meaningful learning were enacted in actual teaching practice. Observational focus included student engagement, instructional interactions, feedback processes, reflective activities, and contextual links between movement tasks and authentic experiences. Observation is particularly important in educational research

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because it enables researchers to capture behaviors and pedagogical interactions that may not be fully articulated in interviews (Angrosino, 2016).

Documentation was used as a supporting data source and included lesson modules, teaching schedules, photographs of learning activities, curriculum documents, and PJOK teacher profiles. Documentary evidence contributed to strengthening contextual understanding and corroborating interview and observation findings (Bowen, 2017).

To ensure trustworthiness and validity, this study applied method triangulation and source triangulation. Method triangulation was conducted by comparing findings from interviews, observations, and documentation, while source triangulation involved cross-checking information among teachers, principals, and students (Safrudin et al., 2023; Lincoln & Guba, 1985). Credibility was further strengthened through member checking, in which participants were given opportunities to verify interpretations of interview data, and through prolonged engagement during field observations.

The research instruments consisted of interview guidelines and observation sheets developed based on the research focus and indicators of deep learning. Interview protocols covered themes related to teachers' understanding of deep learning, instructional implementation, barriers encountered, and adaptive strategies. Observation sheets were structured around indicators reflecting joyful learning (engagement and motivation), mindful learning (awareness and reflection), and meaningful learning (relevance and conceptual connection). Instrument development was guided by conceptual and empirical references related to deep learning pedagogy and qualitative educational inquiry (Ishtiaq, 2019; Fullan et al., 2018).

Data analysis followed the interactive model of data analysis involving three stages: data reduction, data display, and conclusion drawing/verification (Qomaruddin & Sa'diyah, 2024; Miles et al., 2020). Data reduction involved organizing, coding, and selecting relevant information related to the implementation of deep learning. Initial coding was conducted inductively to identify recurring themes emerging from participants' narratives and observational records.

Data display was conducted through thematic matrices, tables, diagrams, and descriptive narrative presentations to facilitate interpretation of patterns and relationships among categories. This stage supported systematic understanding of how deep learning was experienced and implemented across different school contexts. Finally, conclusion drawing and verification were conducted iteratively throughout the research process to ensure consistency, credibility, and analytical accuracy. Emerging interpretations were continuously compared against field evidence and triangulated sources to produce trustworthy findings regarding the implementation of deep learning in PJOK instruction.

Through this methodological framework, the study sought to generate contextually grounded and empirically credible insights into teachers' experiences in implementing deep learning in elementary school physical education.

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RESULTS AND DISCUSSION

Result

The findings of this study reveal that the experiences of Physical Education, Sports, and Health (PJOK) teachers in implementing deep learning in elementary schools in Kudus District can be grouped into two major themes: (1) teachers' level of understanding of deep learning, and (2) the implementation of deep learning in PJOK instructional practices. The results were generated from semi-structured interviews, direct observations, and documentation involving 17 PJOK teachers as main informants, supported by school principals and students as triangulation sources. Data analysis indicates that while the concept of deep learning has begun to be recognized and applied, its implementation remains varied in depth, consistency, and pedagogical structure.

PJOK Teachers' Level of Understanding of Deep Learning

The interview findings show that teachers' understanding of deep learning varied considerably. Some participants demonstrated a strong conceptual understanding and were able to relate deep learning principles to the dimensions of mindful, meaningful, and joyful learning. These teachers described mindful learning as developing awareness, preparedness, and attentiveness before engaging in physical activity. Meaningful learning was interpreted as connecting movement tasks to life relevance, while joyful learning was associated with creating enjoyable and motivating learning experiences for students. One teacher explained:

"Mindful means students are aware and ready before learning starts. Meaningful means they understand the objectives and benefits, and joyful means learning must make children feel happy."

However, not all teachers demonstrated the same depth of understanding. Several participants indicated only partial understanding, describing themselves as still adjusting to the concept and implementing it gradually. Others admitted limited understanding of deep learning as a pedagogical framework. One participant stated: "Actually, I do not fully understand deep learning in depth; I only know a little about it."

