International Journal of Social Learning
April 2026, Vol. 6 (2), 296-306
e-ISSN 2774-4426 and p-ISSN 2774-8359
DOI: https://doi.org/10.47134/ijsl.v6i2.516

Infrastructure Management and Early Childhood Education Teachers' Deep Learning Readiness in Indonesia

Asep Mumung[1*], Fitriyani Kosasih[2]

[1]*Sekolah Tinggi Agama Islam Al Hidayah Tasikmalaya, Indonesia*
[2]*Universitas Islam Nusantara, Indonesia*

*e-mail: asep.amung76@gmail.com

ABSTRACT

Deep learning is an essential approach in Early Childhood Education (ECE). However, its implementation in practice has not been fully optimal, as many educators see it as just a curriculum rather than a pedagogical approach. This study explores how prepared teachers are to apply the three core pillars of deep learning: mindful, meaningful, and joyful learning. Using a descriptive qualitative method, the research employs triangulation through observation, interviews, and document analysis at RA Azzahra Majalengka. The results show that these pillars are in use, but their application is only partial and not yet at an excellent standard. Teachers create opportunities for exploration, but reflection is limited; activities meant to be meaningful are not well integrated across subjects; and enjoyable learning tends to be overly structured. These findings highlight the need for equal, comprehensive deep learning training for all ECE teachers to enhance their ability to create meaningful, holistic learning experiences.

***Keywords*:**

Deep Learning; Infrastructure Management; Early Childhood Education.

ABSTRAK

Pembelajaran mendalam merupakan pendekatan penting dalam Pendidikan Anak Usia Dini (PAUD). Namun, implementasinya dalam praktik belum sepenuhnya optimal, karena banyak pendidik hanya melihatnya sebagai kurikulum dan bukan sebagai pendekatan pedagogis. Studi ini mengeksplorasi seberapa siap guru dalam menerapkan tiga pilar inti pembelajaran mendalam: pembelajaran yang penuh perhatian, bermakna, dan menyenangkan. Dengan menggunakan metode kualitatif deskriptif,

Submitted: 2025-07-26; Accepted: 2026-02-04; Published: 2026-04-28
***Corresponding author:** asep.amung76@gmail.com

penelitian ini menggunakan triangulasi melalui observasi, wawancara, dan analisis dokumen di RA Azzahra Majalengka. Hasil menunjukkan bahwa pilar-pilar ini digunakan, tetapi penerapannya hanya sebagian dan belum mencapai standar yang sangat baik. Guru menciptakan peluang untuk eksplorasi, tetapi refleksi terbatas; aktivitas yang dimaksudkan untuk bermakna tidak terintegrasi dengan baik di seluruh mata pelajaran; dan pembelajaran yang menyenangkan cenderung terlalu terstruktur. Temuan ini menyoroti perlunya pelatihan pembelajaran mendalam yang setara dan komprehensif bagi semua guru PAUD untuk meningkatkan kemampuan mereka dalam menciptakan pengalaman belajar yang bermakna dan holistik.

***Kata kunci*:**

Deep Learning; Manajemen Infrastruktur; Pendidikan Anak Usia Dini.

1. Introduction

Educators operating within the Merdeka Curriculum encounter increasingly intricate challenges, including heightened expectations for competency, continuous curriculum revisions, and rapid technological innovations. While early childhood education (ECE) teachers are adept at designing engaging learning experiences, the foundational deep learning approach central to the Merdeka Curriculum remains unfamiliar, thereby creating a disparity between policy mandates and practical preparedness. According to the 2025 accreditation data from the National Accreditation Agency for Primary and Secondary Education for West Java Province, only 17 out of 86 early childhood education institutions received an Excellent rating. This underscores that many institutions continue to depend on drill-based methodologies and have yet to adopt holistic, integrated deep learning strategies. An additional challenge is teachers' capacity to develop comprehensive teaching modules and Deep Learning Plans, both in conceptual understanding and in practical application. This situation underscores the importance of assessing the readiness of Early Childhood Education (ECE) teachers in Indonesia to comprehend and implement deep learning, thereby ensuring the effective and consistent attainment of the curriculum's objectives.

