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EVALUATION OF ISLAMIC RELIGIOUS EDUCATION LEARNING USING THE ARTIFICIAL INTELLIGENCE - BASED DEEP LEARNING APPROACH

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Abstract

Infrastructure constraints, educator digital literacy, and ethics still need to be addressed through the evaluation of Islamic religious education (PAI) learning to assess students' cognitive, affective, and psychomotor competencies in improving conceptual understanding, critical thinking skills, and religious attitudes in PAI subjects. In the digital era, deep learning methodologies that include artificial intelligence (AI) strategies and technologies present opportunities to improve the effectiveness of evaluation. This study aims to evaluate How effective is the in-depth learning method in improving PAI learning outcomes, the data was analyzed using the qualitative literature approach of the Miles and Huberman model, by conducting Data reduction , data presentation, and conclusion drawing. The research results show that the integration of artificial intelligence-based deep learning results in more comprehensive and meaningful assessments for students, teachers, and educational institutions.

Keywords: *Learning Evaluation, Islamic Religious Education, Deep Learning, Artificial Intelligence.*

A. Introduction

Islamic education is teaching based on the principles of Islamic teachings found in the Qur'an and Hadith, as well as the views of Islamic scholars and historical traditions. ¹Because a country's education system is the most important place for producing high-quality human resources, special attention is required in planning, implementation, and evaluation.

Therefore, incorporating education into initiatives designed to improve the nation's welfare should be a priority for policymakers. This aligns with Article 31 of the 1945 Constitution, as amended in the fourth revision, which affirms that everyone has the right to education.²

Islamic Religious Education (PAI) strives not only to impart knowledge but also to foster students' character and spirituality. In today's era of digital technology and artificial intelligence, deep learning methodology, which can be understood as both in-depth learning techniques and artificial intelligence technology, serves as an effective tool for assessing and improving PAI learning.³

Recognizing the importance of evaluating academic achievement, technological advances in the current digital era have opened up numerous opportunities to improve the standard and effectiveness of education, particularly Islamic Religious Education. *Deep Learning*, a branch of artificial intelligence that

¹ Abudin Nata, *Islamic Education* (Jakarta: Kencana Prenada Media Group, 2010).

² Pratiwi Utami, *The 1945 Constitution, First to Fourth Amendments* (Yogyakarta: Jogja Bangkit, 2010).

³ Sarkawi, *Textbook of Islamic Religious Education for Higher Education* (Surabaya: Alfasyam Jaya Mandiri, 2025).

can process and analyze large amounts of data with high precision, is one technology currently in high demand.⁴

Elbashbishy emphasizes that students' spirituality and character are significantly shaped by Islamic Religious Education (PAI). However, in reality, PAI learning assessment procedures still tend to focus on cognitive outcomes and are not fully capable of measuring reflective, affective, and ingrained Islamic values. According to research, more than 70% of PAI teachers continue to assess their students using written exams and memorization, with little focus on contextual and spiritual understanding.⁵

Meanwhile, Saridudin stated that the field of education is undergoing significant changes due to advances in Artificial Intelligence (AI) technology, particularly the Deep Learning approach. Behavior-based assessments, digital interactions, predicting competency achievement, and analyzing learning patterns are all made possible by this technology. Real-time feedback and increased accuracy in evaluating learning performance are two benefits of integrating AI into education. However, this is still rarely used in the context of Islamic Religious Education.⁶

Research by Muhammad 'Ainul Yaqin concluded that less than 10% of Islamic educational institutions in Indonesia use AI-based systems for learning evaluation. This limitation is due to low teacher digital literacy, a lack of infrastructure support, and the lack of an Islamic Education (PAI) evaluation model integrated with Deep Learning technology. As a result, the Islamic Education (PAI) assessment system does not fully reflect holistic,

⁴ Sri Panca Setyawati, *The Role of Non-Cognitive Factors in Boosting Academic Achievement* (Jakarta: Qiara Media, 2022) .

⁵ Elbashbishy, "Deep Learning in Education In Sustainability Education Globe," *Seg.Journals.Ekb* 1, no. 2 (2024): 114.

