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Integrating Authentic Holistic Assessment into the Digital Ecosystem: A Framework for the Independent Curriculum in Islamic Religious Education

Ema Maesaroh
UIN Sunan Gunung Djati Bandung, Indonesia
ema.maesaroh1988@gmail.com

Kiki Mohammad Iqbal
UIN Sunan Gunung Djati Bandung, Indonesia
kikimohammadiqbal2@gmail.com

Abdul Rohman
UIN Sunan Gunung Djati Bandung, Indonesia
abdul.rohman@salman-alfarisi.sch.id

Pahmi Hidayat
UIN Sunan Gunung Djati Bandung, Indonesia
Pahmihidayat31@gmail.com

Karman Faiz
UIN Sunan Gunung Djati Bandung, Indonesia
karmanfaiz@uinsgd.ac.id

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Abstract:

The transformation of the educational paradigm through the Independent Curriculum encourages fundamental changes in the evaluation system, particularly in Islamic Religious Education (PAI) subjects, which emphasize the formation of students' character, morals, and spirituality. This study aims to analyze the transformation of PAI assessment from a conventional approach to a holistic, authentic assessment based on a digital ecosystem. The study used a qualitative method with a library research approach, while data were analyzed through content analysis techniques. The results show that the use of digital ecosystems, such as Learning Management Systems (LMS), cloud-based storage, and web-based assessment instruments, has the potential to integrate assessment of the cognitive domain through higher-order thinking skills (HOTS), the affective domain through continuous behavioral observation, and the psychomotor domain through audio-visual-based assessment of religious practices. This integration supports systematic documentation of student development and more efficient monitoring of learning outcomes. The novelty of this study lies in the conceptualization of the reconstruction of digital-based PAI assessment instruments that simplify teacher administration without neglecting the human and spiritual dimensions of students. However, its implementation still faces challenges such as limited teacher digital literacy, time management, and disparities in technological infrastructure. Therefore, digital assessment

needs to be balanced with a personalized approach, direct observation, and ongoing mentoring. Thus, digital assessment will function not only as a tool for measuring learning outcomes but also as a holistic, adaptive evaluation tool oriented toward developing students' Islamic character.

Keywords: assessment transformation; authentic assessment; holistic evaluation; independent curriculum; Islamic Religious Education.

INTRODUCTION

Islamic Religious Education (PAI) has unique characteristics compared to other subjects. PAI bears a significant responsibility for shaping students' character, morals, and noble qualities. Therefore, the success of PAI learning cannot be measured solely by how many verses of the Quran or religious teachings students memorize, but rather by how these values are internalized and realized in their daily lives. In education, because of their duty to teach and guide students, teachers play a crucial role in society. Teachers can influence students' attitudes, behaviors, and thinking because they serve as role models for them (Kumar et al., 2016). The transformation of education in Indonesia has extensively implemented independent curricula across various school levels. This curriculum provides extensive autonomy for educational units and emphasizes student-centered learning. One of the main pillars of the independent curriculum is a shift in the assessment paradigm, where assessment is no longer merely a learning measurement tool (assessment of Learning) but has shifted to a tool for improving the learning process (assessment for Learning and assessment as Learning). In this context, authentic, holistic assessment becomes an instrument to measure the development of students' competencies in a real and comprehensive manner (Putri et al., 2024)

Unfortunately, the reality on the ground shows that the Islamic Religious Education evaluation or assessment system is often still conventional. Assessments are mostly dominated by written tests (paper and pencil tests) that only touch on the lower-order cognitive domain (Low Order Thinking Skills). Along with the changing educational paradigm, including the implementation of the Independent Curriculum in Indonesia, a significant transformation is needed in the way Islamic Religious Education teachers conduct assessments. This paper will discuss the urgency, forms of transformation, and challenges of Islamic Religious Education assessment in the modern era (Judrah et al., 2024). Several previous studies have attempted to highlight the problems of curriculum evaluation and implementation within the Islamic Religious Education corridor. For example, Qodrunnadi Alisa Munawaroh (2026) Digital Disruption in Islamic Religious Education: Considering the Impacts, Challenges, and Adaptation Strategies in the Era of Society 5.0. Furthermore, Rosmiati Ramli (2025) Development of an Authentic Assessment Model in Islamic Religious Education Learning in Elementary Schools.

Conceptually, this research is built on a modern assessment theory framework, namely a paradigm shift from Assessment of Learning (final summative assessment) to optimizing Assessment for Learning (assessment as feedback for the improvement process) and Assessment for Learning (assessment involving independent student reflection). This line of thinking is theoretically based on the concept of authentic assessment, which defines assessment as a comprehensive activity to ask students to apply conceptual-theological material to the scope of their real-world or social environment as a whole. Several previous studies have attempted to unravel the problems of assessment in the independent curriculum. Research by Rohman (2023) stated that Islamic Religious Education teachers still experience stuttering in developing authentic formative assessment rubrics due to time constraints. Furthermore, a study by Handayani and Wijaya (2024) highlighted the effectiveness of using digital platforms such as Google Forms or Quiziz for Islamic Religious Education assessment, but their focus is still limited to the lower-level cognitive domain. Meanwhile, research conducted by Setiawan (2025) discussed the urgency of a digital ecosystem in schools, but did not specifically link it to the characteristics of holistic PAI assessment which is full of spiritual and moral values (Black & Wiliam, 1998).