According to the concept of deep learning, learning is not only about improving cognitive skills; instead, it involves linking children's new knowledge with prior experiences to increase their creativity and critical thinking. Biesta (2015) States that “Deep learning is about going beyond surface-level acquisition of knowledge to develop a student's capacity to think, inquire, reflect, and create knowledge collaboratively”. Moreover, Larmer & Mergendoller, (2015) corroborated that, through project-based learning, teachers can improve children's collaboration and communication. Likewise Sando et.al. (2023) the results of the study showed “a significant increase in the ability to design experiential learning of effective teacher professional development”. Stillman, (2018) added that “experimental learning management can improve cognitive aspects of early childhood with kinesthetic learning styles”. Some of these studies emphasize that experience in learning has a significant impact on children's cognitive improvement. Children will better understand learning when they are actively involved directly in a meaningful and fun experience.

However, field conditions indicate that teachers are unprepared to implement deep learning. Teachers' partial knowledge of deep learning has become an obstacle to their holistic, integrated implementation. Deep learning is an integration of three pillars that cannot be separated. In deep learning, teachers are required to create a fun, conscious, and meaningful learning experience. The three pillars include meaningful learning, mindful learning, and joyful learning (Fullan et al., 2018). A holistic framework for deep learning can be built on three pillars. The ability to focus and academic outcomes in children can be enhanced through mindful learning, while emotional engagement and student involvement can be supported by joyful learning.

Thus, it can be concluded that teacher readiness needs to be improved through various trainings. The goal is for teachers to implement deep learning holistically and integratively. Chen, (2022) found the integration of interactive technologies in ECD, such as smart boards and digital applications, can improve collaborative skills, critical thinking, and active engagement. However, success is highly dependent on teacher training and infrastructure support, consistent with the idea that a holistic and integrative understanding of deep learning concepts is key to success".

Based on data on early childhood education teacher training in Indonesia, as of the beginning of 2025, only 18% of teachers have received integrated deep learning training, 12% have received partial recognition of deep learning, and the remaining 70% have not received recognition of the three main pillars of deep learning. In fact, teachers in Indonesia have been faced with various challenges to the quality of early childhood education in the digital era (Bailey & Jones, 2019). Deep learning is the process through which students gain the competencies to contribute to the common good, address global challenges, and flourish in a complex world. However, most teachers agree that the three pillars of deep learning are relevant to improving early childhood learning readiness. Therefore, teachers need to participate in deep learning training equally.

Li (2022) argues that evaluating the quality of early childhood learning should be supported by a machine learning-based system. Bay (2022) States that early childhood education teachers face the challenge of integrating disciplines and technology. Budiarti & James (2025) corroborate that "in facing the era of digitalization, early childhood education teachers need to develop digital skills and mindful learning approaches". Das et al. (2021) stated that "deep learning integrated with technology can help improve image understanding in early childhood". Sando et al. (2023) proved that "the use of technology in early childhood learning can stimulate creativity, independent exploration, and critical thinking". This aligns with deep learning. Zhong (2023) argues that, in deep learning, teachers need to design an early childhood education quality evaluation model using deep learning networks with a holistic indicator system. Ge et al. (2021) stated that "the quality of learning can be accurately assessed by using deep learning and XBoost technology". Bjerknes et al. (2024) more broadly discusses "the need to design a deep learning-based early childhood education resource platform that can create learning scenarios according to children's interests".

Some research results indicate that teacher readiness in implementing integrated deep learning is vital. Teachers should be able to create an effective learning environment. Stillman, (2018) stated that "Effective learning environments must support deep understanding by building on prior knowledge, engaging learners in active processing, and providing opportunities for reflection".

The purpose of this study is to analyze teachers' readiness to implement a deep learning approach in early childhood education, both conceptually and practically. Of course, this is a big homework for all stakeholders, from the top to the bottom.

2. Methods

2.1. Research Design

This study employs a qualitative descriptive design to evaluate the readiness of RA Azzahra teachers in Majalengka Regency to implement integrated deep learning. The methodology is intended to present factual information, characteristics, and the interactions of activities within natural settings. This approach aligns with. Nowell et al. (2017) who asserts that qualitative descriptive research aims to depict natural or human-made phenomena by emphasizing their qualities and interconnected components. As Supa'at & Ihsan (2023) the reason for using this method is to confirm that respondents are highly eligible and relevant to the research focus: teachers' readiness for deep learning implementation.

