

## DIGITAL ASSESSMENT MANAGEMENT IN QUALITY ASSURANCE OF ISLAMIC EDUCATION LEARNING OUTCOMES AT MAN 18 JAKARTA

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### **Abstract**

Digital transformation in education requires madrasahs to develop an assessment system that is not only effective in measuring learning outcomes but also capable of supporting the continuous quality assurance of learning outcomes. This study aims to analyze the management of digital-based learning assessments in the subject of Islamic Religious Education (PAI) and its contribution to the Internal Quality Assurance System (SPMI) at MAN 18 Jakarta. The study employs a qualitative approach using a descriptive-analytical method. Informants were selected through purposive sampling, including the madrasah principal, the vice principal for curriculum, the Madrasah Education Quality Assurance Team (TPMPS), PAI teachers, and students. Data were collected through in-depth interviews, participatory observation, and analysis of documentation such as teaching modules, assessment instruments, rubrics, and digital learning outcome data. Data validity was strengthened through triangulation of sources and methods, while data analysis utilized the interactive model proposed by Miles, Huberman, and Saldaña. The research findings indicate that digital assessment management occurs through four main processes: planning assessment instruments aligned with learning outcomes; conducting assessments via digital platforms; utilizing analytical data on learning outcomes; and quality control and improvement through the PPEPP cycle. Assessment data is used to identify learning mastery, design remedial and enrichment programs, evaluate the quality of assessment instruments, and recalibrate teachers' instructional strategies. Challenges such as varying levels of digital literacy, connectivity issues, and infrastructure limitations are addressed through ongoing training and contingency procedures. The study concludes that digital assessment management can serve as a strategic tool for fostering data-driven decision-making and sustainably improving the quality of Islamic Religious Education (IRE) learning outcomes.

**Keywords:** digital assessment, Islamic Religious Education, assessment management, internal quality assurance, SPMI, madrasah

### **Abstrak**

*Transformasi digital dalam pendidikan menuntut madrasah mengembangkan sistem asesmen yang tidak hanya efektif dalam mengukur capaian pembelajaran, tetapi juga mampu mendukung penjaminan mutu hasil belajar secara berkelanjutan. Penelitian ini bertujuan menganalisis manajemen asesmen pembelajaran berbasis digital pada mata pelajaran Pendidikan Agama Islam (PAI) serta kontribusinya terhadap Sistem Penjaminan Mutu Internal (SPMI) di MAN 18 Jakarta. Penelitian menggunakan pendekatan kualitatif dengan metode deskriptif analitis. Informan dipilih secara purposif yang melibatkan kepala*

*madrasah, wakil kepala madrasah bidang kurikulum, Tim Penjaminan Mutu Pendidikan Madrasah (TPMPS), guru PAI, dan peserta didik. Data dikumpulkan melalui wawancara mendalam, observasi partisipatif, dan analisis dokumentasi berupa modul ajar, instrumen asesmen, rubrik, serta data hasil belajar digital. Keabsahan data diperkuat melalui triangulasi sumber dan metode, sedangkan analisis data menggunakan model interaktif Miles, Huberman, dan Saldaña. Hasil penelitian menunjukkan bahwa manajemen asesmen digital berlangsung melalui empat proses utama, yaitu perencanaan instrumen yang diselaraskan dengan capaian pembelajaran, pelaksanaan asesmen melalui platform digital, pemanfaatan data analitik hasil belajar, serta pengendalian dan peningkatan mutu melalui siklus PPEPP. Data asesmen dimanfaatkan untuk mengidentifikasi ketuntasan belajar, merancang program remedial dan pengayaan, mengevaluasi kualitas instrumen, serta merekalibrasi strategi pembelajaran guru. Kendala berupa variasi literasi digital, gangguan konektivitas, dan keterbatasan infrastruktur diatasi melalui pelatihan berkelanjutan dan prosedur kontingensi. Penelitian menyimpulkan bahwa manajemen asesmen digital dapat menjadi instrumen strategis dalam membangun pengambilan keputusan berbasis data dan meningkatkan mutu hasil belajar PAI secara berkelanjutan.*