⁶ Saridudin, "Deep Learning in Islamic Religious Education: Optimizing a Deeper Learning Process," *Al-Afkar: Journal for Islamic Studies* 8, no. 2 (2025), <https://doi.org/https://doi.org/10.31943/afkarjournal.v8i2.2243>.

comprehensive, and adaptive principles for the needs of the digital era.⁷

The above facts indicate a significant gap between the actual use of artificial intelligence technology in the context of Islamic Religious Education and its potential to improve the quality of learning evaluation. The primary objective of this study is to systematically assess this gap.

B. Discussion

1. The Concept of Evaluation of Islamic Religious Education Learning

a. Understanding Learning Evaluation

The methodical process of collecting, examining, and interpreting data to determine the extent to which learning objectives have been met is known as learning evaluation. Evaluation in the context of Islamic Religious Education (PAI) encompasses psychomotor (action) and affective (attitude) components, in addition to cognitive (knowledge) components.⁸

According to several expert definitions, learning evaluation is the process of identifying student learning values by measuring and evaluating the learning outcomes achieved.⁹ According to Suharsimi Arikunto (2012), learning evaluation is a process used to assess the effectiveness of a program in terms of its design, implementation, and results.¹⁰ Evaluation, according to

⁷ Muhammad 'Ainul Yaqin, "Supervision of Islamic Education in the Era of Artificial Intelligence: Opportunities and Challenges," *Nakula Journal: Center for Educational Sciences, Language and Social Sciences* 3, no. 4 (2025): 08–18, <https://doi.org/10.61132/nakula.v3i4.1859>.

⁸ Heni Listiana, *Learning Evaluation: Approaches, Theories, and Innovations in Islamic Religious Education* (Yogyakarta: KBM Indonesia, 2025).

⁹ Nana Sudjana, *Media Pengajaran* (Sinar Baru Algensindo, 2009), 89.

¹⁰ Suharsimi Arikunto, *Penelitian Tindakan Kelas* (Jakarta: Bumi Aksara, 2013), 57.

Benjamin Bloom, is a methodical process that determines how well students meet the required learning objectives.¹¹

One of the most important parts of the Islamic Religious Education learning process is learning evaluation. This methodological approach to collecting, evaluating, and interpreting data is used to determine how well students have met the learning objectives of Islamic Religious Education, in line with the main objectives of the program. namely the development of pious, obedient and moral Muslims which is known as learning evaluation.

b. Objectives of PAI Evaluation

Evaluation aims to determine whether students have achieved the competencies set out in the learning plan (cognitive, affective, and psychomotor aspects). Evaluation provides information to teachers about the success of learning methods and strategies, information to students about their progress and weaknesses, and information to parents regarding their child's learning development. By knowing the evaluation results, teachers can improve their learning approaches, choose more appropriate media, and redesign teaching strategies.¹²

This objective is related to summative assessment, namely providing a final grade for student learning outcomes as a form of academic report. The evaluation results are used to design: Remedial program for students who have not completed. Enrichment for students who have exceeded competency standards.

Evaluation helps detect obstacles in the learning process, whether from the side of students, teachers, materials, or the learning environment. Evaluation that is constructive and does not only focus on numbers can

¹¹ Yowelna Tarumasely, *Textbook of Learning Strategies* (Lamongan: Academia Publication, 2024) .

¹² Hamid Sakti Wibowo, *Development of the PAI Evaluation System : Towards Improving the Quality of Islamic Religious Learning* (Semarang: Tiram Media, 2023) .

encourage students to be more motivated to learn and develop.¹³

The above explanation shows that the purpose of learning evaluation is not only limited to providing grades, but more broadly includes improving the quality of education as a whole, both from the aspect of students, teachers, and the learning system itself.

c. Scope of PAI Evaluation

Learning evaluation encompasses various aspects related to student learning processes and outcomes. The scope of this evaluation is crucial to ensuring that all dimensions of learning are measured comprehensively and comprehensively.