2.2 Population and Sample

The population of this study comprises all stakeholders involved in the educational process at RA Azzahra Majalengka, including the principal, teachers, administrative personnel, the foundation leader, parents, and students. Participants were intentionally selected for their direct relevance to the research objectives. The sample consisted of the principal, four teachers, one administrative staff member, the foundation leader, a group of parents, and students from two classes of 18 students each (totaling 36 students of A and B Classes), who either participated in or were observed during learning activities. As a Hajar et al. (2024) a purposive sampling method was employed to select participants who were relevant and actively engaged in implementing deep learning techniques. Consequently, the study's participants comprised classroom teachers and students from designated schools.

2.3 Research Instruments

As Hasni (2024) the principal research instrument was the researcher themselves, supplemented by observation guidelines, unstructured interview guides, and documentation checklists. These instruments were developed around the three fundamental pillars of deep learning: meaningfulness, mindfulness, and joyfulness learning.

2.4 Data Collection Procedures

Data were collected utilizing a triangulation methodology, integrating multiple techniques to enhance data validity (Nowell et al., 2017). The three methods employed are:

2.4.1 Observation

Both direct and indirect observations were conducted to identify indicators of teacher readiness for implementing the three pillars of deep learning. Field notes were systematically and meticulously recorded.

2.4.2 Unstructured Interviews

Interviews entailed direct conversations with the principal, teachers, administrative staff, the foundation head, parents, and students. The unstructured format allowed participants to share their perspectives, experiences, and feelings freely. This approach aligns with the methodology of Zongqing et al. (2023), who employed qualitative methods, including in-depth interviews and document analysis, to evaluate inclusive education.

2.4.3 Document Study

Documents were examined and analyzed to understand the institutional support for implementing deep learning. These included Standard Operating Procedures, curriculum policy documents, weekly and daily lesson plans, educational materials, lists of facilities and infrastructure, and student learning outcomes (Creswell, 2013). Notes that observation, interviews, and documentation work together to improve data validity in early childhood research.

2.5 Data Analysis Techniques

Data analysis entailed an interactive model comprising three principal stages: data reduction (simplifying and organizing data), data presentation through descriptive narratives, and the formulation and validation of conclusions throughout the research process. This methodology enables the researcher to interpret findings precisely and substantially within the context of the study.

3. Results and Discussion

3.1 Findings

The findings indicate that early childhood educators in Indonesia are acquainted with the concept of deep learning, as it has been embedded in the practice of "learning through play" for an extended period. However, triangulation results underscore a discrepancy between teachers' perceptions and the practical application of deep learning principles in daily classroom activities. Many educators continue to misconstrue deep learning as a novel curriculum rather than recognizing it as a pedagogical approach, resulting in inconsistent implementation.

Data analysis shows that RA Azzahra Majalengka has applied the three fundamental principles of deep learning, namely mindful, meaningful, and joyful learning, although not in the most optimal way. 1) Mindful Learning; Teachers provided opportunities for play and exploration, but reflection activities after play were rarely facilitated. The absence of structured reflection hindered children's metacognitive development, leading to a superficial understanding. 2) Meaningful Learning; Activities such as planting, role-playing, and linking stories to daily life were present and widely practiced. However, these activities lacked interdisciplinary integration and reinforcement of prior knowledge, reducing their potential to develop deep conceptual understanding. 3) Joyful Learning; Singing, painting, coloring, simple experiments, and educational games were conducted regularly. Despite this, the learning environment remained overly structured, limiting autonomy and reducing opportunities for children's intrinsic motivation and creativity.

Interviews with teachers revealed that children in classes A and B exhibited differences in emotional readiness. Teachers acknowledged that deep learning is a suitable approach for early childhood education. However, their pedagogical skills, creativity, and reflective practices remain insufficient to support deep learning effectively. As a result, teachers have struggled to integrate deep learning concepts into learning modules or develop comprehensive lesson plans.

The overall impact is that although children enjoy learning activities, they do not achieve deeper understanding or develop higher-order skills such as critical thinking, problem-solving, and self-regulation. The impact is quite significant: children enjoy the learning process but do not achieve a deeper understanding, which limits the development of their critical thinking, problem-solving, and self-regulation skills. To address this, teachers should receive professional training focused on the theory and practice of deep learning, with an emphasis on guided reflection and integrating cross-disciplinary knowledge. Institutions must also support collaborative learning planning to help teachers create richer, more meaningful experiences.

