

A Deep Learning–Based Islamic Education Learning Model for Developing Students’ Higher Order Thinking Skills

Moch. Rizki¹, Asrori², Moch Charis Hidayat³

^{1,2,3}Pendidikan Agama Islam, Fakultas Agama Islam, Universitas Muhammadiyah Surabaya, Surabaya, Indonesia
mochrizki014@gmail.com¹, asrori@fai.um-surabaya.ac.id², charishidayat@um-surabaya.ac.id³

Submitted: December 24 th 2025	Revised: January 9 th 2026	Accepted: January 24 th 2026	Published: April 30 th 2026
--	--	--	---

Corresponding author : Asrori
Email : asrori@fai.um-surabaya.ac.id

Abstrak

Penelitian ini mengkaji konstruksi, implementasi, dan kontribusi model pembelajaran Pendidikan Agama Islam berbasis deep learning terhadap pengembangan *Higher Order Thinking Skills* (HOTS) pada peserta didik sekolah dasar. Penelitian ini menggunakan pendekatan kualitatif interpretatif dengan desain studi kasus intrinsik dan dilaksanakan di SD Muhammadiyah 21 Surabaya. Pengumpulan data dilakukan melalui observasi kelas, wawancara mendalam, dan analisis dokumen, yang dianalisis secara tematik menggunakan teknik pengodean reflektif. Hasil penelitian menunjukkan bahwa model Pendidikan Agama Islam berbasis deep learning menekankan pemahaman konseptual yang mendalam, dialog reflektif, pembelajaran kontekstual, serta internalisasi nilai-nilai Islam. Implementasi model ini menggeser pembelajaran Pendidikan Agama Islam dari pendekatan normatif dan berorientasi hafalan menuju pembelajaran yang bermakna dan dialogis. Temuan empiris menunjukkan bahwa model tersebut efektif dalam mengembangkan kemampuan berpikir analitis, evaluatif, dan reflektif peserta didik, sekaligus memperkuat kesadaran moral dan pembentukan karakter.

Kata kunci: Pendidikan Agama Islam; Deep Learning; Higher Order Thinking Skills; Pembelajaran Reflektif; Sekolah Dasar.

Abstrack

This study examines the construction, implementation, and contribution of a deep learning–based Islamic education learning model to the development of Higher Order Thinking Skills (HOTS) among primary school students. It employs an interpretive qualitative approach with an intrinsic case study design and was conducted at SD Muhammadiyah 21 Surabaya. Data were collected through classroom observations, in-depth interviews, and document analysis, and were thematically analyzed using reflective coding techniques. The findings indicate that the deep learning–based Islamic education model emphasizes deep conceptual understanding, reflective dialogue, contextual learning, and the internalization of Islamic values. The implementation of this model shifts Islamic education instruction from a normative, memorization-oriented approach to meaningful, dialogical learning. Empirical evidence further demonstrates that the model is effective at fostering students’ analytical, evaluative, and reflective thinking abilities while strengthening moral awareness and character formation.

Keywords: Islamic Education; Deep Learning; Higher Order Thinking Skills; Reflective Learning; Elementary School.

INTRODUCTION

The transformation of 21st-century education necessitates a paradigm shift from knowledge reproduction–oriented learning toward the development of *Higher Order Thinking Skills* (HOTS),

encompassing analytical, evaluative, and creative abilities. HOTS are widely regarded as essential competencies for equipping learners to navigate the complexity of global challenges, the rapid advancement of digital technologies, and continuously evolving socio-cultural dynamics (Liu et al., 2024; Zhou et al., 2023). At the primary education level, strengthening HOTS is particularly critical, as this stage represents a formative period for building cognitive and affective foundations that shape learners' future learning quality and thinking patterns (Epinasti et al., 2021; Oknaryana et al., 2025).

Within the context of Islamic education, the development of HOTS faces more complex challenges. Islamic education functions not only as a medium for transmitting Islamic knowledge but also as a strategic instrument for cultivating reflective, critical, and ethically grounded thinking among learners. In this study, Higher Order Thinking Skills (HOTS) are operationally defined as higher-level cognitive abilities that encompass analyzing the meanings of Islamic teachings, evaluating phenomena and behaviors based on Islamic values, and reflecting on and constructing contextualized understandings of values in everyday life. HOTS are understood not merely as abstract cognitive skills but as a reflective–ethical thinking process integrated with value awareness and character formation within the framework of Islamic education. However, numerous studies indicate that Islamic education practices in schools remain dominated by conventional instructional approaches that emphasize memorization, literal text comprehension, and low-level cognitive outcomes (Hidayat & Syahidin, 2019; Khofiyah, 2020; Ridlwan & Asrori, 2022). The predominance of such approaches limits students' opportunities to develop HOTS in a systematic and sustainable manner.