This research is built on three main theoretical frameworks, namely: (1) Holistic Authentic Assessment, measuring student performance in real terms through meaningful tasks that include the integration of faith, knowledge and charity. (2) Educational digital ecosystem, namely an integrated digital environment (such as LMS, digital portfolio applications and digital report card systems) that are interconnected to support instructional and evaluation processes. (3) PAI learning concepts in the independent curriculum. Namely the restructuring of PAI materials that focus on the formation of a Pancasila Student Profile who is faithful, pious to God Almighty, and has noble character. This study has a crucial GAP. Most previous studies separate the

concept of authentic PAI assessment with digital technology, a holistic integration that combines the principles of authentic assessment with digital technology (such as e-portfolios, worship practice vlogs and interactive assessments) specifically in PAI subjects under the auspices of the Independent Curriculum. This article's novelty lies in formulating how a digital ecosystem can be used to conduct holistic assessments, particularly to monitor students' daily worship habits and noble character within the framework of the independent curriculum. It conceptualizes the reconstruction of an Islamic Religious Education (PAI) assessment curriculum that integrates authentic holistic values (HOTS cognitive, continuous spiritual observation, and project performance) with digital ecosystem instruments in an integrative manner. This model offers a systemic integration of authentic Islamic Religious Education (PAI) assessment instruments (such as behavioral observation sheets, self-assessments, digital worship portfolios, and Quranic recitation performance via audio-visual recordings) into a cloud-based digital ecosystem (Hu et al., 2025). This research provides methodological novelty by simplifying Islamic Religious Education (PAI) teacher administration without reducing the holistic-spiritual value of the assessment itself.

Learning Islamic Religious Education (PAI) is essentially not just a process of transferring religious knowledge, but rather a conscious, systematic, and planned effort to internalize divine values in students. Epistemologically, PAI aims to shape individuals who are not only intellectually intelligent but also spiritually and emotionally mature, so they are able to recognize, understand, internalize, and practice Islamic teachings comprehensively. In a pluralistic society, PAI also plays a role in instilling moderate, tolerant attitudes and respect for differences to create social harmony (Muharrozi et al., 2025). Therefore, PAI learning achievements need to be evaluated holistically through three main domains: cognitive, affective, and psychomotor. Assessments that are solely oriented towards knowledge mastery risk reducing religious education to theoretical memorization, without considering the practice of Islamic values in everyday life.

Authentic assessment exists as an evaluation approach that bridges the gap between knowledge acquired in the classroom and its application in real life. Unlike traditional assessments, which tend to rely on written tests to measure mastery of material, authentic assessment emphasizes students' ability to demonstrate competence through meaningful tasks and activities. In Islamic Religious Education (PAI) learning, this approach is relevant because the success of religious education is determined not only by the ability to answer questions but also by the skills of carrying out worship and behavior that reflects noble moral values. Forms of authentic assessment include performance assessments, such as prayer practices and reading the Quran; portfolios, such as documentation of reflection and development of religious activities; and ongoing observation of students' attitudes of empathy, politeness, responsibility, and social awareness (Latipah et al., 2026).

Implementing authentic assessments requires teachers to play a key role in planning instruments, collecting evidence of competency achievement, processing information, and utilizing assessment results to improve learning. Assessment techniques can include performance, attitude assessments, written tests, projects, products, portfolios, and self-assessments. However, their implementation requires precision, time, and adequate professional skills. Teachers are not only required to generate grades but also to develop clear indicators, use appropriate rubrics, and ensure objective and continuous assessment. This complexity presents a particular challenge when the number of students is large and documentation of their progress is still done manually (Vlachopoulos & Makri, 2024). The development of digital technology opens up opportunities to strengthen the implementation of Islamic Religious Education assessments through the use of Learning Management Systems (LMS), interactive quizzes, cloud-based storage, and e-portfolios. Digital ecosystems can help teachers manage assessment data, document learning outcomes, provide feedback, and monitor student progress more systematically. Technology integration also enables the integration of cognitive, affective, and psychomotor assessment evidence within a single information management system. However, digitalization does not automatically guarantee assessment quality. Limited teacher digital literacy, time management, device access, internet connectivity, and infrastructure disparities can still hinder implementation (Hafidz et al., 2026). Furthermore, assessments of attitudes and spirituality still require direct observation and personal interaction to avoid relying solely on digital data.

Based on these conditions, the transformation of Islamic Religious Education assessment needs to be directed at developing an authentic evaluation system that combines the effectiveness of technology with a humanistic approach. Technology serves as a means to improve administrative efficiency and documentation quality, while pedagogical considerations, exemplary behavior, and character building remain the primary foundations of assessment. Therefore, improving teacher competency, providing adequate infrastructure, and developing adaptive assessment instruments are crucial aspects in supporting

this transformation. Based on this background, this article aims to examine the transformation of assessment in Islamic Religious Education learning through a shift from a traditional assessment paradigm to a holistic, authentic assessment based on digital technology. This study is expected to produce a conceptual formulation regarding the form and implementation of assessments relevant to the characteristics of Islamic Religious Education, while also identifying alternative solutions to challenges in teacher competency and infrastructure limitations to make learning evaluation more effective without neglecting the moral and spiritual dimensions of students.