3.2 Discussion

Based on the triangulation results, the teachers at RA Azzahra had basically implemented the three pillars, but not optimally. First, Mindful learning. Teachers have provided space for play and exploration, but still rarely reflect on understanding after playing second, Meaningful learning. Planting activities, role-playing, and linking stories to daily life are not new, meaning that almost all early childhood education institutions in Indonesia have implemented them; it's just that the lack of consistent reflection from teachers and the lack of teacher creativity in integrating various relevant sciences make children's understanding less deep. Joyful learning: likewise, learning while singing, painting, coloring, doing simple experiments, and playing multiple fun games is not new; they have always done it. However, the learning atmosphere is often too structured and less creative. This leads to a lack of creative stimulation in children, preventing them from enjoying the activities. Click or tap here to enter text. Bailey & Jones (2019) showed that mindfulness interventions in early childhood effectively improve attention, emotional regulation, and self-control through simple activities such as mindful breathing and reflective play. The success of this approach depends heavily on the teacher's ability to consistently facilitate mindfulness practices, making it an essential element in supporting calmer, more focused, and deeper learning. Zosh et al. (2018) moreover, the learning environment should be made more adaptable to allow children space to explore, develop, and learn more independently.

Based on the interview results, children in grades A and B do show differences in emotional readiness. Therefore, teachers also realize that deep learning is an appropriate approach to early childhood education. Wei & Liu (2025) states that “Deep-level learning in early childhood is visible in children's involvement and well-being: when children are deeply engaged and emotionally secure, high-quality learning occurs”.

Deep learning was introduced by Marton and Saljo Dario in Sweden in 1976. However, it has only recently been recognized in Indonesia after being implemented in the National Curriculum as a learning approach. Fullan et al., (2018) stated that "Deep learning is the process through which students gain the competencies to contribute to the common good, address global challenges, and flourish in a complex world". There are at least three pillars in deep learning that can be implemented in early childhood education. 1) Mindful Learning. This is a cognitive-based learning process. This means that, in this process, children are stimulated to learn, understand, and think critically so they can solve problems in their lives. 2) Meaningful Learning. Meaningful experience-based learning. In this process, teachers are required to provide meaningful learning experiences. 3) Joyful learning. Namely, a fun learning process. In this process, teachers are required to provide fun learning, often referred to as the 'play while learning' approach.

When implementing deep learning, it is appropriate to use contextual learning, inquiry, discovery, problem-based learning, and project-based learning. For example, teachers encourage children to recognize currency and use it in their daily lives. In this case, the teacher can directly show the various currencies and their functions. In practice, the child is accompanied by the teacher to buy UHT milk at the mini market. The child is given 5000 rupiah from the start, chooses the milk, carries out the transaction at the cashier, and receives change. Through this experience, children will feel happy and not realize that they are learning. They will understand the function of using currency in everyday life.

Thus, it can be concluded that deep learning is not just memorization or the introduction of new ideas, but the linking of these ideas with prior knowledge in a critical and meaningful way. Loughlin et al. (2021) States that Deep learning involves the critical analysis of new ideas, linking them to already known concepts and principles, and leads to understanding and long-term retention of concepts so that they can be used for problem solving in unfamiliar contexts."

Some previous research, Manik et al. (2025) suggested that the integration of the three pillars of deep learning is crucial in supporting children's holistic development. Jamal et al. (2021) stated the same thing in their research that although deep learning is a general context, its impact is very relevant for early childhood education, especially its implications in increasing children's participation, motivation, and critical thinking skills. Gloppen (2023) according to him, teacher potential and institutional infrastructure barriers greatly affect the implementation of deep learning. Asterhan & Lefstein (2024) stated that systematically preparing, exploring, applying, and reflecting greatly supports the implementation of deep learning. Bernsteinet et al. (2020) Argues that contextual learning, such as gamification, art lessons, and reflection, greatly influences student motivation and creativity.