Several studies have examined innovations in Islamic education learning through various approaches, including participatory observation-based learning, contextual learning, motivational enhancement, and the integration of religious moderation values into instructional materials (Masturin, 2023; Anisah, G., & Wahyu, 2022; Mutaqorribain et al., 2022). These studies affirm that pedagogical innovation can enhance student engagement, character formation, and the internalization of Islamic values (Singkhala et al., 2024; Hendawi et al., 2024). Nevertheless, most of these studies focus primarily on methodological and affective aspects and have not explicitly designed Islamic education learning models to develop HOTS through deep conceptual understanding and critical reflection.

Meanwhile, contemporary global educational discourse highlights growing attention to *deep learning* as an approach that emphasizes conceptual interconnectedness, higher-order cognitive processing, critical reflection, and meaningful, sustainable learning (Bakambekova & James, 2020). In this study, deep learning is operationally defined as a pedagogical approach rather than a

technological term that emphasizes deep conceptual understanding, interconceptual connections, reflective dialogue, and the internalization of values through meaningful learning experiences. This conceptualization aligns with the epistemology of Islamic education, which foregrounds the principles of *tadabbur*, *tafaqquh*, and the internalization of reflective values (Wedi et al., 2025). In Islamic education, deep learning holds strong epistemological relevance, as it aligns with the principles of *tadabbur*, *tafaqquh*, and reflective internalization of values. Wedi et al. (2025) emphasize that the digital transformation of Islamic education in the era of artificial intelligence requires learning models that are not only technologically adaptive but also capable of fostering deeper meaning-making and strengthening students' critical thinking capacities. However, empirical studies that position deep learning as a pedagogical framework for Islamic education rather than merely a technological concept remain limited, particularly at the primary education level.

Furthermore, studies on HOTS indicate that the development of higher-order thinking requires authentic, cognitively challenging, and contextually relevant learning designs that align with students' learning experiences (Huang et al., 2023; Hamdan et al., 2024). Despite this, HOTS research has predominantly focused on science, mathematics, or higher education contexts, while studies addressing HOTS within Islamic education at the primary school level remain relatively marginalized. This situation reveals a significant research gap: the lack of integration among HOTS development, deep learning approaches, and the context of primary-level Islamic education within a comprehensive, empirically grounded learning model.

Accordingly, there remains a paucity of research that conceptually and empirically examines how deep learning-based Islamic education models are constructed and implemented, and how they contribute to the development of HOTS among primary school students. This gap underscores the need for research that goes beyond methodological innovation or digitalization of Islamic education and instead focuses on fostering higher-order thinking integrated with the internalization of Islamic values.

Based on this research gap, the present study focuses on the development and analysis of a Deep Learning-Based Islamic Education Learning Model for Enhancing Higher Order Thinking Skills (HOTS) among students at SD Muhammadiyah 21 Surabaya. This study is expected to contribute empirically to the development of innovative, HOTS-oriented Islamic education practices, while also enriching the theoretical discourse on integrating deep learning into Islamic education at the primary education level, a domain that remains underexplored in the existing literature.

METHODS

This study employed an interpretive qualitative approach with an intrinsic case study design to obtain an in-depth understanding of the construction, implementation, and meaning of a deep learning-based Islamic education learning model, as well as its contribution to the development of Higher Order Thinking Skills (HOTS) among primary school students. An interpretive qualitative paradigm was adopted because it emphasizes the exploration of meaning, context, and participants' perspectives in natural settings, particularly in socially and culturally constructed educational processes (Creswell et al., 2018; Norman et al., 2018). The intrinsic case study design was selected to allow a holistic and contextualized examination of a specific educational phenomenon considered unique and worthy of in-depth investigation (Stake, 1995; Yin, 2018).

This approach was considered appropriate because learning is conceptualized as a contextual and meaning-laden pedagogical process, in which deep learning is understood not merely as the use of digital technology, but as a learning orientation that emphasizes deep conceptual understanding, critical reflection, and value internalization (Bakambekova & James, 2020; Elshenawy et al., 2025).

The study was conducted at SD Muhammadiyah 21 Surabaya, which was purposively selected for its innovative Islamic education practices, strong orientation toward Islamic character development, and explicit emphasis on fostering critical and reflective thinking among students. Site selection followed the principle of information-rich cases, which is central to qualitative inquiry aiming for depth rather than generalization (Patton, 2015). Research participants were selected through purposive sampling and included Islamic education teachers, students, and school administrators who were directly involved in the planning, implementation, and evaluation of the learning process (Miles, M.B, Huberman, A.M, dan Saldana, 2018).