Cognitive Aspects, related to students' mastery of knowledge and thinking skills. Includes the ability to remember, understand, apply, analyze, evaluate, and create (in accordance with the revised Bloom's taxonomy). Examples of evaluation: written tests, multiple choice questions, essays, oral exams.¹⁴

Affective aspects, related to students' attitudes, values, interests, motivation and character. Includes acceptance, assessment, and internalization of values in everyday life. Examples of evaluation: behavioral observations, attitude questionnaires, interviews, self- and peer assessments.¹⁵

Psychomotor aspects, related to physical skills and actions carried out by students. This includes the ability to perform tasks, practice, technical skills, and motor activities.¹⁶

Examples of evaluations include practical assessments,

¹³ Novita Dwi Astuti, *Education in the Digital Era* (Jambi: Sonpedia Publishing Indonesia, 2025) .

¹⁴ Yusuf Budi Prasetya Santosa, *Islamic Educational Thought* (Sidoarjo: Duta Sains, 2024) .

¹⁵ Kadek Ayu Astiti, *Learning Evaluation* (Yogyakarta: Andi Offset, 2017) .

¹⁶ Zulyadaini, *Future-Oriented Culture-Based Learning and Teaching* (Klaten: Sarnu Untung, 2025) .

demonstrations, project assignments, and skills portfolios. Social aspects are sometimes also evaluated to assess students' social interaction, cooperation, and communication skills.¹⁷ Examples of evaluation: group work observations, social participation assessments.

Evaluation of the Learning Process, Measuring the continuity and quality of the learning process itself. Includes observations of learning activities, teacher-student interactions, and the learning methods used. Evaluation of Learning Outcomes , assessing the final results of the learning process, both individually and in groups. Refers to the achievement of established goals and competency standards .¹⁸ Evaluation of the Learning Environment and Resources, Assessing the suitability and effectiveness of the learning environment and the media and learning resources used.¹⁹ Examples of evaluation: facility surveys, assessment of learning media.

The explanation above shows that the scope of learning evaluation includes cognitive, affective, psychomotor aspects, learning processes and outcomes, and the learning environment. A comprehensive evaluation will provide a comprehensive picture of educational success and the need for improvement in the learning system.

d. Principles of Learning Evaluation

For learning evaluations to produce valid and useful results, the evaluation process must be conducted based on several principles : it must be free from bias, subjectivity, and prejudice. Assessments must be based on concrete data

¹⁷ Sari Lisdian, "A Study of the Social Interaction Ability of Group A Children in Project Method Activities at TK Plus Al-Falah Pungging Mojokerto," *Jurnal BK Unesa* 04, no. 01 (2013), <https://ejournal.unesa.ac.id/index.php/jurnal-bk-unesa/article/view/6592%0Ahttps://ejournal.unesa.ac.id/index.php/jurnal-bk-unesa/article/view/6592/7344>.

¹⁸ Heni Listiana, *Learning Evaluation: Approaches, Theories, and Innovations in Islamic Religious Education*

¹⁹ Rahmat, *Evaluation of Islamic Religious Education Learning*

and evidence, ensuring reliable results. Systematic Evaluation is carried out in a planned and structured manner, following clear procedures starting from data collection, analysis, to reporting the results .²⁰

Comprehensive Evaluation must cover all aspects of learning, both cognitive, affective, and psychomotor, so that the picture of learning outcomes is complete. Measurable The aspects being evaluated must be measurable quantitatively and qualitatively using valid and reliable instruments. Fairness: Evaluations must address fairness for all students, without discrimination or unequal treatment.²¹

Evaluation is not only conducted at the end of learning, but also throughout the learning process for continuous monitoring and improvement. Evaluation criteria and procedures must be communicated to students so they understand how the assessment is conducted and what is expected in a transparent manner.²²

Evaluation results should be used to improve the learning process, provide constructive feedback, and aid decision-making. Evaluations should be easy to implement with available resources and not burden students or teachers. Evaluations should be relevant to the learning context and student needs, so that the results can be applied in real-world contexts.²³

e. Islamic Religious Education Learning Evaluation Method

²⁰ Nurhan Buka et al., "The Role of Validity and Rehabilitation in Learning Evaluation," *Socius: Journal of Social Sciences Research* 02, no. 11 (2025): 224–26, <https://doi.org/10.5281/zenodo.15557188>.