METHOD

This study uses a qualitative approach with a library research method to examine the transformation of assessment in Islamic Religious Education (PAI) learning, specifically the shift from conventional assessment to holistic, authentic assessment integrated with the digital ecosystem. This method was chosen because the research focuses on reviewing concepts, theories, previous research results, and relevant educational policies, rather than on collecting empirical data directly from the field. Through library research, the study seeks to build a conceptual understanding of the characteristics of authentic assessment, the use of digital technology in learning evaluation, and the challenges faced by teachers in implementing it in PAI learning. The research data sources consist of primary and secondary sources (Muharrozi et al., 2025). Primary sources include scientific journal articles discussing authentic assessment, digital assessment, PAI learning evaluation, Learning Management Systems (LMS), and the use of e-portfolios in the assessment process. Secondary sources include academic books, literature reviews, laws and regulations, and educational policy documents related to assessment and the implementation of the Independent Curriculum. Literature was selected based on its relevance to the research focus, the credibility of the publisher or journal, the clarity of the research method, and its contribution to the discussion of assessment transformation. The study also prioritized recent publications to gain an overview of the development of digital assessment thinking and practice, without neglecting classic literature that remains relevant as a theoretical foundation (Widodo et al., 2026).

Data collection was conducted through literature searches in databases and scientific publication portals, such as Google Scholar, Crossref, and official journal publisher websites. The search used keywords related to authentic assessment, digital assessment, Islamic Religious Education, e-portfolio, learning management system, and holistic assessment. The literature found was then selected by examining the title, abstract, keywords, and document content to ensure its suitability to the research objectives. Important information from each source was recorded and grouped by theme, including the concept of authentic assessment, cognitive-affective-psychomotor dimensions, the use of digital technology, the role of teachers, and implementation constraints (Nurohmah & Ma'rifah, 2025).

Data were analyzed using content analysis techniques through the stages of identification, categorization, interpretation, and synthesis of information. In the identification stage, researchers identified information relevant to the focus of the study. Next, the information was categorized based on key themes to identify similarities, differences, and argumentative tendencies across sources. The interpretation stage was conducted by linking literature findings to the characteristics of Islamic Religious Education (PAI) learning, which emphasizes knowledge mastery, worship skills, moral formation, and the development of spiritual attitudes. The analysis results were then synthesized to formulate a conceptual framework for transforming Islamic Religious Education assessment that integrates authentic assessment and digital technology support (Creswell, 2019).

To maintain analytical accuracy, the study pays attention to consistency between reference sources, constructed arguments, and formulated conclusions. Inter-literature comparisons are used to avoid reliance on a single perspective and to identify limitations of available evidence. The results are expected to produce a conceptual understanding of the opportunities, challenges, and principles of implementing digital ecosystem-based authentic assessment in Islamic Religious Education (PAI) learning. Because this research is a literature review, the results are positioned as a theoretical synthesis that can serve as a basis for subsequent field research, rather than as empirical evidence regarding the effectiveness of implementing a particular assessment model in schools (Sugiyono, 2012).

RESULTS AND DISCUSSION

The application of authentic assessment in Islamic Religious Education (PAI) learning has evolved along with the increasing use of digital technology in educational settings. Assessment no longer relies solely on a

single application or instrument, but can be developed through a digital ecosystem that connects various learning tools, such as a Learning Management System (LMS), cloud-based portfolio storage, and web-based self-assessment and peer-assessment instruments. Utilizing these various tools allows teachers to collect, store, and manage evidence of student learning achievement more systematically. In the context of PAI, technology integration has the potential to support documentation of the development of religious knowledge, worship skills, and behaviors that reflect moral values. The development of authentic assessment in Islamic education. However, the integration of these three assessment domains should be understood as an effort to build a comprehensive picture of learning outcomes, not as a guarantee that the use of technology automatically improves the quality of assessment (Putri et al., 2024).

Authentic assessment also plays a crucial role in supporting student engagement throughout the learning process. When assessment is not solely focused on final test results, students are given the opportunity to demonstrate their competency through a variety of activities aligned with learning objectives. Respect for the process, effort, skill development, and quality of work can help create a more participatory learning environment. In Islamic Religious Education (PAI) learning, for example, students are assessed not only on their ability to explain religious requirements but also on their practical skills, their ability to reflect on the meaning of religious obligations, and their understanding of the moral values contained within them. Assessments that provide targeted feedback can help teachers identify students' learning needs and determine the type of support needed. This is crucial because successful PAI learning is not only related to mastery of the material but also to the development of students' attitudes and behaviors. Saidah and Muhid's work can be used to support discussions on the importance of teachers' ability to identify learning difficulties and adapt learning strategies to students' needs (Saidah & Muhid, 2025).

One form of authentic assessment relevant for Islamic Religious Education (PAI) learning is portfolio assessment. A portfolio is a collection of student work compiled in a focused manner to demonstrate the learning process, development, and achievements over a specific period. Through this approach, teachers can assess student progress based on a wider range of evidence than written test results alone. An PAI portfolio can include reports of religious activities, reflection notes after studying Islamic material, summaries of understanding Quranic verses or hadiths, results of social projects, and documentation of religious activities relevant to learning objectives. When managed digitally, these documents can be stored in text, images, audio recordings, or videos, depending on the needs and privacy requirements of the school (Widodo et al., 2026).