The fieldwork was conducted over approximately three months, encompassing an initial site orientation phase, the main data collection process, and subsequent clarification and deepening of the findings. Classroom observations were carried out repeatedly over an eight-week period, with the frequency aligned with the instructional schedule of Islamic education classes. This duration enabled the researcher to consistently capture patterns in the implementation of the deep learning-based instructional model, gain a comprehensive understanding of classroom interaction dynamics, and observe the sustained development of students' higher-order thinking skills within an authentic learning context.

Data were collected using a multi-method strategy, consisting of classroom observations, in-depth semi-structured interviews, and document analysis, enabling methodological triangulation to enhance data credibility (Hadi et al., 2021). Classroom observations focused on deep learning-

oriented instructional activities, teacher-student interactions, and indicators of HOTS development, employing a moderate-participatory observation approach to capture authentic learning practices without disrupting instructional dynamics (Nasih et al., 2020). In-depth interviews were conducted to explore participants' perceptions, experiences, and reflections regarding the learning model, while document analysis examined lesson plans, teaching modules, instructional materials, and students' learning products to assess coherence between instructional planning and classroom implementation (Masturin, 2023).

Data analysis was conducted using a thematic-reflective approach through systematic stages of open coding, axial coding, and selective coding to construct conceptual linkages among instructional strategies, students' cognitive processes, and the internalization of Islamic values (Miles et al., 2018; Hidayat, 2020). Data trustworthiness was ensured through established qualitative validation strategies, including triangulation of data sources and methods, the maintenance of an audit trail, and the provision of rich, thick descriptions to support transferability (Norman et al., 2018). The study adhered to ethical standards in educational research, including informed consent, voluntary participation, and the protection of participants' confidentiality (Cohen et al., 2018).

RESULTS AND DISCUSSION

Construction and Characteristics of the Deep Learning–Based Islamic Education Learning Model

The findings indicate that the deep learning–based Islamic education model developed and implemented at SD Muhammadiyah 21 Surabaya was constructed as a reflective and contextual pedagogical framework that emphasizes deep conceptual understanding, internalization of Islamic values, and the strengthening of students' higher-order thinking skills. This model was not designed as a single instructional method, but rather as a learning framework encompassing various active learning strategies, including reflective discussions, contextual case studies, experiential learning, and simple analytical tasks.

Conceptually, the construction of this model emerged from the need to transform Islamic education learning from an instructional-normative approach toward one that promotes meaning-making, reflection, and value awareness. This finding aligns with Wedi et al. (2025), who argue that the transformation of Islamic education in the era of artificial intelligence cannot rely solely on the digitalization of learning media, but must also address pedagogical dimensions and students' ways of thinking. In this study, deep learning is understood not as the application of algorithms or artificial intelligence, but as a pedagogical approach that fosters conceptual interconnectedness, higher-level

cognitive processing, and meaningful learning, as emphasized by Bakambekova and James (2020) and Balas et al. (2020).

The identified characteristics of the learning model demonstrate a clear orientation toward improving the quality of the learning process. First, learning activities were designed to foster deep conceptual understanding, encouraging students to grasp the meaning of Islamic teachings and their relevance to everyday life rather than merely memorizing texts or definitions. This approach reinforces the findings of Hidayat and Syahidin (2019) that contextual and meaningful Islamic education learning enhances students' levels of thinking. Second, the use of higher-order, open-ended questions was a primary strategy for stimulating students' analytical and evaluative abilities. Such questions created space for dialogue, argumentation, and critical reasoning, which are foundational to HOTS development (Dewi & Sørensen, 2023).

Third, the model positioned reflection on Islamic values as an inherent element at every stage of learning. Reflection was not treated as an additional activity, but was integrated into concept exploration, discussions, and assignments. This finding is consistent with Hasanah et al. (2024), who showed that learning Islamic values becomes more meaningful when students engage in experience-based reflective processes. This reflective approach also strengthens character formation, as highlighted by Nasih et al. (2020) and Masturin (2023), who emphasize that value internalization in Islamic education requires active involvement and personal awareness among learners.

Fourth, the model reflects a shift in the teacher's role from a knowledge transmitter to a facilitator of thinking processes and a guide for reflection. Teachers were responsible for designing cognitively challenging learning situations, posing reflective questions, and mediating classroom dialogue. This role transformation aligns with Zakiyyah et al. (2024), who stress the importance of adaptive Islamic education learning management oriented toward active student engagement, and supports Usman et al. (2025), who highlight the role of collaboration and meaningful dialogue in Islamic education learning.