²¹ Haryanto, *Learning Evaluation (Concept and Management)* (Yogyakarta: UNY Press, 2020) .

²² Anggi Wulandari, Feby Zaliani Margolang, and Srierta Yeni Sinaga, "The Importance of the Evaluation Process in Learning in Elementary Schools," *Jurnal Intelek Insan Cendikia* , 2025, 11633–40, <https://jicnusantara.com/index.php/jiic>.

²³ Hamid Sakti Wibowo, *Development of the PAI Evaluation System : Towards Improving the Quality of Islamic Religious Learning*

Evaluation methods are techniques or approaches used to measure how well learning outcomes and processes are progressing. Assessment methods used in Islamic Religious Education (PAI) evaluate affective (religious attitudes), psychomotor (practice of worship and actual behavior), and cognitive (religious knowledge). Arikunto (2019) emphasized that evaluation is a methodical procedure used to determine the extent to which learning objectives have been achieved. Evaluation serves as a reflection of self-reflection and self-control in achieving the goals of Islamic education in PAI.²⁴

The Philosophical Basis of Assessment in Islamic Religious Education is based on Islamic values which emphasize: justice (*al-'adl*) namely that assessment must be objective and proportional, without discrimination, trustworthy in the form of evaluation results reflecting the truth and being the responsibility of educators, muhasabah is understood as evaluation is seen as a means of spiritual reflection to improve oneself.²⁵

The purpose of the evaluation is to find out how well students understand Islamic Education teaching materials, evaluate how students' morals and religious views have developed, evaluate the practical application of Islamic teachings by students by providing feedback to teachers so that they can improve teaching methods in shaping students' personalities and Islamic values in accordance with the vision of Islamic education.²⁶

Types and methods of evaluation in Islamic Religious Education (PAI) As a tool to assess the effectiveness of the overall educational process, including cognitive

²⁴ Caswita, *Management of Islamic Religious Education Learning Evaluation* (Yogyakarta: Deepublish Digital, 2021) .

²⁵ Ashari, *Islamic Religious Education in the Lens of Philosophy of Science* (Ponorogo: Uwais Inspirasi Indonesia, 2019) .

²⁶ Rahmat, *Evaluation of Islamic Religious Education Learning*

(knowledge), affective (religious attitudes), and psychomotor (religious practices), evaluation types and methods play a strategic role in Islamic Religious Education (PAI). Unlike general subjects, PAI evaluation measures students' internalization of Islamic values in addition to their level of mastery of the subject matter.²⁷

Education (PAI) evaluation in the modern era is holistic, authentic, and digitally based. This new paradigm focuses evaluation on the process, spiritual experiences, and development of students' Islamic character as the final learning outcomes. Artificial intelligence (AI) and advances in information technology provide significant opportunities for Islamic Religious Education (PAI) teachers to conduct assessments that are more efficient, objective, and responsive to their students' needs. The assessment process can be conducted in real time, transparently, and comprehensively using methods such as digital evaluations, online portfolios, project-based learning, and data analysis using AI or deep learning systems.²⁸

The principles of Islamic Education evaluation methods play an important role in ensuring that the assessment process truly supports the main goal of Islamic education, namely to form people who are faithful, knowledgeable, have noble morals, and are able to practice Islamic teachings comprehensively in everyday life.²⁹

Obstacles to Evaluation Islamic Religious Education faces conceptual, technical, and practical challenges, including teachers' unfamiliarity with holistic evaluation, the prevalence of cognitive assessment, a lack of adequate

²⁷ Heni Listiana, *Learning Evaluation: Approaches, Theories, and Innovations in Islamic Religious Education* .

²⁸ Dewi Murthosia, *Innovation in Managing the Quality of Islamic Religious Education* (Cirebon: Arr Rad Pratama, 2024) .