Based on coding and thematic categorization, teachers' understanding was classified into three categories: good understanding, moderate understanding, and limited understanding. The distribution of participants in each category is presented in Figure 1.

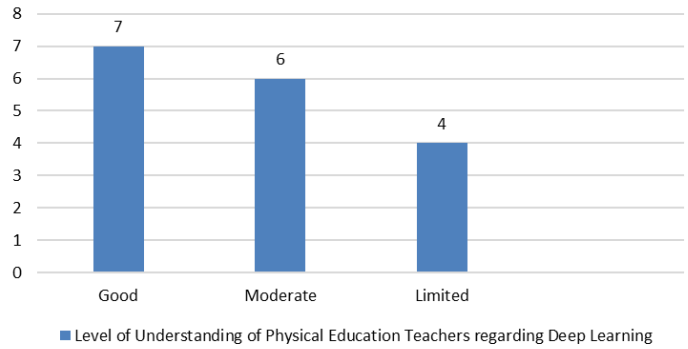

Figure 1.
Diagram of PJOK Teachers' Level of Understanding

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The data show that 41% of teachers demonstrated good understanding, characterized by the ability to explain deep learning principles and relate them to teaching practices. Meanwhile, 35% were categorized as having moderate understanding, indicating familiarity with basic concepts but limited theoretical mastery and practical integration. A further 24% were categorized as having limited understanding, suggesting superficial or incomplete conceptual knowledge. These findings indicate that although most teachers have begun engaging with the concept of deep learning, levels of pedagogical comprehension remain uneven.

Application of Deep Learning in Physical Education Practice

Findings from interviews and observations indicate that deep learning principles have begun to be incorporated into PJOK practice, although implementation varies among teachers. Evidence suggests that teachers have attempted to integrate mindful, meaningful, and joyful learning into instructional activities, particularly through physical readiness exercises, reflective explanations, and game-based approaches.

For the mindful dimension, teachers encouraged students to prepare physically and mentally before engaging in movement tasks. This was reflected in warm-up routines, awareness-building discussions, and discipline in following learning instructions. For the meaningful dimension, teachers sought to connect movement activities to everyday benefits. For example, teachers explained how agility drills such as zig-zag running help improve balance and coordination that can be applied beyond sports contexts.

For the joyful dimension, teachers commonly used games, varied movement tasks, and emotionally supportive interactions to create enjoyable learning environments. This was the most consistently observed dimension among participants.

These findings are summarized in Table 1.

Table 1.

Implementation of Deep Learning in PJOK Practice

Aspects of Deep Learning	Forms of Application in PJOK	General Findings
Mindfull	Physical preparation before learning, awareness of the importance of warm-ups, discipline in following instructions	Some teachers encourage students to be prepared before practice begins
Meaningfull	Linking movements to everyday life, instilling the values of sportsmanship and cooperation	Teachers explain the objectives and benefits of each movement activity.
Joyfull	Use of varied games, approaches that do not burden students, building emotional connections	The majority of teachers strive to create a pleasant learning atmosphere.
Implementation	Implementation is carried out simply and developed according to experience	Some teachers are still adjusting and are not yet fully structured.

The table shows that deep learning principles have been introduced into instructional practice, but not yet systematically integrated into comprehensive lesson design. Teachers tend to adopt deep learning values pragmatically rather than through structured pedagogical planning.

Variations in Implementation Consistency

A further finding concerns differences in implementation consistency among teachers. Teachers with stronger conceptual understanding tended to demonstrate more coherent integration of deep learning principles across lesson stages, including planning, activity execution, and reflective closure. By contrast, teachers with limited understanding tended to focus mainly on joyful learning through games, while mindful and meaningful elements were less visible.

This pattern suggests that conceptual understanding significantly influences pedagogical enactment. Teachers who better understood deep learning were more likely to move beyond activity delivery toward reflective and value-oriented learning processes. Meanwhile, teachers with weaker understanding often interpreted deep learning simply as making lessons enjoyable.

Observational evidence also revealed that reflective practices—such as asking students what they learned, why a movement was important, or how skills relate to daily life—were inconsistently implemented. This indicates that the mindful and meaningful dimensions remain less developed compared to joyful learning.