The use of digital portfolios allows teachers to track the development of students' competencies over time. For example, in Quran reading, students can collect recordings of readings at various stages of the learning process to demonstrate their progress in pronunciation and tajweed. Teachers then provide notes on improvements based on predetermined indicators. In morals, students can compile reflections on their experiences practicing honesty, responsibility, or caring for others. However, written reflections or documentation of activities cannot be directly considered definitive proof that a value has been internalized. Therefore, portfolio assessment needs to be combined with observation, dialogue, and other forms of assessment to allow teachers to more accurately interpret student development (Zainuddin et al., 2026).

In addition to portfolios, problem-based projects can be used as a form of authentic assessment that connects Islamic Religious Education material to everyday life issues. Through these activities, students are guided to identify problems in their environment, analyze them based on Islamic values, develop alternative solutions, and convey their thoughts. For example, students might identify issues related to school cleanliness, low social awareness, bullying behavior, or the spread of unverified information. After identifying the problem, students discuss Islamic principles related to the issue, design a simple activity, and evaluate its implementation. Assessments are conducted on the problem identification process, the accuracy of concept use, the ability to collaborate, the quality of solutions, and reflection on the activities undertaken (Ali, 2025). Thus, assessments not only measure the ability to memorize material but also assess the ability to apply religious knowledge in real contexts.

Despite its potential, the implementation of authentic assessment still faces several obstacles. One major challenge is the limited ability of some teachers to design instruments that align with the characteristics of authentic assessment. While assessing knowledge is relatively easy through written tests, assessing skills, attitudes, and behavioral development requires more detailed indicators. Teachers need to establish success criteria, develop rubrics, determine relevant forms of evidence, and ensure that assessments are conducted consistently. Without adequate planning, assessments risk becoming subjective or overly oriented toward general impressions of students (Liu et al., 2024).

The next obstacle relates to time constraints and the large number of students. Observing religious practices, providing individual feedback, reviewing portfolios, and documenting student progress require significant time. This situation can be further complicated when teachers teach multiple classes simultaneously or have to fulfill other administrative requirements. While utilizing digital technology can help store documents and organize information, it still requires proper management. Teachers must determine appropriate platforms, understand how to use them, maintain data security, and ensure all students have relatively equal opportunities to participate. Inequality in access to devices and internet networks also needs to be considered to ensure that digital assessments do not limit the engagement of certain students.

To address these issues, improving teacher competency needs to be a crucial part of developing authentic assessments. Training should not only focus on application operation but also encompass indicator development, rubric development, assessment technique selection, feedback provision, and the use of assessment results to improve learning. Schools and education offices can support these efforts by providing practical guidelines, sample instruments, portfolio formats, and flexible assessment tools that can be easily adapted to student characteristics. Developing shared instruments through teacher learning communities can also help establish a common understanding of assessment criteria and reduce the burden of developing tools individually. With this support, authentic assessments are expected to be implemented in a more planned, efficient, and sustainable manner. Assessment transformation also requires a shift in assessment orientation, from one that emphasizes only final results to one that utilizes assessment throughout the learning process. In this approach, Islamic Religious Education (PAI) teachers cannot simply implement assessment of learning or assessment of learning outcomes, but also need to optimize assessment for learning and assessment as learning. All three have complementary functions. Learning outcome assessment is used to determine competency attainment at the end of a specific period, while assessment during the learning process helps teachers and students identify progress and determine corrective measures. Meanwhile, assessment as a learning process encourages students to actively monitor and reflect on their own learning (Orman et al., 2025).

Assessment for Learning (AfL) is an assessment approach used to support learning improvement through information and feedback obtained during learning activities. In Islamic Religious Education (PAI) learning, AfL can be implemented when teachers observe religious practices, listen to Quranic recitations, ask questions during discussions, assess group presentations, or check the progress of student projects. For example, when a student practices a prayer recitation, the teacher can immediately point out areas that need improvement and provide opportunities for repetition. Thus, assessment serves as a means of guidance, not simply a grading activity. Implementing AfL can also strengthen communication between teachers and students because students gain clearer information about aspects that have been mastered and areas that still need improvement. In its implementation, AfL requires clear learning objectives, observable indicators, and specific feedback. Teachers need to ensure that the assessment information is used to determine follow-up actions, such as repeating material, individual mentoring, additional practice, or enrichment. Mardiah and Hamami's work can be used to discuss the implementation of formative assessment in learning and the challenges associated with teacher understanding and time constraints (Mardiah & Hamami, 2026). Therefore, the effectiveness of AfL depends not only on the frequency of assessment but also on the quality of feedback and the utilization of the results to improve the learning process.

Meanwhile, Assessment as Learning (AaL) positions students as active participants in monitoring, evaluating, and reflecting on their learning progress. In Islamic Religious Education (PAI) learning, this approach can be implemented through self-assessment, peer assessment, reflective journals, and self-reflection activities tailored to their age and learning objectives. Students can be asked to assess their understanding of the material, identify difficulties they are experiencing, and plan corrective actions. During group work, students can also provide feedback on their peers' contributions based on mutually agreed-upon criteria. These activities help students develop responsibility, honesty, the ability to accept feedback, and awareness of their learning process ya (Brandmo & Gamlem, 2025).