²⁹ Heni Listiana, *Learning Evaluation: Approaches, Theories, and Innovations in Islamic Religious Education* .

tools, a weak link to character development, time constraints, an excessive number of students, and a lack of teacher training. Several systematic solutions needed to address these challenges include improving teacher competency through training, using authentic and varied evaluation methods, and utilizing digital technology in the form of *artificial intelligence features*. (AI) for objectivity of assessment, as well as collaboration with educators, parents, and educational institutions to make evaluations more comprehensive and meaningful.³⁰

The above explanation confirms that the Islamic Religious Education (PAI) learning evaluation method is an integral tool for assessing and shaping individuals who are faithful, knowledgeable, and virtuous. Evaluation serves not only to measure academic achievement but also as a process of spiritual formation. By combining Islamic values, modern educational theory, and AI-based evaluation technology, Islamic Religious Education (PAI) evaluation can be an effective instrument for producing well-rounded students—faithful, knowledgeable, and devout.

The above understanding can be concluded that these learning evaluation principles serve as a guide so that the evaluation process can run effectively, produce accurate information, and contribute to improving the quality of education.

2. Deep Learning Concept

a. Understanding Deep Learning

In general, depending on the situation, deep learning can mean one of two things: *Deep Learning*, as used in pedagogy, is a teaching method that emphasizes critical and

³⁰ Ariibah Radita Ayu Candrika et al., “Challenges of IT-Based Islamic Education Learning Evaluation in the Digital Era,” *Pendas: Scientific Journal of Elementary Education* 10, no. 02 (2025): 258–72, <https://journal.unpas.ac.id/index.php/pendas/article/view/27075>.

reflective thinking skills, connections between materials, and a thorough understanding of concepts. Technologically, *Deep Learning* is a subfield of artificial intelligence (AI) that analyzes large amounts of data, finds patterns, and generates predictions using algorithms from artificial neural networks.³¹ These two meanings can be combined to create a comprehensive and data-based assessment process when evaluating Islamic Education learning with a deep learning approach.

Learning strategies that emphasize a thorough understanding of the subject matter rather than mere memorization are called " deep learning " in education. They include the ability to apply knowledge to practical situations, the development of critical, introspective, and imaginative thinking skills, and the internalization of the meaning and value of learning experiences. For example, in Islamic Religious Education (PAI), students are encouraged to understand the meaning of the pillars of Islam, consider their application in everyday life, and develop spiritual awareness, rather than simply memorizing them.³²

b. *Deep Learning* in Technology (Artificial Intelligence)

A subfield of machine learning called Deep Learning mimics the way the human brain processes information by using multi-layered artificial neural networks, or deep neural networks.³³ Technologically, deep learning has the ability to analyze large amounts of complex data. It is used for prediction, text, speech, and image recognition. Without the

³¹ Nadia Nadawina, *Implementation of Deep Learning in Education in Indonesia* (Yogyakarta: Star Digital Publishing, 2025) .

³² Suriyah Satar, *Integrated Learning (The Nature and Strategy of Integrated Learning in Elementary Schools)* (Yogyakarta: Green Pustaka Indonesia, 2024) .

³³ Nadia Nadawina, *Implementation of Deep Learning in Education in Indonesia* , 54.

need for explicit programming rules, it learns from data automatically.³⁴

c. Characteristics of Learning with a Deep Learning Approach

Students are encouraged to actively participate in the learning process, construct their own knowledge, and develop critical, collaborative, and creative thinking skills through the use of an active, student-centered approach. Instructors serve as guides, facilitators, and learning partners in these settings.³⁵

Developing conceptual understanding rather than superficial memorization means helping students understand the relationships, significance, and applications of a concept rather than simply memorizing definitions or facts without gaining a thorough understanding of the underlying concepts of the material. being able to apply concepts in various real-life scenarios or contexts and recognizing relationships between ideas, not just isolated facts.

Connecting new information with past experiences: Learning becomes relevant, contextual, and memorable when new information is connected to previous experiences. This method makes learning more integrated and applicable to students' daily lives by incorporating emotional and personal components into the cognitive process.

Encouraging introspection and the use of values An educational approach that seeks to help students consider the importance of what they learn and apply it in their attitudes, behaviors, and daily lives is called "encouraging reflection and the application of values." This method is very important in character education, including Islamic

³⁴ Noviyanti, *Deep Learning Technology: Exploring the Capabilities of the Method* (Ponorogo: Uwais Inspirasi Indonesia, 2023) .