Challenges Experienced by Teachers

The results also identified several challenges affecting implementation. The most frequently reported challenges included limited conceptual understanding of deep learning, lack of structured guidance, insufficient facilities, varying student characteristics, and limited instructional time.

Teachers reported that implementing reflective and meaningful learning in physically active environments is often difficult due to class management demands and time constraints. Some teachers also stated that existing training related to the Merdeka Curriculum has not fully translated abstract deep learning principles into practical PJOK strategies.

These challenges suggest that the implementation gap is influenced not only by individual teacher readiness but also by contextual and systemic factors.

Overall, the findings demonstrate that deep learning has begun to be implemented in elementary school PJOK in Kudus District, particularly through efforts to create joyful and meaningful learning experiences. However, teachers' understanding remains varied, implementation is not yet systematically structured, and several contextual barriers affect consistency. The results indicate that successful implementation of deep learning depends on the interaction between teacher understanding, pedagogical adaptation, and school context. These findings provide an empirical basis for further discussion regarding teacher readiness, professional development, and strengthening deep learning practices in physical education.

Discussion

The findings of this study confirm that the implementation of deep learning in elementary school Physical Education, Sports, and Health (PJOK) in Kudus District is still in a developmental and transitional phase, characterized by variations in teachers'

conceptual understanding and differences in pedagogical enactment. Two central findings emerged from this study: first, the level of teachers' understanding of deep learning varies considerably; second, the implementation of deep learning principles in PJOK practice has begun to occur, but remains partial and insufficiently systematic. These findings contribute to the growing discourse on deep learning implementation in physical education, particularly in relation to the principles of mindful, meaningful, and joyful learning.

The first important finding concerns variation in PJOK teachers' understanding of deep learning. Teachers categorized as having good understanding were generally able to interpret deep learning not merely as active or enjoyable instruction, but as a pedagogical process involving awareness, conceptual engagement, reflection, and meaningful student participation. This finding aligns with the perspective of Ragoonaden (2017), who argues that deep learning is fundamentally rooted in reflective knowledge construction, while Hermes and Rimanoczy (2018) emphasize the integration of cognitive, emotional, and ethical dimensions in learning. From this perspective, teachers who demonstrated stronger understanding have begun shifting from activity-centered instruction toward learning-oriented pedagogy.

This finding also supports arguments that teacher cognition plays a critical role in educational innovation. John Hattie emphasizes that meaningful instructional change is strongly influenced by teachers' understanding of learning itself, rather than merely compliance with curriculum policy. Similarly, Fullan et al. (2018) argue that deep learning implementation requires changes in pedagogical beliefs, not simply the adoption of new instructional terminology. In the present study, teachers with stronger conceptual understanding appeared more capable of translating curriculum expectations into practice, particularly in fostering reflection and relevance in learning.

However, the finding that some teachers demonstrated limited understanding suggests that deep learning remains unevenly interpreted. Several participants associated deep learning primarily with joyful learning or student activity involvement, without fully connecting it to mindful engagement and meaningful reflection. This reflects what Akbar (2021) identifies as a common tendency in curriculum implementation, where innovative concepts are simplified at the practical level and lose theoretical coherence. Similar patterns have been reported in studies by Widyaningrum et al. (2019) and Susanto (2025), showing that curriculum reform often encounters barriers at the level of teachers' conceptual readiness.

Differences in understanding among teachers may be explained by several factors, including teaching experience, access to professional development, and institutional support. This is consistent with Kanca (2018), who argues that PJOK teachers' professional competence is strongly influenced by ongoing training opportunities. Likewise, Opfer and Pedder (2019) note that teacher learning develops through interaction between individual agency, organizational conditions, and policy contexts. In the present study, teachers who reported participation in training or collaborative discussions tended to exhibit stronger understanding, suggesting that professional

learning communities may play a significant role in strengthening deep learning implementation.

Another notable finding concerns the importance of school support in facilitating pedagogical transformation. The perspective of school principals, which indicated that teachers' understanding remains in a developmental stage, reinforces the idea that implementation depends not only on individual teachers but also on institutional conditions. This supports the argument of Darling-Hammond et al. (2020) that sustainable educational innovation requires systemic support, including supervision, mentoring, and professional dialogue. Without these supports, innovations often remain superficial rather than transforming practice.