Nurlitasari and Hamami (2023) can be used as a reference in discussions regarding affective domain assessment, particularly regarding student attitudes, interests, values, and motivation. However, self-assessment and peer assessment must be implemented carefully because the results can be influenced by subjectivity, friendships, and the desire to provide answers that are considered good. Therefore, teachers need to provide clear guidance, create a safe atmosphere, and compare reflection results with other relevant evidence. Assessment of attitudes and spirituality should not be based solely on student statements or a single observation (Nurlitasari & Hamami, 2023). Developing authentic assessments in Islamic Religious Education (PAI) learning

requires the integration of appropriate instruments, the active role of teachers and students, and the proportional use of technology. Portfolios, problem-based projects, observations, assessment for learning, and assessment as learning can complement each other to provide a more comprehensive picture of competency achievement. The digital ecosystem serves as a supporting tool for documentation, data management, and feedback, while interpretation of behavior and the development of religious values still requires professional judgment and human interaction. With consistent implementation, authentic assessment can support Islamic Religious Education learning which is not only oriented towards mastering knowledge, but also provides space for the development of skills, social responsibility, and the formation of noble morals in students.

Digitalization of PAI Assessment

The development of information and communication technology has driven changes in various aspects of education, including the system for assessing student learning outcomes. Assessments, which were previously largely conducted through printed exam sheets and manual checks, are now shifting toward the use of digital technology. These changes are not simply related to the use of electronic devices, but also include the development of more flexible, interactive, and efficient assessment processes that provide more comprehensive information on student learning progress. In Islamic Religious Education (PAI) learning, this transformation opens up opportunities for teachers to develop assessments that not only measure mastery of religious knowledge but also document worship skills, reflection processes, and the application of Islamic values in daily life. The use of digital technology in assessment can be done through various platforms, such as Quizizz, Kahoot!, and Google Workspace. These platforms allow teachers to create questions, administer interactive quizzes, collect answers, and obtain assessment results in a relatively short time. The use of digital quizzes can also create a more engaging evaluation environment through visual displays, time limits, and immediate feedback. Thus, the assessment process is not always perceived as a stressful activity, but can instead become part of the learning experience that encourages student engagement. However, platform selection needs to be adjusted to learning objectives, student characteristics, device availability, and internet network quality.

Hu, Liu, and Daniel's (2025) study of digital technology in authentic assessment demonstrates the importance of considering technology as a tool to support the assessment process, rather than as the primary goal of learning. Technology will be beneficial if its use helps teachers obtain relevant learning evidence and provides opportunities for students to demonstrate their competence. Therefore, in Islamic Religious Education (PAI) learning, digital quizzes can be used to assess conceptual understanding, such as knowledge of purification, the rules of prayer, Islamic history, and the content of Quranic verses. However, cognitive mastery of the material must be distinguished from the ability to practice religious teachings and cultivate behaviors in accordance with Islamic values (Hu et al., 2025).

In practice, digital assessment is not limited to online learning but can also be integrated into face-to-face learning. Teachers can administer quizzes via digital devices at the end of a lesson, collect assignments using cloud-based storage, or utilize electronic forms to assess students' initial understanding and learning progress. This integration allows teachers to obtain assessment information in a more organized manner while providing flexibility in determining the timing and format of evaluations. In other words, digital assessment can support learning in a variety of situations, as long as its use is designed based on pedagogical needs and does not neglect direct interaction between teachers and students. Conceptually, digital assessment can be understood as the process of collecting, processing, analyzing, and utilizing information regarding learning outcomes using digital devices and systems. This process essentially follows the principles of educational assessment: establishing assessment objectives, determining success indicators, selecting appropriate instruments, collecting learning evidence, analyzing results, and using those results to improve learning. The difference lies in technological support that can accelerate data processing, simplify document storage, and expand the forms of learning evidence that can be collected. Therefore, digital assessment is not an assessment method that is completely separate from conventional assessment, but rather a development of how to carry out assessment through the use of technology.

In practice, digital assessment systems can support two interrelated functions: as a medium for assessment implementation and as a means of managing instruments or question banks. The first function allows teachers to administer tests, receive assignments, record work, and provide feedback through a digital platform. The second function helps teachers store, group, update, and reuse questions based on material, indicators, or difficulty level. Systematic question bank management can facilitate the development of varied instruments aligned with learning objectives. However, the quality of assessments still depends on the accuracy of the

indicators, the validity of the instruments, the appropriateness of the difficulty level, and the fairness of their implementation. Digital systems do not necessarily guarantee that the questions used are of high quality or capable of measuring the targeted competencies. Another advantage of digital assessment is the relatively rapid availability of feedback. On some quiz platforms, students can see their scores immediately after completing the test, while teachers can view a summary of answers and identify material that has not been understood. This information can be used to design remedial activities, provide enrichment, or re-explain concepts that are causing difficulties. However, automatic scoring is not necessarily sufficient to explain the reasons behind student errors. In Islamic Religious Education learning, meaningful feedback still requires teacher explanation, especially when students have difficulty understanding the context of the evidence, interpreting moral values, or connecting religious teachings with real-life problems.