Research by Macrides et al. (2022) shows that young children can learn programming through games using educational robotics and block-based platforms, thereby strengthening computational thinking skills and enhancing creativity, collaboration, and problem-solving. This review confirms that the success of programming learning in early childhood education is highly dependent on

teachers' readiness to understand coding pedagogy and integrate it meaningfully with other curricula. The main challenges include a lack of teacher training, limited technological resources, and minimal integration into the national curriculum. These findings emphasize the importance of teacher professional development to ensure the implementation of a mindful, meaningful, and joyful deep learning approach in early childhood education.

Based on these studies, it can be concluded that deep learning has a significant impact on children's holistic development. The three pillars of deep learning stimulate children to participate more actively and creatively, and to think critically. However, this is a challenge for teachers to be more creative in integrating several disciplines so that learning becomes more meaningful and fun. Ding et al. (2024) their research found that deep learning is a promising approach for early childhood education and is highly effective at improving children's motivation and learning outcomes. Roeser & Eccles (2015) concluded that teachers can use deep learning to design programs and evaluate the quality of early childhood education. Deep learning can help children's holistic development. Gao (2025) supports that the variety of games and personalization in early childhood education support more interesting and interactive learning (Putra et al., 2025). State that “meaningful and joyful learning creates interactive, creative, and reflective experiences that are aligned with deep learning”. Panadero & Jonsson (2020) argued that "early childhood education needs to explore integrative concepts. Weisberg et al. (2016) Stated that “training activities are effective in introducing the concept of Deep Learning to teachers”.

Several of these studies are highly relevant to this study. Still, this study emphasizes the importance of teachers understanding the basic concepts of the three pillars of deep learning in an integrated manner. Teachers' readiness and understanding significantly impact the effectiveness of deep learning implementation in early childhood education (Pane & Rocco, 2014). Focused learning should be directed at competencies, not merely content. This means the learning process should emphasize improving understanding, not just memorization (Polman et al., 2021). In addition, the learning environment needs to support collaboration, questioning, discussion, and the deepening of ideas. This is the implementation of the combination of mindful learning and meaningful learning in the context of deep learning (Yemini et al., 2023). The Merdeka Curriculum encourages contextual learning relevant to students' environments. Thus, children will gain a deeper understanding of learning when the material they study is directly related to their daily lives.

Some of these studies are very relevant to this research. Still, this research emphasizes the importance of teachers understanding the basic concepts of the three pillars of deep learning in an integrated manner. Teachers' readiness and understanding significantly impact the effectiveness of deep learning implementation in early childhood education.

4. Conclusion

This study shows that while deep learning is not a new idea in Indonesia's early childhood education, its practice remains incomplete and inconsistent. The three core aspects mindful,

meaningful, and joyful learning are present but not fully developed. Teachers still face challenges in encouraging reflection, integrating multiple subjects, and fostering a flexible learning environment that supports children's independence and inner motivation. Consequently, learning activities often become routine and overly structured, which limits children's chances to gain a deeper understanding and to develop critical thinking, problem-solving, creativity, and self-regulation skills.

These findings highlight the critical role of teacher preparedness as a foundation for effective deep learning. Early childhood educators require thorough and fair training in deep learning, covering both theoretical and practical aspects, to craft comprehensive, meaningful, and engaging learning experiences aligned with the Merdeka Curriculum. With equal access to training and ongoing professional development, all early childhood teachers across Indonesia can adopt a holistic and consistent approach to implementing deep learning, ultimately elevating the quality of early childhood education.

5. References

Asterhan, C. S. C., & Lefstein, A. (2024). The Search for Evidence-Based Features of Effective Teacher Professional Development. *Professional Development in Education, 50*(1), 11-23. https://doi.org/10.1080/19415257.2023.2283437.

Bailey, R., & Jones, S. M. (2019). Mindfulness-Based Interventions in Early Childhood Education. *Child Development Perspectives, 13*(4), 225–231. https://doi.org/10.1111/cdep.12345.

Bay, D. N. (2022). The Perspective of Preschool Teachers on The Use of Digital Technology. *Southeast Asia Early Childhood Journal, 11*(2), 87–111. https://doi.org/10.37134/saecj.vol11.2.6.2022.

Bernstein, B., Rivoltella, P. C., & Cino, D. (2020). Contextual Learning and Knowledge Transfer in Early Childhood Education. *Teaching and Teacher Education, 96,* 103186. https://doi.org/10.1016/j.tate.2020.103186.