³⁵ Endah Tri Kusumawati, *Towards Deep Learning: The Role of Flipped Learning in Developing Religious Literacy and Character* (Yogyakarta: Deepublish Digital, 2025) .

Religious Education (PAI), because it emphasizes the development of morals and correct behavior in addition to knowledge.³⁶

A key component of twenty-first-century education is the development of higher-order thinking skills. Within the framework of Islamic Religious Education, HOTS fosters a rational, critical, and practical understanding of Islamic values while simultaneously enhancing intellectual intelligence.³⁷

Table 1. Comparison of Deep Learning vs Surface Learning

Aspect	Deep Learning	Surface Learning
Objective	Understanding and application	Memorize to pass the exam
Strategy	Critical, reflective, connecting concepts	Remembering facts without context
Motivation	Want to understand and grow	Want to finish quickly or get good grades
Results	Knowledge is meaningful and long-lasting	Knowledge is quickly lost

3. Evaluation of Islamic Religious Education Learning Using

a. Deep Learning Approach

The methodical process for measuring and evaluating how well students understand, internalize, and apply Islamic teachings in accordance with the curriculum's learning objectives is known as Islamic Religious Education (PAI) learning evaluation. This assessment measures the extent to which Islamic values are embedded in students' lives, in addition to testing memorization. This is done by combining cognitive (religious knowledge), affective

³⁶ Nadia Nadawina, *Implementation of Deep Learning in Education in Indonesia* .

³⁷ Ihsan El Khuluqo, *Curriculum Development Management Learning Module* (Palu: Feniks Muda Sejahtera, 2022) .

(religious attitudes and values), and psychomotor (practice of Islamic worship and behavior) components.³⁸

Evaluating several effective teaching strategies in order to assess teaching in the context of Islamic Religious Education (PAI). The goal is to determine the effectiveness of teaching methodologies used in Islamic Religious Education (PAI). This goal includes evaluating the effectiveness of the methods in improving the quality and scope of PAI evaluations and how these methods contribute to more comprehensive research on students' cognitive, affective, and psychomotor characteristics by using research methodologies that focus on teaching to strengthen students' understanding of Islamic principles, critical thinking, and reflection. Identifying useful indicators, such as increasing adherence to Islam, reducing crime, and incorporating religious principles in daily life.³⁹

Efforts to examine the fundamental ideas and principles of comprehensive learning methodology in order to assess Islamic Religious Education (PAI) in the form of recognizing models and forms of PAI evaluation that are in line with a holistic approach, such as formative and summative tests that emphasize in-depth understanding. demonstrating how students' cognitive, affective, and psychomotor skills can be assessed using comprehensive learning techniques.⁴⁰

Deep learning approach is used to evaluate Islamic Education (PAI) learning in instructional units, examining the advantages and difficulties of incorporating deep learning-based assessment into Islamic Education (PAI)

³⁸ Sapari, *Smart Evaluation: Measuring Educational Success in the 21st Century* (Indramayu: Adab Indonesia, 2025).

³⁹ Nilna Mayang Kencana, *Philosophy of Islamic Education* (Medan: UMSU Press, 2024).

⁴⁰ Caswita, *Management of Islamic Religious Education Learning Evaluation* (Yogyakarta: Deepublish Digital, 2021).

learning by putting forward tactical suggestions to help Islamic Education (PAI) educators and stakeholders create a comprehensive, transformative, and reflective ⁴¹deep learning -based assessment system.