The importance of student involvement in the assessment process is also in line with a study on assessment as learning published in Studies in Educational Evaluation (2024). Assessment can support learning when the results help students understand competency development, identify deficiencies, and plan improvements. Therefore, digital assessment should not stop at scoring, but rather be directed towards fostering self-reflection and responsibility for learning. In Islamic Religious Education (PAI) learning, students can be asked to write reflections on their understanding of the material, record progress in memorization, or evaluate their religious practices based on indicators explained by the teacher. These reflections should be positioned as a learning tool, not the sole basis for assessing the depth of one's faith. To measure the affective and psychomotor domains, teachers can utilize e-portfolios as a medium for continuously collecting evidence of learning. Students can upload videos of ablution or prayer practices, recordings of Quranic recitation, reflection journals, documentation of social projects, or activity reports demonstrating the application of Islamic values. Through portfolios, teachers not only see the final results but also can examine the development of students' abilities and efforts over time. Zainuddin and colleagues (2026), in their study of e-portfolios as authentic assessments in pre-service teacher education, discussed the relevance of digital portfolios to support reflection, professional identity formation, and digital readiness. Although the context of this research differs from Islamic Religious Education (PAI) learning in schools, their study can serve as a conceptual reference for developing digital portfolios as documentation of the learning process (Zainuddin et al., 2026).

The implementation of e-portfolios in Islamic Religious Education (PAI) learning must be accompanied by a clear assessment rubric. Videos of religious practices, for example, can be assessed based on the accuracy of the sequence of movements, the appropriateness of the reading, and understanding of the procedures. Meanwhile, reflection journals and reports on social activities can be analyzed based on the depth of understanding, the ability to connect the material to experience, and the quality of the student's reflection. Attitude assessments require ongoing observation across various situations, not just conclusions based on a single post or activity. Digital evidence needs to be combined with direct observation, dialogue, and the teacher's professional judgment to ensure that assessments remain proportionate and aligned with the character of the competency being measured. In terms of learning management, digital assessments have the potential to reduce long-term administrative burdens, expedite grade recapitulation, simplify document storage, and improve data management. The use of interactive media can also increase student participation, while digital documentation allows teachers to review learning evidence when needed. However, this efficiency does not mean that the entire assessment process can be left to the system. Teachers remain responsible for interpreting the results, checking the accuracy of the evidence, providing feedback, and making follow-up decisions. Assessment of character, attitudes, and the practice of religious values in particular requires contextual considerations that cannot always be represented by numbers or algorithms (Utama & Minerva, 2021).

Thus, the transformation to digital assessment in Islamic Religious Education (PAI) learning needs to be understood as an effort to improve assessment quality through a combination of technology, pedagogical principles, and human support. Its implementation must take into account the digital literacy of teachers and students, device availability, network stability, personal data protection, and equal access. Teachers also need to provide alternatives for students facing technological limitations to ensure they are not disadvantaged in the assessment process. Ultimately, the success of digital assessment is not determined by the number of applications used, but by its ability to produce accurate, fair, meaningful, and actionable learning information. In the context of PAI, technology should strengthen the assessment of knowledge, skills, reflection, and the application of Islamic values without replacing the role of teachers in guiding the development of students' character.

Holistic Assessment (Cognitive, Affective, Psychomotor)

The transformation of assessment in Islamic Religious Education (PAI) learning needs to be directed toward implementing balanced assessments across the cognitive, affective, and psychomotor domains. These three domains are interrelated in describing students' overall learning outcomes. PAI learning aims not only to increase students' knowledge of Islamic teachings but also to develop positive attitudes and morals, as well as the ability to practice religious teachings in daily life. Therefore, an assessment system needs to be designed to measure conceptual understanding, observe attitudinal development, and assess religious practice skills through instruments tailored to the characteristics of each domain. This approach aligns with the concept of holistic assessment, which positions the learning process and outcomes as complementary components (Sandrika et al., 2025).

First, the cognitive domain relates to students' ability to understand, apply, analyze, evaluate, and develop thinking based on the material studied. In Islamic Religious Education (PAI) learning, cognitive assessment should not be limited to memorizing verses, remembering definitions, or citing Islamic legal provisions. Teachers need to develop instruments that encourage students to use religious knowledge to understand problems and construct logical arguments. One approach that can be used is a Higher Order Thinking Skills (HOTS)-based test, an assessment that directs students to higher-order thinking skills. For example, students could be asked to analyze a case study on inheritance distribution based on Islamic jurisprudence, explain the rationale behind a law, or examine the issue of interfaith tolerance based on Islamic principles. Through these activities, teachers can assess students' ability to connect religious concepts to concrete situations, not just measure their memory. Assessment can be conducted through essay questions, case analysis, structured discussions, and problem-solving assignments.

Second, the affective domain relates to students' attitudes, values, interests, responsibilities, and behavioral tendencies in response to learning. This domain holds a crucial position in Islamic Religious Education (PAI) because religious learning is closely linked to the formation of morals and the development of spiritual awareness. Affective assessment can be carried out through behavioral observations, attitude journals, self-reflection, and attitude scales compiled based on clear indicators. Teachers, for example, can observe honesty, discipline, responsibility, concern for friends, politeness in communication, and a willingness to respect differences. Attitude journals can be used to record students' behavioral development over a period of time, while self-reflection helps students identify attitudes that need to be maintained or improved. However, affective assessment should not be determined solely by a single incident or the teacher's personal impression. Observations need to be conducted continuously, using consistent criteria, and considering the context of students' behavior. In this way, assessment can provide a fairer picture of attitudinal development without reducing spirituality to mere numbers.