**Kata kunci:** *asesmen digital, Pendidikan Agama Islam, manajemen asesmen, penjaminan mutu internal, SPMI, madrasah*

## INTRODUCTION

Digital transformation has brought about fundamental changes in the delivery of education—not only in how learning takes place, but also in how students’ learning outcomes are measured, analyzed, and used as the basis for educational decision-making. Advances in information technology have driven a shift from conventional assessment systems toward digital assessment that utilizes various platforms, applications, learning management systems, computer-based testing, and learning data processing technologies. These changes require educational institutions to no longer view assessment as an administrative activity at the end of the learning process, but rather as an integral part of learning management and educational quality control. The OECD (2023) emphasizes that the digitization of assessment has the potential to expand the use of learning data, improve the efficiency of measurement, and support evidence-based decision-making. However, the digitization of assessment does not automatically lead to improved quality if technology is used merely to convert paper-based exams into electronic formats without changes to assessment design, data utilization, and follow-up on learning.

From a pedagogical perspective, assessment serves a far broader function than simply assigning scores or determining students’ final grades. Assessment is a systematic process for collecting, processing, interpreting, and using information regarding students’ learning progress and achievements. Regulation of the Minister of Education, Culture, Research, and Technology No. 21 of 2022 states that assessment is the process of collecting and processing information to identify students’ learning needs and their developmental progress or learning outcomes. This regulation also positions assessment as an activity that must be conducted fairly, objectively, and educationally, with assessment results utilized as feedback to improve the learning process and outcomes. Assessment procedures include formulating objectives, selecting or developing instruments, implementation, processing results, and reporting.

This concept demonstrates that assessment is, in essence, part of the learning improvement cycle. Formative assessment, for example, allows teachers to identify gaps in students’

understanding during the learning process and provide feedback that can be used to make improvements. Meanwhile, summative assessment provides information on the extent to which learning objectives have been achieved after a specific period. The OECD (2023) distinguishes between the functions of formative and summative assessment but also highlights that both can contribute to educational decision-making if assessment data is used appropriately. Thus, the primary issue is not merely whether assessment has been conducted digitally, but rather how assessment results are managed to serve as the foundation for continuous learning improvement and the enhancement of educational quality.

This urgency becomes even more complex in the context of Islamic education. Madrasah Aliyah (senior high schools) have distinct characteristics from general high schools because they provide both general education and education with distinct Islamic characteristics. In the subject of Islamic Religious Education (PAI), educational outcomes cannot be reduced solely to the mastery of conceptual knowledge. PAI instruction is aimed at building religious understanding while shaping students' attitudes, character, moral conduct, and ability to apply Islamic values in daily life. Therefore, PAI assessment requires an approach capable of capturing the complexity of student learning outcomes more comprehensively.

Consequently, the management of PAI assessment cannot be limited to measuring the cognitive domain through objective tests alone. Assessments must be designed to provide information on students' understanding of Islamic concepts, critical thinking skills, religious attitudes, moral character, practical religious skills, and the ability to connect Islamic values with real-life issues. Ministry of Religious Affairs Regulation (KMA) No. 450 of 2024, which serves as a guideline for curriculum implementation in madrasahs—including the Madrasah Aliyah level—positions learning and assessment as crucial components of the madrasah curriculum. The Ministry of Religious Affairs also emphasizes that this policy is a response to advancements in science, communication technology, and the demands of 21st-century life.

Thus, the digitization of assessment in Islamic Education (PAI) should not be understood merely as the use of digital devices to administer exams. Digital assessment must be positioned as a learning information management ecosystem that integrates assessment planning, instrument development, assessment administration, data processing, achievement analysis, feedback provision, remediation, enrichment, and evaluation of the learning program. If all these stages can be integrated, assessment data can serve as a strategic information source for teachers, students, madrasah principals, and quality assurance officers in determining corrective actions.

In the context of educational quality assurance, the role of assessment becomes increasingly strategic. Quality assurance is not merely about fulfilling administrative requirements or meeting formal standards, but also involves an educational institution's ability to identify actual conditions, pinpoint quality gaps, develop improvement plans, implement corrective actions, and continuously evaluate the effectiveness of these improvements. The Internal Quality Assurance System (SPMI) is fundamentally designed to build the internal capacity of educational institutions to independently and sustainably recognize, plan, and improve quality. The SPMI cycle is closely linked to the collection and utilization of educational data as the basis for decision-making.