Evaluating Religious Education in Islamic Learning using a values-based *deep learning methodology* is a crucial step toward realizing an education that fosters intellectual, social, and spiritual growth. This method transforms evaluation from a simple assessment tool into a process that fosters and develops a holistic Islamic personality.⁴²

In the current situation and conditions, a relevant and calculated approach to cultivating true Islamic character is the evaluation of Islamic Religious Education using a continuous deep learning methodology . This evaluation serves as both a measurement tool and a process of continuous value improvement throughout the educational process. In this approach, it functions as a spiritual mentor and value facilitator.⁴³

Evaluating academic performance and encouraging character development is an essential part of the Islamic Religious Education (PAI) learning process. Therefore, assessment must be free from subjectivity, discrimination, and ambiguity in the context of modern education, which upholds equality and transparency. The ability to assess the unique mental processes, attitudes, and full meaning of Islamic teachings with upholding the values of justice and openness confirms that the deep learning approach is so important.⁴⁴

Assessment of Islamic Religious Education encompasses not only memorization and knowledge tests,

⁴¹ Nadia Nadawina, *Implementation of Deep Learning in Education in Indonesia*

⁴² Elbashbishy, "Deep Learning in Education In Sustainability Education Globe."

⁴³ Noviyanti, *Deep Learning Technology: Exploring the Capabilities of the Method*

⁴⁴ Rahmat, *Evaluation of Islamic Religious Education Learning*

but also the measurement of Islamic values, attitudes, and practices. Resources and approaches must be unique, fair, varied, and consistent with fundamental educational principles. Therefore, assessment is a crucial step in the process of developing moral, honorable, and religious individuals.

A more careful, fair, and creative approach is needed to address the challenges of Islamic Religious Education (PAI) evaluation. Evaluation is a crucial part of moral and spiritual growth, as well as serving as a measurement tool. To develop knowledgeable, dedicated, and highly characterized students, educators must be trained to develop authentic assessment techniques that encompass all aspects of Islamic Religious Education (PAI) learning, including the cognitive, affective, and psychomotor domains.⁴⁵

Table 2. Some of the key features of contemporary evaluation approaches:

Aspect	Traditional Evaluation	Modern Evaluation
Focus	Learning outcomes (output)	Learning process and outcomes
Measuring instrument	Written test	Various techniques (tests, portfolios, observations, projects)
The role of students	Passive (checked)	Active (reflecting, self-assessing)
Time	End of learning	Throughout the learning process
Objective	Determining the final value	Improve learning
Openness	It's not always clear	Transparent & participatory
Technology	Rarely used	Integrated digital

⁴⁵ Heni Listiana, *Learning Evaluation: Approaches, Theories, and Innovations in Islamic Religious Education*

The table shows how the current evaluation approach actively engages students in the learning process while evaluating them holistically and contextually to foster a deeper understanding, spiritual character, and the application of Islamic values in everyday life. This Islamic religious education method is highly relevant to make the Islamic Religious Education learning process more meaningful, effective, and builds religious character.

Primary goal of evaluating Islamic Religious Education (PAI) learning using a *deep learning approach* is to build a transformative learning process that fosters deep understanding, awareness of Islamic values, and sincere and contextual behavior. This type of assessment evaluates "how to think and behave based on known knowledge" in addition to "what is known."⁴⁶

PAI learning uses a deep learning approach for evaluation, not only measuring how well they understand, appreciate and apply Islamic values as a whole and holistically in their lives , but more than that, this assessment method is transformative, significant, and highly instructive.

Deep learning evaluation in Islamic Religious Education (PAI) places a strong emphasis on developing higher-order thinking skills (HOTS), integrating Islamic values into everyday life, and fostering meaningful understanding. Beyond assessing memorization, the primary objective is to measure students' understanding, critical thinking, and contextual and reflective application of Islamic teachings.⁴⁷

⁴⁶ Nadia Nadawina, *Implementation of Deep Learning in Education in Indonesia* ,

⁴⁷ Elbashbishy, "Deep Learning in Education In Sustainability Education
Globe."