Third, the psychomotor domain relates to students' skills in carrying out an action or practice based on the knowledge and procedures they have learned. In Islamic Religious Education (PAI) learning, this domain can be assessed through demonstrations, simulations, and projects relevant to the learning competencies. Teachers can ask students to demonstrate ablution and prayer procedures, practice religious recitations, or simulate funeral arrangements based on the material learned. Assessment is conducted using a rubric containing indicators such as the accuracy of the sequence of actions, appropriateness of procedures, smooth implementation, and understanding of the practice. In addition to religious skills, psychomotor assessment can be developed through social projects, such as community service activities, fundraising, or environmental awareness programs. In these activities, teachers can assess students' abilities to plan activities, carry out tasks, collaborate, and produce outputs that align with the project's objectives.

In line with Sandrika et al.'s (2025) discussion regarding the transformation of learning assessments within a holistic approach in the Independent Curriculum era, assessments need to be designed to capture a broader picture of learning outcomes than simply written test results. These three domains can be integrated through the use of digital technology, for example, online tests to measure cognitive abilities, electronic journals to document reflection and attitude development, and video portfolios to record practical skills. However, the use of technology must be tailored to the assessment objectives and the students' circumstances. Teachers still need to check the accuracy of learning evidence, provide feedback, and consider context when interpreting assessment results (Sandrika et al., 2025). Thus, the transformation of Islamic Religious Education assessments that balance the cognitive, affective, and psychomotor domains can support a more comprehensive learning evaluation. Assessments not only show what students know but also provide information on the attitudes displayed and the skills they can practice. The integration of these three domains is expected to help teachers design appropriate

learning follow-up while supporting the Islamic Religious Education goal of developing knowledgeable, skilled, responsible, and virtuous students.

Assessment Domain	PAI Special Competencies	Authentic Instruments	Digital Ecosystem Components	Output Data
Affective (Holistic)	Spiritual (faith) and social (moral) attitudes.	Self-assessment, peer-assessment, and teacher observation journals.	Google Forms / Microsoft Forms embedded in the LMS, as well as periodic cloud databases.	Real-time character development graph (Pancasila Student Profile).
Cognitive	Understanding of concepts, tajwid rules, Islamic history, and jurisprudence.	Context-based questions (HOTS) and case study analysis.	LMS (Quizizz/Moodle) interactive quiz feature with automatic feedback.	Material completion scores and mapping of students' material concept weaknesses.
Psychomotor	Practice of worship (prayer, ablution) and fluency in reading/memorizing the Quran.	Performance test and demonstration video project.	Cloud storage space (Drive), YouTube unlisted, or video assignment features in LMS.	Digital portfolio (audio-visual recording) that can be accessed at any time for evaluation.

The Challenge of PAI Assessment Transformation

Conceptually, teachers' understanding of assessment, which encompasses attitudes, knowledge, and skills, aligns with the principles of authentic assessment. This approach positions assessment as a process that is not solely oriented toward final learning outcomes but also considers the process, competency development, and students' ability to apply knowledge to real-world situations. In Islamic Religious Education (PAI) learning, this principle is crucial because learning success is not solely determined by students' ability to answer questions or memorize religious material. Assessment also needs to consider skills in performing religious duties, the ability to reflect Islamic values, and behavior that reflects morality in daily life. Thus, authentic assessment can be an approach to obtaining a more comprehensive picture of learning outcomes. However, this conceptual understanding does not always align with assessment practices in schools. One issue that arises is the gap between the comprehensive objectives of assessment and the capabilities of the assessment system used to document student progress. Digital systems generally facilitate score recording, value processing, and the compilation of exam result summaries. However, when its use is solely focused on numbers, the system may not be able to fully reflect changes in attitudes, the process of skill formation, or the development of students' character. Kartowagiran and Jaedun discuss the development of an authentic assessment model for assessing junior high school students' learning outcomes, which is relevant as a foundation for understanding the need for assessment instruments that are appropriate to the characteristics of the competencies being measured (Kartowagiran & Jaedun, 2016). Therefore, digital technology needs to be used with a broader approach than simply changing the format of grade recording.

In the context of Islamic Religious Education (PAI) learning, digital assessments still have the potential to become trapped in technical and administrative orientations. The use of applications to administer online exams, enter grades, store test results, and generate reports does provide convenience for teachers. However, these benefits do not fully demonstrate that technology has been used to strengthen the quality of authentic assessments. If digital assessments merely serve as replacements for exam papers and gradebooks, the changes occurring are more related to the implementation medium than to a renewed pedagogical approach. In fact, the use of technology should expand the ways teachers collect learning evidence, monitor student progress, provide feedback, and design follow-up actions based on each student's individual needs.

An understanding of the importance of comprehensive assessment is also evident in Nawali et al.'s (2024) discussion on the implementation of authentic assessment at SDI Surya Buana Malang to improve learning quality. This study is relevant to support discussions on the importance of tailoring assessments to various

aspects of learning outcomes. In Islamic Religious Education (PAI) learning, assessment should not only focus on cognitive abilities, such as understanding the concept of thaharah, explaining the rules of prayer, or identifying events in Islamic history. Teachers also need to obtain evidence regarding students' abilities to practice worship, cooperate in social activities, demonstrate responsibility, and explain the meaning of the religious values they are learning (Nawali et al., 2024). Therefore, the use of technology needs to be directed to support the collection of evidence from these various domains.