Analysis of instructional planning documents revealed that teachers intentionally formulated learning objectives encompassing both higher-level cognitive dimensions (analysis and evaluation) and affective-reflective dimensions. This indicates alignment between planning and instructional practice and affirms that deep learning was positioned as a pedagogical approach for constructing meaning and value awareness rather than merely as a technology-driven approach. This finding extends the work of Luthfi et al. (2025), who emphasize that the development of Islamic education learning models should be oriented toward fostering moderate attitudes and reflective thinking among learners.

Overall, the construction and characteristics of the deep learning-based Islamic education learning model demonstrate a strong integration of conceptual understanding, reflection on Islamic values, and the development of higher-order thinking skills. This model offers both theoretical and practical contributions to innovation in Islamic education at the primary school level by affirming that deep learning can serve as a relevant, contextual, and value-oriented pedagogical framework for addressing the challenges of 21st-century Islamic education.

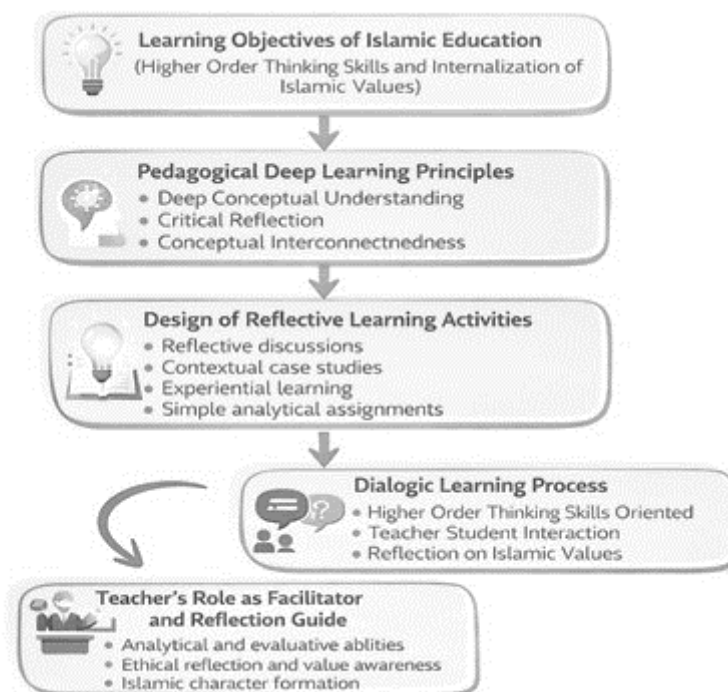


Figure 1. Conceptual Diagram of the Deep Learning-Based Islamic Education Learning Model

Implementation of Deep Learning and Reflective Learning

The findings further indicate that the implementation of the deep learning based Islamic education model at SD Muhammadiyah 21 Surabaya was systematic and oriented toward meaningful and reflective learning. Instruction was no longer centered on one-way transmission of content, but was designed as a sequence of pedagogical activities that encouraged students' cognitive and affective engagement through concept exploration, reflective dialogue, and internalization of Islamic values.

Empirically, deep learning implementation was evident in the use of contextual stimuli closely related to students' lived experiences, open discussions, reflective group work, and assignments requiring students to connect Islamic education concepts with social realities and personal behavior. These activities enabled students not only to understand the normative aspects of Islamic teachings, but also to reason about their meanings and implications in daily life. This finding is consistent with

Hidayat and Syahidin (2019), who demonstrated that contextual learning enhances students' thinking levels by providing opportunities for analysis, evaluation, and reflection.

The reflective dimension constituted a central element of the model's implementation. Reflection on Islamic values was not positioned as a concluding activity but was inherently integrated into all stages of learning, from concept exploration and discussion to assignments. Teachers consistently posed reflective questions that guided students in assessing the meaning of Islamic teachings, their relevance to real-life experiences, and their implications for personal attitudes and behavior. This pattern reinforces the findings of Hasanah et al. (2024), who showed that experience-based reflective approaches, such as *tadabbur* and contextual meaning-making, effectively deepen the internalization of Islamic values.

Moreover, the implementation of deep learning was marked by increased active student participation. Classroom observations indicated that students were given ample opportunities to express opinions, ask questions, and respond to peers' perspectives. This dialogical interaction strengthened students' affective and social engagement and contributed to character development. This aligns with Nasih et al. (2020), who found that participatory and observation-based Islamic education enhances students' value awareness and character formation.