Table 3. PAI Learning Evaluation Strategy with the *Deep Learning approach*

Evaluation Strategy	Explanation	Examples in Islamic Education
1. Written Reflection / Spirituality Journal	Students write about personal experiences related to Islamic values.	Daily journal about experiences of applying the values of honesty, responsibility, or mutual assistance
2. Religious Case Studies	Provides real situations that require Islamic-based moral judgment.	Case study: How does Islam respond to hoaxes or conflicts between friends?
3. Analytical and Reflective Essay Test	Questions that require analysis, evaluation, and synthesis of Islamic teaching values	"Why is patience and trust in God the solution in facing life's difficulties?"
4. Portfolio of Worship Values and Practices	Collecting evidence of student development in understanding and practicing Islamic values	Documentation of student involvement in religious activities, such as congregational prayer, preaching, or social activities
5. Integrative Project	Project-based assignments that integrate religious knowledge with 21st-century skills	Create educational videos about the importance of zakat, or anti-bullying digital campaigns based on Islamic teachings.
6. Direct Observation (Affective and Attitude)	Teacher assessment of student attitudes and behavior in learning activities and school life	Observation of morals, responsibility, and cooperation during discussions or worship practices
7. Reflective Interview / Guided Discussion	A question and answer session that explores students' deep thoughts on Islamic teachings.	Questions and answers about the meaning of prayer, fasting, or sacrifice in the context of their lives

Table 4. Examples of Deep Learning Applications in PAI Assessment

Technology/Tools	Utilization in PAI Evaluation
Auto-Grading System	Analyze students' essay answers about the value of honesty or the meaning of worship semantically, not just keywords.
Sentiment and Emotion Analysis (Emotion AI)	Observing students' facial expressions or tone of voice during discussions or presentations of Islamic values to understand emotional engagement.
Moral Guidance Chatbot	Provides reflective questions and automated feedback on the attitudinal choices students make in ethical case simulations.
Digital Portfolio App	Collecting recordings of religious practices, Islamic social projects, and student reflections evaluated with machine learning.
Learning Analytics	Track student progress from various Islamic Education activities (quizzes, discussion forums, preaching videos) and identify patterns of understanding values.

Students' critical thinking skills, the development of noble morals, and the reinforcement of Islamic values all have a positive impact through the evaluation of Islamic Religious Education learning using a deep learning approach. However, its implementation requires systemic support, sufficient time, appropriate equipment, and teacher readiness, as follows:

Table 5. Evaluation of students' critical thinking skills using the deep learning approach

Excess	Challenge
More precise and individual assessment	Infrastructure requirements for technology
Promote purposeful learning	Teacher readiness to master technology
Promoting a wise understanding of religious principles	Ethical and privacy issues related to student data

C. Conclusion

This study found that AI-based deep learning can identify the affective and behavioral dimensions of religiosity more effectively than traditional assessment methods that rely more on rote learning or theoretical learning. Students demonstrated a greater capacity for critical and reflective thinking about Islamic values, particularly when considering current moral issues and how they relate to the teachings of the Quran and Hadith. This allowed them to not only understand Islamic teachings theoretically but also have the ability to interpret, assess, and integrate Islamic values into their daily behavior and decision-making processes.

The Islamic Religious Education (ISE) in-depth learning methodology emphasizes the idea that education should be a process that develops students' morality, empathy, and spiritual awareness, not simply the dissemination of knowledge. To help students practice Islamic values, Islamic Religious Education (ISE) teachers act as facilitators, encouraging critical, reflective, and cooperative thinking to develop students with a holistic Islamic character. Educators can balance cognitive, affective, and spiritual aspects and conduct more objective, adaptive, and personalized assessments with the help of artificial intelligence (AI) technology.

Developers of Islamic education systems must develop AI-based digital assessments that can track students' moral and spiritual growth over time and across contexts, in addition to evaluating cognitive abilities. While ensuring that the entire process remains grounded in Islamic values, educational ethics, and humanitarian principles, such systems must be designed to offer automated and adaptive feedback on Islamic education learning outcomes.

Deep learning based evaluation system *Deep learning* is more effective in assessing the level of understanding, the ability to apply Islamic principles in daily life, and the consistency of religious attitudes. Students engaged in deep learning-based learning

demonstrate more active, independent, and intrinsic motivation when studying Islamic Education because it assesses learning comprehensively. includes the process, meaning, and impact of learning on students' ways of thinking and behaving.

Policymakers must support the integration of technology in Islamic education to implement Islamic education evaluations based on deep learning and artificial intelligence (AI). For the successful and sustainable implementation of modern evaluations, it is crucial to create comprehensive national evaluation standards that address cognitive, affective, and spiritual aspects. Furthermore, funding support for teacher training and digital infrastructure development is also needed.

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