Another challenge relates to the tendency for technology to be more efficiency-oriented than developing meaningful assessment experiences. Hadi and Ramdhani (2025), in their article on the transformation of Islamic education in the Independent Curriculum era, can serve as a conceptual reference for discussing the relationship between technological developments, pedagogical approaches, and Islamic values. In practice, the use of digital devices should not be limited to providing electronic questions but should also support more contextual and reflective assessments. For example, students can collect videos of religious practices, compile a portfolio of memorization progress, write a reflective journal, or document involvement in social activities. Teachers then assess this evidence using clear criteria and provide feedback to help students improve their competencies. Based on these issues, one important conceptual contribution to this discussion is the affirmation that digital transformation in Islamic Religious Education assessment must remain human-centered and morally oriented. Technology should not replace the role of teachers in understanding the context of student behavior, providing moral guidance, and assisting in character building. Instead, technology can serve as a supporting tool for more regularly documenting student progress and providing information that helps teachers make learning decisions (Hadi & Ramdhani, 2025). From this perspective, assessment quality is not only measured by the speed of processing scores or the sophistication of the application, but also by its ability to produce information that is accurate, fair, relevant, and beneficial to student development.

Despite offering numerous opportunities, the implementation of digitally-based authentic assessments still faces several obstacles that require attention. The first obstacle is teacher readiness and competence. Not all Islamic Education teachers have the same level of assessment literacy and digital skills. Some teachers may be able to use applications to create questions and process grades, but still experience difficulties when designing attitude assessment rubrics, determining behavioral indicators, or integrating various forms of learning evidence into assessment decisions. Attitude assessments, for example, require observable indicators, consistent criteria, and observations in relevant contexts. Without such planning, assessments risk being influenced by teachers' subjective impressions or based solely on a single behavior that occurs in a particular situation. Therefore, improving teacher competence needs to include training in technology use as well as strengthening understanding of the principles, instruments, and interpretation of authentic assessment results.

The second obstacle is time constraints and teacher workload. Compared with multiple-choice tests that can be checked automatically, authentic assessments often require a more lengthy process. Teachers need to develop rubrics, observe student behavior, check practical assignments, read reflective journals, and provide feedback tailored to students' needs. When student numbers are large and learning time is limited, implementing all of these activities can be challenging. This situation can lead teachers to prefer practical forms of assessment, even though they may not fully reflect student competency. To overcome this, teachers can use a combination of instruments, determine priority indicators, conduct planned observations, and utilize digital portfolios to store evidence of learning. These strategies should prioritize assessment quality, not simply reduce administrative work.

The third barrier is the disparity in digital facilities and infrastructure. Device availability, internet connection stability, access to learning platforms, and students' ability to use technology can vary from school to school. Some students may have personal devices and adequate internet access, while others must share devices or face network limitations. This disparity can impact students' opportunities to complete assessments, upload assignments, and demonstrate their competency. Therefore, teachers and schools need to ensure that the use of technology does not create new inequities. Alternatives such as offline assignment submission, alternating use of school devices, or providing additional time can be considered depending on the circumstances (Rosfiyani et al., 2026). Therefore, developing authentic digital-based assessments in Islamic Religious Education (PAI) learning requires a combination of teacher competence, appropriate instrument planning, infrastructure support, and a commitment to humanitarian values. Digitalization will provide more meaningful benefits if it can strengthen the assessment of students' knowledge, skills, attitudes, and reflection processes proportionally. Technology should be a tool to improve the quality of learning decisions, not simply a means to expedite administration. With this approach, Islamic Education assessment can develop into a more comprehensive, contextual, and moral-

building-oriented evaluation process, while still paying attention to fairness and diversity of students' learning conditions.

CONCLUSION

The transformation of assessment in Islamic Religious Education (PAI) learning in the Independent Curriculum era is a fundamental need to improve the quality of learning evaluation. Assessments no longer function solely as a tool for measuring learning outcomes or determining report card grades, but also as a means of reflection, providing feedback, and fostering student character. Therefore, the assessment paradigm needs to shift from a conventional approach oriented toward memorization to an authentic and holistic assessment encompassing the cognitive, affective, and psychomotor domains. This approach allows for a more comprehensive assessment of the integration of faith, knowledge, and good deeds in students' lives. Utilizing digital ecosystems, such asLearning Management System (LMS), interactive quizzes, data-based storagecloud, And e-portfolio, has the potential to increase administrative efficiency, simplify the documentation of learning outcomes, and support ongoing monitoring of student progress. However, the digitalization of assessments must not ignore the spiritual and humanitarian dimensions that are the main characteristics of Islamic Religious Education (PAI) learning. Technology must be positioned as a supporting tool, while personal interaction, teacher role models, and behavioral observations remain crucial in assessing students' moral development. The implementation of this assessment transformation still faces several challenges, particularly limited teacher digital literacy, time management, and disparities in technological infrastructure. Therefore, ongoing training for Islamic Religious Education (PAI) teachers, the development of adaptive assessment instruments, and adequate policy support and digital facilities are needed. Thus, Islamic Religious Education (PAI) assessment can develop into an effective, inclusive, and character-building evaluation system. Ultimately, this transformation is expected to support the realization of students who are faithful, devoted to God Almighty, and possess noble character in accordance with the goals of national education.

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