From a learning management perspective, the implementation of deep learning also demonstrated coherence among instructional planning, execution, and learning objectives. Teachers designed learning activities oriented not only toward cognitive outcomes, but also toward strengthening attitudes, moderation values, and ethical awareness. This supports Masturin's (2023) argument that the development of Islamic education should focus on character formation through conscious and reflective value integration. It also aligns with Zakiyyah et al. (2024), who emphasize the importance of adaptive, integrated, and student-centered Islamic education learning management within the context of digital transformation.

More broadly, the implementation of deep learning in this study reflects a form of pedagogical transformation consistent with Wedi et al. (2025), who argue that the transformation of Islamic education in the era of artificial intelligence must involve paradigm shifts that promote deep understanding, value reflection, and the strengthening of students' critical thinking capacities. This study demonstrates that such transformation can begin at the primary education level through appropriate pedagogical approaches.

Furthermore, reflective learning based on deep learning created opportunities to strengthen students' moderate and collaborative attitudes. The patterns of discussion, group work, and value-based dialogue align with Luthfi et al. (2025) regarding the importance of Islamic education learning

in fostering moderation, and support Usman et al. (2025) on the role of collaboration and meaningful interaction in Islamic education learning.

Thus, the implementation of deep learning in Islamic education transformed the classroom from a space of normative transmission into one for dialogue, reflection, and value construction, simultaneously fostering students' cognitive and affective engagement. These findings confirm that deep learning holds strategic potential to revitalize Islamic education, making it more meaningful, reflective, and relevant to the demands of 21st-century Islamic education, while also serving as a critical foundation for the development of higher-order thinking skills at the primary education level.

Contribution of the Learning Model to the Development of Higher Order Thinking Skills (HOTS)

The findings demonstrate that the deep learning-based Islamic education learning model implemented at SD Muhammadiyah 21 Surabaya made a significant contribution to the development of students' Higher Order Thinking Skills (HOTS). Manifestations of HOTS were consistently observed in students' abilities to analyze value-related issues, evaluate actions in light of Islamic principles, and reflect on the meanings of Islamic teachings in everyday contexts. These findings confirm that HOTS develop through learning processes that emphasize meaningful experiences, active engagement, and sustained reflection on value.

Empirically, HOTS development occurred when Islamic education learning was designed not only to address what is learned, but also why and how Islamic values should be understood and practiced. Activities such as reflective discussions, contextual case analysis, and value-based problem-solving encouraged students to naturally engage in higher-order thinking processes. This aligns with Dewi and Sørensen (2023), who argue that HOTS develop through cognitively challenging, personally meaningful learning activities. The findings also support Epinasti et al. (2021), who emphasize that HOTS development in primary education depends heavily on learning designs that allow for dialogue, reflection, and argumentation.

Within the context of Islamic education, these findings reinforce the argument that the development of HOTS does not conflict with the goals of character and spiritual formation. On the contrary, HOTS function as a pedagogical instrument for deepening reflective and conscious understanding of Islamic values. Analytical skills enable students to comprehend Islamic teachings holistically; evaluative skills help them assess behaviors and social phenomena in light of Islamic principles; and reflective skills foster the internalization of values in attitudes and actions. This is

consistent with Hasanah et al. (2024), who demonstrated that reflective approaches, such as *tadabbur* and experiential meaning-making, are effective for strengthening Islamic value learning.

Furthermore, the model's contribution to HOTS was evident in students' increased moral awareness and character development. Active student engagement in value discussions and personal reflection fostered a participatory, dialogical learning process. This supports Nasih et al. (2020), who found that participatory Islamic education directly contributes to character formation and value awareness. Similarly, Masturin (2023) emphasized that Islamic education oriented toward moderation and character requires higher-order cognitive processes so that values are not only understood normatively, but also internalized and practiced.

From a pedagogical transformation perspective, these findings are also relevant to Wedi et al. (2025), who argue that the transformation of Islamic education in the AI era should focus on strengthening learners' critical and reflective thinking capacities. This study demonstrates that HOTS development can begin at the primary education level without diminishing spiritual and value dimensions. Thus, HOTS are positioned not merely as academic competencies, but as reflective-ethical thinking skills integrated with religious consciousness.

Additionally, the model's contribution to HOTS was reflected in increased student motivation and engagement throughout the learning process. Dialogical and meaningful learning activities encouraged students to participate more actively and to express their ideas more confidently. This supports Khofiyah (2020), who found that collaborative and interactive Islamic education learning enhances student motivation, which in turn strengthens higher-level cognitive engagement.

Conceptually, this study extends the discourse on HOTS by situating it within the context of Islamic education. While most HOTS studies focus on science, mathematics, or higher education (Handayani et al., 2024; Hamdan et al., 2024) This research demonstrates that Islamic education has equal potential to develop HOTS when supported by appropriate pedagogical approaches. The deep learning-based Islamic education model reveals a synergy between the development of higher-order thinking skills and the internalization of Islamic values.