The second major finding relates to the implementation of deep learning in PJOK practice. The study found evidence that teachers have begun integrating mindful, meaningful, and joyful principles into learning activities, although inconsistently. This is significant because it suggests that deep learning is not entirely absent in practice, but rather emerging through incremental adaptation.

The mindful dimension, reflected in physical readiness, discipline, and awareness-building before activity, indicates efforts to cultivate learning awareness. This supports Syafi'i and Darnaningsih (2025), who emphasize that mindfulness in education involves developing conscious engagement rather than passive participation. However, findings also show that mindfulness in PJOK practice remains largely procedural and focused on physical preparedness, rather than deeper student reflection. This suggests that mindful learning is being interpreted narrowly, consistent with concerns raised by Barkah et al. (2025) regarding partial implementation of deep learning principles.

The meaningful dimension, reflected in linking movement activities to everyday relevance, represents an important strength. Teachers' efforts to explain how movement tasks relate to health, cooperation, and daily functioning align with the theory of meaningful learning proposed by Ausubel and contemporary interpretations advanced by Wali et al. (2020). Meaningful learning occurs when students connect new experiences with prior understanding and perceive relevance. In this sense, PJOK offers substantial potential for meaningful learning because physical activity naturally connects to lived experience.

However, the findings indicate that reflective exploration of meaning remains limited. While teachers often explain benefits, fewer facilitate structured reflection on what students learned or how experiences connect to broader understanding. This finding echoes Goodyear et al. (2021), who argue that meaningful physical education requires opportunities for reflection, dialogue, and critical thinking, not merely contextualized activity.

The joyful dimension emerged as the most dominant aspect in teachers' practices. This is unsurprising, given the longstanding association between PJOK and game-based, enjoyable learning. Teachers' use of varied games and emotionally supportive environments reflects strong alignment with joyful learning principles and is consistent with findings by Yuliana et al. (2025) and Dyson et al. (2020). However, the dominance of

joyful learning also reveals a potential imbalance. Enjoyable activities alone do not necessarily constitute deep learning unless linked with conceptual reinforcement and reflection. As Fullan et al. (2018) caution, engagement without depth may lead to active but shallow learning.

The stronger presence of joyful learning compared with mindful and meaningful dimensions suggests that teachers may be prioritizing the most accessible component of deep learning while underdeveloping the more cognitively demanding dimensions. This imbalance is important because deep learning requires integration among all three dimensions, rather than isolated implementation. The findings therefore suggest that deep learning in PJOK is emerging, but not yet holistically enacted.

The study also highlights the significant pedagogical potential of PJOK for integrating cognitive, affective, and psychomotor domains. This supports Roehatul (2025) and Martinez-Yarza et al. (2024), who emphasize that physical education can serve as a multidimensional learning space when designed beyond technical skill development. Through movement, cooperation, problem-solving, and reflection, PJOK can contribute to holistic student development. However, realizing this potential depends on teachers' ability to design learning experiences intentionally rather than relying primarily on activity execution.

Another important implication concerns the early-stage nature of implementation. The findings suggest that innovative practices have begun at the activity level, but are not yet embedded in planning and assessment. This aligns with literature on pedagogical transformation showing that changes often begin in classroom activities before extending into curriculum design and evaluation (Casey et al., 2021; Kirk, 2020). In this sense, the current findings may represent an initial stage of broader transformation rather than implementation failure.

The novelty of this study lies in showing that deep learning implementation in PJOK is shaped not only by curriculum demands but by teachers' interpretations and contextual adaptations. Unlike studies focused primarily on student outcomes or instructional models, this study foregrounds teachers' lived experiences as central to understanding educational change. This contributes empirically to literature on teacher agency and deep learning implementation, particularly within Indonesian elementary school contexts.

At the same time, the findings must be interpreted within study limitations. Because participants were limited to PJOK teachers in Kudus District, generalization should be cautious. In addition, the stronger focus on teacher perspectives means students' direct experiences of deep learning were not explored in equal depth. Future studies should include student perspectives and comparative contexts to extend understanding.