Biesta, G. (2015). What is Education for? On Good Education, Teacher Judgement and Educational Professionalism. *European Journal of Education, 50*(1), 75-87. https://doi.org/10.1111/ejed.12109.

Bjerknes, A. L., Wilhelmsen, T., & Bruun, E. F. (2024). A Systematic Literature Review of Curiosity and Wonder in Early Childhood Education. *International Journal of Early Childhood Education, 38*(1), 50-65. https://doi.org/10.1080/02568543.2023.2192249.

Budiarti, E., & James, M. L. (2025). Revolutionizing University Mathematics Education: The Impact of Deep Learning and Educational Technology. *Journal of Teaching and Learning Mathematics, 2*(2), 44. https://doi.org/10.22219/jtlm.v2i1.28271.

Chen, C. (2022). Application Design in A Preschool Education Resource System Platform Based on Deep Learning Technology. *Lecture Notes on Data Engineering and Communications Technologies, 138,* 729–735. Springer. https://doi.org/10.1007/978-3-031-05484-6_92.

Creswell, J. W. (2013). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research / John W. Creswell. — 4th ed*. Nebraska: University of Nebraska–Lincoln.

Das, B., Sekh, A. A., Majumder, M., & Phadikar, S. (2021). Can Deep Learning Solve a Preschool Image Understanding Problem? *Neural Computing and Applications, 33,* 14401–14411. Retrieved from https://link.springer.com/article/10.1007/s00521-021-06080-w.

Ding, Y., et al. (2024). A Study of Preschool Integration of Deep Learning to Optimize the Content of Personalized Education for Young Children. *Applied Mathematics and Nonlinear Sciences, 9*(1), 1–12. https://doi.org/10.2478/amns-2024-2432.

Fullan, M., Quinn, J., & McEachen, J. (2018). *Deep Learning: Engage the World, Change the World*. Thousand Oaks, CA: Corwin Press.

Gao, Y. (2025). Artificial Intelligence and Children: The Application of AI Devices in Preschool Education. *Journal of Contemporary Educational Research, 9*(3), 80–85. https://doi.org/10.26689/jcer.v9i3.9894.

Ge, D., Wang, X., & Liu, J. (2021). A Teaching Quality Evaluation Model for Preschool Teachers Based on Deep Learning. *International Journal of Emerging Technologies in Learning (IJET), 16*(03), 127–143. https://doi.org/10.3991/ijet.v16i03.20471.

Gloppen, S. K. (2023). Enacting Teacher Evaluation in Norwegian Compulsory Education: Teachers' Perceptions of Possibilities and Constraints. *Educational Assessment, Evaluation and Accountability, 35*. https://doi.org/10.1007/s11092-023-09409-2.

Hajar, S., Syabuddin, S., & Mahmud, M. (2024). Exemplary Model of Teachers in Fostering Student Morals in Aceh Utara District, Indonesia. *International Journal of Social Learning (IJSL), 4*(1), 15–29. https://doi.org/10.55324/ijsl.v4i1.292.

Hasni, H. (2024). Cultural Value of "A'bulo Sibatang" in Social Studies Learning. *International Journal of Social Learning (IJSL), 4*(1), 65–78. https://doi.org/10.55324/ijsl.v4i1.308.

Jamal, T., Kircher, J., & Donaldson, J. P. (2021). Re-Visiting Design Thinking for Learning and Practice: Critical Pedagogy, Conative Empathy. *Sustainability (Switzerland), 13*(2), 1–26. https://doi.org/10.3390/su13020964.

Larmer, J., & Mergendoller, J. (2015). Seven Essentials for Project-Based Learning. *Educational Leadership, 72*(1), 34–37. https://doi.org/10.1093/elt/ccv037.

Li, D. (2022). Machine-Learning-Based Preschool Education Quality Assessment System. *Mobile Information Systems, 2022*(1), 1–8. https://doi.org/10.1155/2022/2862518.

Loughlin, C., Lygo-Baker, S., & Lindberg-Sand, Å. (2021). Reclaiming Constructive Alignment. *European Journal of Higher Education, 11*(2), 119–136. https://doi.org/10.1080/21568235.2020.1816197.