In conclusion, the contribution of the deep learning-based Islamic education learning model to HOTS development is not only practical in enhancing learning quality but also theoretical in enriching contemporary Islamic education scholarship. The model affirms that HOTS development and spiritual character formation are not competing goals, but mutually reinforcing dimensions within the framework of 21st-century Islamic education.

Challenges and Constraints in Implementing Deep Learning

Although the implementation of the deep learning–based Islamic education learning model yielded positive outcomes, this study also identified several challenges and constraints encountered during its application in the primary education context. A primary challenge relates to teachers’ pedagogical readiness, particularly in designing higher-order questions and reflective learning activities that align with the cognitive developmental characteristics of primary school students. Several studies indicate that teachers are often still accustomed to transmissive instructional approaches and memorization-based assessments; consequently, shifting toward dialogical and reflective learning requires ongoing adaptation, pedagogical reflection, and continuous professional capacity building (Hidayat & Syahidin, 2019; Epinasti et al., 2021; Hamdan et al., 2024).

The participating students were primary school learners aged approximately 9–11 years, whose cognitive, linguistic, and reflective capacities were still in a formative stage. While many students demonstrated enthusiasm and curiosity during dialogical activities, their ability to articulate arguments, engage in abstract reasoning, and express reflective judgments varied considerably. Some students required more concrete examples, guided questioning, and scaffolding to participate meaningfully in reflective discussions.

In addition, limited instructional time constitutes a significant structural constraint. Deep learning–based instruction requires more flexible and extended time for concept exploration, in-depth discussion, and value reflection, whereas primary school curricula and class schedules tend to be dense and fragmented. This condition necessitates teachers’ ability to manage instructional time flexibly and to be selective regarding the depth of content and learning activities implemented (Huang et al., 2023; Zakiyyah et al., 2024).

Another challenge concerns the heterogeneity of students’ abilities. Variations in literacy levels, argumentative skills, and students’ confidence in expressing opinions lead to reflective dialogue processes that do not always unfold evenly among all learners. Some students tended to be passive during open-ended discussions, while others were more verbally expressive and confident, indicating the need for differentiated instructional strategies to ensure inclusive participation.

This finding is consistent with (Khofiyah, 2020) and (Nasih et al., 2020) N, who report that participatory and dialogical learning in Islamic education requires gradual habituation and the creation of psychologically safe learning environments to encourage active student

engagement. Nevertheless, this condition also highlights that deep learning–based instruction is inherently adaptive and can be developed progressively in accordance with students’ readiness and individual characteristics.

Although these challenges were not the primary focus of the present study, acknowledging implementation constraints adds analytical depth and demonstrates that the success of a deep learning-based Islamic education learning model is highly dependent on pedagogical support, teachers’ professional readiness, and supportive school policies. This finding aligns with (Wedi et al., 2025), who emphasize that the transformation of Islamic education learning, particularly in the era of artificial intelligence, requires strengthening human resource capacity and ensuring curricular policy flexibility. Therefore, teacher professional development and institutional support constitute essential prerequisites for the sustainability and broader replication of this learning model within primary education contexts.

CONCLUSION

This study demonstrates that the deep learning–based Islamic education learning model implemented at SD Muhammadiyah 21 Surabaya is effective in integrating deep conceptual understanding, the internalization of Islamic values, and the development of Higher Order Thinking Skills (HOTS) among primary school students. Deep learning is positioned as a reflective pedagogical framework that promotes higher-level cognitive processing through dialogue, contextual problem solving, and value-based reflection, rather than merely as a technology-driven approach. The implementation of this model shifts Islamic education learning from an instructional-normative orientation toward meaningful learning that simultaneously fosters students’ analytical, evaluative, and ethical reflective capacities.

Theoretically, this study contributes to the advancement of Islamic education scholarship by extending the conceptualization of deep learning as a pedagogical approach aligned with the epistemological foundations of Islamic education, particularly the principles of *tadabbur* and *tafaqquh*. The findings affirm that HOTS development and spiritual character formation are not separate or competing objectives, but mutually reinforcing dimensions within a reflective learning framework. From a practical and policy perspective, the results imply the need to integrate deep learning principles into curriculum design and teacher professional development for Islamic education at the primary education level as a systemic strategy to strengthen HOTS.

Future research is recommended to investigate the applicability of this Deep Learning–based Islamic education (PAI) learning model across diverse institutional contexts and

educational levels. Such studies would help to evaluate its effectiveness in different settings, enhance its theoretical robustness, and ensure its transferability, thereby providing broader insights for the development of innovative learning strategies in Islamic education.