Overall, this discussion indicates that implementing deep learning in PJOK is not simply a matter of adopting a new concept, but a process of pedagogical transformation requiring conceptual understanding, reflective practice, institutional support, and sustained professional development. The variation in teachers' understanding and the

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partial integration of mindful, meaningful, and joyful learning suggest that progress has begun, but substantial work remains to strengthen consistent and comprehensive implementation. These findings reinforce that the success of deep learning in physical education depends not only on curriculum policy, but on the capacity of teachers and schools to translate pedagogical ideals into authentic learning practice.

CONCLUSION

This study concludes that the experiences of Physical Education, Sports, and Health (PJOK) teachers in implementing deep learning in elementary schools in Kudus District reflect a process of pedagogical transition rather than a fully established practice. The findings show that teachers' understanding of deep learning varies across three categories: good, adequate, and limited understanding. Teachers with good understanding were able to explain and integrate the principles of mindful, meaningful, and joyful learning into their instructional practices, demonstrating awareness that deep learning involves not only active student participation but also reflection, relevance, and conceptual engagement. In contrast, teachers with limited understanding tended to interpret deep learning in more general or superficial terms, often associating it primarily with enjoyable activities or active learning without fully integrating reflective and meaningful dimensions.

The study also found that deep learning principles have begun to be implemented in PJOK practice, particularly through efforts to create joyful learning environments and to connect movement activities with students' daily lives. Teachers demonstrated emerging practices related to student readiness, meaningful movement experiences, and enjoyable learning through games and varied activities. However, the implementation remains inconsistent and has not yet been systematically embedded across lesson planning, instructional processes, and learning evaluation. Among the three dimensions, joyful learning appeared to be the most dominant in practice, while mindful and meaningful learning were less consistently developed.

These findings reinforce that the success of deep learning implementation depends not only on curriculum policy mandates but also on the depth of teachers' conceptual understanding, pedagogical competence, and institutional support. Deep learning in PJOK requires continuous professional development, reflective teaching practices, and stronger school support systems to move from partial adoption toward comprehensive implementation. This study contributes to the literature by providing empirical insights into teachers' experiences of implementing deep learning in elementary school physical education. Nevertheless, because the study is limited to a specific regional context and primarily reflects teachers' perspectives, the findings should be generalized with caution. Further studies involving broader contexts and student perspectives are recommended to strengthen understanding of deep learning implementation in physical education.

ACKNOWLEDGMENTS

The author would like to express sincere gratitude to all individuals and institutions who contributed to the completion of this research entitled *Exploring the Experiences of Physical Education Teachers in Implementing Deep Learning in Elementary Schools in Kudus District*. This study could not have been accomplished without the academic, technical, and moral support of many parties.

First, the author extends deepest appreciation to the Elementary School Physical Education Study Program for providing academic guidance, intellectual support, and learning facilities throughout the lecture process and during the preparation and completion of this research article. The academic environment, scholarly discussions, and institutional support have been invaluable in strengthening both the conceptual foundation and methodological rigor of this study.

The author also expresses sincere thanks to all Physical Education, Sports, and Health (PJOK) teachers in elementary schools throughout Kota District, Kudus Regency, who willingly participated as the main informants in this research. Their openness in sharing experiences, perspectives, and challenges related to the implementation of deep learning in physical education provided essential empirical data and enriched the findings of this study.

Special appreciation is also extended to the school principals in Kota District, Kudus Regency, for their support, cooperation, permission, and facilitation during the research process. Their willingness to provide access to schools, support field observations, and assist in coordinating research activities greatly contributed to the smooth implementation of this study. The author further acknowledges all students and additional participants who indirectly contributed valuable insights during the data collection process. Their participation helped strengthen the credibility and contextual depth of the research findings.

Finally, the author hopes that the support and contributions of all parties involved will continue to encourage the development of future research, particularly related to the implementation of deep learning in physical education. It is expected that this study can contribute to improving pedagogical practices, strengthening teacher professional development, and supporting the advancement of meaningful, mindful, and joyful learning in elementary school PJOK.

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