Macrides, E., Miliou, O., & Angeli, C. (2022). Programming in Early Childhood Education: A Systematic Review. *International Journal of Child-Computer Interaction, 32,* 100396. https://doi.org/10.1016/j.ijcci.2021.100396.

Manik, S. M., Ritonga, M. U., & Hadi, W. (2025). Integrating Deep Learning into School Curriculum: Challenges, Strategies, and Future Directions. *Jurnal Pendidikan Indonesia, 3*(1), 29–44. https://doi.org/10.62007/joupi.v3i1.415.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods, 16*(1). https://doi.org/10.1177/1609406917733847.

Pane, D. D., & Rocco, T. (2014). A Competency-Based Approach for 21st-Century Learners. *Journal of Education and Learning, 3*(4), 150–158. https://doi.org/10.5539/jel.v3n4p150.

Panadero, E., & Jonsson, A. (2020). A Critical Review of the Arguments Against the Use of Rubrics. *Educational Research Review, 30,* 100329. https://doi.org/10.1016/j.edurev.2020.100329.

Polman, J., Hornstra, L., & Volman, M. (2021). The Meaning of Meaningful Learning in Mathematics in Upper-Primary Education. *Learning Environments Research, 24*(2), 1-18. https://doi.org/10.1007/s10984-020-09337-8.

Putra, G. M. C., Prasetyaningtyas, F. D., Ansori, I., Kurnianto, B., Wahyuni, N. I., Xinzhe, Z., & Nurmanto, T. N. (2025). Effectiveness of Project-Based Scratch Programming to Improve Problem-Solving Skills of Elementary School Students. *International Journal of Social Learning, 5*(2), 460–478. Retrieved from https://ijsl.pubmedia.id/index.php/ijsl/article/view/417.

Roeser, R. W., & Eccles, J. (2015). Mindfulness and Teacher Development. *Educational Psychologist, 50*(3), 174–190. https://doi.org/10.1080/00461520.2015.1047034.

Sando, O. J., Johansen, K. L., & Haugland, S. (2023). Predictors of Deep Learning and Competence Development in Children Aged 5–7 Using Augmented Reality Technology. *Education Sciences, 14*(9), 1024–1036. https://doi.org/10.3390/edsci14091024.

Stillman, S. B. (2018). Mindfulness in Early Learning Environments. *Journal of Applied Developmental Psychology, 54,* 1–11. https://doi.org/10.1016/j.appdev.2017.11.006.

Supa'at, S., & Ihsan, M. (2023). The Challenges of Elementary Education in Society 5.0 Era. *International Journal of Social Learning (IJSL), 3*(3), 341–360. https://doi.org/10.55324/ijsl.v3i3.214.

Wei, Y., & Liu, Y. (2025). The Essence and Key Constructs of Deep Learning in Early Childhood: A Conceptual Analysis. *Education Insights, 2*(6), 267–274. https://doi.org/10.70088/nwcm5k83.

Weisberg, D. S., Hirsh-Pasek, K., & Golinkoff, R. M. (2016). *Guided Play: Principles and Practices. Current Opinion in Psychology, 10,* 70–74. https://doi.org/10.1016/j.copsyc.2015.12.006.

Yemini, M., Engel, L., & Simon, S. (2023). Place-Based Education – A Systematic Review of Literature. *Educational Review, 77*(2), 640-660. https://doi.org/10.1080/00131911.2023.2177260.

Zhong, L. (2023). Quality Evaluation Model of Preschool Art Education Based on Deep Learning Theory. *EAI International Conference on BigIoT-EDU 2022, 138,* 55–65. https://doi.org/10.1007/978-3-031-23950-2_55.

Zongqing, Y., Ainiyah, N., Saputra, R., & Widiyono, A. (2023). Qualitative Analysis: Effective Practices in Inclusive and Special Needs Education in China. *International Journal of Social Learning (IJSL), 3*(2), 185–196. https://doi.org/10.55324/ijsl.v3i2.181.

Zosh, J. M., Hirsh-Pasek, K., & Golinkoff, R. M. (2018). Accessing Playful Learning Across the Globe: A Cross-Cultural Exploration. *Frontiers in Psychology, 9,* 1124. https://doi.org/10.3389/fpsyg.2018.01124.