REFERENCES

- Anisah, G., & Wahyu, D. D. R. (2022). Pengaruh Metode Problem Based Learning Terhadap Keterampilan Berpikir Tingkat Tinggi (HOTS) Pada Adab Bermedia Sosial. *Al Aulfa: Jurnal Pendidikan dan Kajian Keislaman*, 4(1), 36–54.
<https://doi.org/10.32665/alulya.v8i2.2048>
- Bakambekova, A., & James, A. P. (2020). Deep Learning Theory Simplified. In *Modeling and Optimization in Science and Technologies*. https://doi.org/10.1007/978-3-030-14524-8_3
- Balas, V. E., Mishra, B. K., & Kumar, R. (2020). Handbook of Deep Learning in Biomedical Engineering: Techniques and Applications. *Handbook of Deep Learning in Biomedical Engineering: Techniques and Applications*. <https://doi.org/10.1016/B978-0-12-823014-5.01001-2>
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research Methods in Education* (8th ed.). Routledge. <https://doi.org/https://doi.org/10.4324/9781315456539>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (4th ed.). Sage Publications, Inc.
- Dewi, A. N., & Sørensen, B. (2023). Higher-order Thinking Skills and Metaphor. *Southern Semiotic Review*, 2023(18). <https://doi.org/10.33234/SSR.18.1>
- Dumbe, Y., Bin Yusuf, J., Nasir Zakaria, G. A., Malik, S., Anwar, S., Cahyono, G., & Moch. Charis Hidayat. (2024). The Development of Islamic Education: An Analysis of Hasan al-Banna's Thought. *Ar-Fachruddin: Journal of Islamic Education*, 1(2), 68–81. <https://doi.org/10.7401/16xx7266>
- Elshenawy, A., Mohammed, A., & Hamouda, S. (2025). (2025). The evolution of deep learning: Models, applications, and future directions. *Journal of Critical Reviews*. <https://doi.org/https://doi.org/10.22159/jcr.07.01.05>
- Epinasti, G., Y. Slamet, S., & Yamtinah, S. (2021). Teacher's Perception towards Assessing of Higher Order Thinking Skills (HOTS) in Elementary Schools. *ICLIQE 2021: Proceeding of The 5th International Conference on Learning Innovation and Quality Education*, 88. <https://doi.org/10.1145/3516875.3516980>
- Hadi, A., Asrori, & Rusman. (2021). *Penelitian Kualitatif Studi Fenomenologi, Case Study, Grounded Theory, Etnografi, Biografi*. CV. Pena Persada.
- Hamdan, N., Heong, Y. M., Masran, S. H., Kiong, T. T., Sutadji, E., & Fuada, S. (2024). Exploring Marzano Higher-Order Thinking Skills: Demographic Disparities Among Technical Students. *Journal of Technical Education and Training*, 16(2). <https://doi.org/10.30880/JTET.2024.16.02.009>
- Handayani, N., Aw, S., Zamroni, Imanita, M., Setiawan, J., & Fadli, M. R. (2024). Development of higher order thinking skill assessment instruments in social studies learning. *International Journal of Evaluation and Research in Education*, 13(2). <https://doi.org/10.11591/ijere.v13i2.26448>
- Hasanah, I. F., Istiqomah, Hasanah, U., & Budiman, H. (2024). Connecting with Nature: Tadabur Alam and its Effect on Islamic Value Learning. *E3S Web of Conferences*, 482. <https://doi.org/10.1051/e3sconf/202448204020>
- Hendawi, M., Al Murshidi, G., Asrori, A., Hadi, M. F., Huda, M., & Lovat, T. (2024). The

- Development of Islamic Education Curriculum from the Quranic Perspective. *Ar-Fachruddin: Journal of Islamic Education*, 1(2), 93–123. <https://doi.org/10.7401/hms52091>
- Hidayat, M. C. (2020). Implementation of Cognitive, Affective, Psychomotor Aspect Assessment Case Study at SDN Ngembung Cerme Gresik. *Studia Religia: Jurnal Pemikiran Dan Pendidikan Islam*, 4(1), 71–83. <https://doi.org/10.30651/sr.v4i1.5272>
- Hidayat, T., & Syahidin, S. (2019). Inovasi Pembelajaran Pendidikan Agama Islam Melalui Model Contextual Teaching and Learning Dalam Meningkatkan Taraf Berfikir Peserta Didik. *Jurnal Pendidikan Agama Islam*, 16(2). <https://doi.org/10.14421/jpai.2019.162-01>
- Huang, Y.-M., Silitonga, L. M., Murti, A. T., & Wu, T.-T. (2023). Learner Engagement in a Business Simulation Game: Impact on Higher-Order Thinking Skills. *Journal of Educational Computing Research*, 61(1). <https://doi.org/10.1177/07356331221106918>
- Khofiyah, S. (2020). Implementasi Model Make a Match untuk Meningkatkan Motivasi Belajar Siswa dalam Pembelajaran PAI di SMP N 01 Kesesi. *Jurnal Pendidikan Agama Islam*, 17(1). <https://doi.org/10.14421/jpai.2020.171-07>
- Liu, J., Liu, Z., Wang, C., Xu, Y., Chen, J., & Cheng, Y. (2024). *K-12 students' higher-order thinking skills: Conceptualization, components, and evaluation indicators*. *Thinking Skills and Creativity*, 52, 101551. <https://doi.org/10.1016/j.tsc.2024.101551>
- Luthfi, A., Saputra, E., & Ali, N. (2025). Development of a Multicultural-Based Islamic Religious Education Learning Model in Fostering Moderate Attitudes of Junior High School Students in Cilegon. *Journal of Educational and Social Research*, 15(4). <https://doi.org/10.36941/jesr-2025-0126>
- Masturin, M. (2023). Development of Islamic Religious Education Materials Based on Religious Moderation in Forming Student Character. *Munaddhomah: Jurnal Manajemen Pendidikan Islam*, 3(4). <https://doi.org/10.31538/munaddhomah.v3i4.310>
- Miles, M.B, Huberman, A.M, dan Saldana, J. (2018). *Qualitative Data Analysis, A Methods Sourcebook* (4th ed.). Sage Publications.
- Mutaqorribain, S., Asrori, A., & Rusman, R. (2022). The Effect of Teacher's Motivation on Student Learning Activities in Islamic Education Lessons. *Nazhruna: Jurnal Pendidikan Islam*, 5(3). <https://doi.org/10.31538/nzh.v5i3.2101>
- Nasih, A. M., Sultoni, A., Thoriquattyas, T., Yani, A., Ramli, S., & Umar, M. (2020). Applying Participatory Observation in Islamic Education to Improve Students' Character. *Jurnal Pendidikan Islam*, 6(2). <https://doi.org/10.15575/jpi.v6i2.9756>
- Norman K. Denzin and Yvonna S. Lincoln. (2018). *The Sage Handbook of Qualitative Research* (5th ed.). Sage Publications.
- Oknaryana, Z., Zona, M. A., Marna, J. E., Hayati, A. F., Syofyan, R., Zulvia, Y., Kurniawan, H., & Murdy, K. (2025). *Improving students' higher-order thinking skills: A comparison between flipped learning and traditional teaching approach*. *European Journal of Educational Research*, 14(4), 1245–1257. <https://doi.org/10.12973/eu-jer.14.4.1245>
- Özpir, H. C., Balcı Çömez, C., & Benzer, E. (2025). *Scientific stories in the assessment of higher order thinking skills*. *Cogent Education*, 12(1), Article 2460226. <https://doi.org/10.1080/2331186X.2025.2460226>
- Patton, M. Q. (2015). *Qualitative Research and Evaluation Methods* (4th ed.). SAGE Publications, Inc.
- Ridlwani, M., & Asrori, A. (2022). *Problems of implementation of Islamic religious education at Muhammadiyah Junior High School 4 Gadung Surabaya*. In *International Conference on Islamic and Muhammadiyah Studies (ICIMS 2022)* (pp. 312–318). Atlantis Press. <https://doi.org/10.2991/assehr.k.220708.039>
- Stake, R. E. (1995). *The Art of Case Study Research*. Sage Publications, Inc.

- Usman, T., Bahraeni, & Nurhilalayah. (2025). Exploring Islamic-Oriented Cooperative Learning through Faith-Driven Collaboration in among University Students in Islamic Education Courses. *International Journal of Learning, Teaching and Educational Research*, 24(9). <https://doi.org/10.26803/ijlter.24.9.44>
- Wedi, A., Mardiana, D., & Umiarso. (2025). Digital Transformation Model of Islamic Religious Education in the AI Era: A Case Study of Madrasah Aliyah in East Java, Indonesia. *International Journal of Learning, Teaching and Educational Research*, 24(8). <https://doi.org/10.26803/ijlter.24.8.37>
- Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods* (6th ed.). SAGE Publications, Inc.
- Zakiyyah, I., Suparto, & Maswani. (2024, October 3). Learning Management of Islamic Religious Education Based on Digital Technology. *2024 12th International Conference on Cyber and IT Service Management (CITSM)*. <https://doi.org/10.1109/CITSM64103.2024.10775708>