Within this framework, data from learning assessments can serve as a crucial source of evidence for quality control in madrasahs. Assessment data can be used to identify competencies that students have mastered, competencies that have not yet been achieved, patterns of learning difficulties, variations in achievement across classes, the effectiveness of learning strategies, and the need for interventions. In other words, assessment serves a dual function: first, as a tool to measure student learning outcomes; and second, as a managerial tool to evaluate the quality of the learning process. When assessment data is managed systematically, madrasahs can transition from perception-based decision-making to data-driven decision-making.

However, the digitization of assessment presents its own challenges. Technology does not automatically guarantee the validity, reliability, objectivity, or meaningfulness of assessment results. Digitization that merely shifts the examination medium from paper to electronic devices risks resulting in what might be termed *digitalization without pedagogical transformation*. In such circumstances, while technology does enhance administrative speed and efficiency, it has not yet brought about substantive changes to the quality of learning. The OECD (2023) also notes that the transformation of digital assessment must take into account assessment design, data usage, educators' capacity, and the overall digital ecosystem.

Another issue is the quality of feedback. Scores generated by digital systems do not necessarily provide students with sufficient information regarding where they went wrong, which competencies they have not yet mastered, and the corrective steps they need to take. In fact, learning-oriented assessment must generate *actionable feedback*. Appropriate feedback enables students to understand their learning progress while helping teachers determine subsequent learning strategies. Research on *assessment for learning* indicates that feedback is a crucial element linking the assessment process to improved learning. Thus, the speed with which digital systems generate scores must be matched by teachers' ability to interpret and act on that data.

Another equally important issue is teachers' digital assessment competencies. Digital transformation requires teachers who are not only capable of operating technological devices but also possess *assessment literacy*—that is, the ability to understand the purpose of assessment, design appropriate instruments, evaluate item quality, interpret data, provide feedback, and use assessment results to improve learning. In the context of madrasahs, this need becomes even more critical because Islamic Education (PAI) teachers must be able to integrate pedagogical competencies, Islamic content, and digital literacy simultaneously. Without these competencies, digital platforms risk becoming nothing more than a new administrative tool.

In addition to teacher competencies, data management is a critical aspect of digital assessment. Digital systems enable madrasahs to collect large volumes of data, but this data will have no strategic value unless it is processed into relevant information. Assessment data must be analyzed based on competencies, indicators, grade levels, learning periods, and student characteristics. Such analysis can be used to identify patterns in student achievement and learning gaps. Developments in digital assessment research also indicate growing attention toward *learning analytics*, computer-based testing, and the use of technology to support formative assessment and instructional decision-making.

These issues have direct relevance to the situation at MAN 18 Jakarta. As one of the state senior high schools in Jakarta, MAN 18 Jakarta has sought to accelerate digital transformation in various aspects of educational management, including the implementation of digital-based learning assessments. However, based on preliminary observations and interviews with policymakers—which form the basis of this study—several issues in the governance of digital assessment were identified. These issues include the suboptimal integration of assessment planning, implementation, result processing, evaluation, and follow-up within the framework of ensuring the quality of learning outcomes. Digital assessment practices also tend to remain fragmented, resulting in technology being utilized primarily for implementation and administrative tasks rather than for using data to improve the quality of learning.

These issues highlight a gap between *digital assessment practices* and *quality assurance functions*. On one hand, assessments have shifted toward digital formats; on the other hand, assessment results have not yet fully become an integral part of the quality decision-making system. This situation warrants careful examination because the effectiveness of assessment is determined not only by the platforms or devices used but also by the governance framework that links the entire assessment process to learning objectives and quality improvement. This gap is also evident in the scope of competencies being measured. In Islamic Education (PAI) instruction, assessments that are overly focused on multiple-choice questions or knowledge-based tests risk providing an incomplete picture of student achievement. The ability to understand Islamic teachings must be accompanied by the ability to internalize and actualize these values in one's behavior. Therefore, the management of digital PAI assessment must consider a variety of techniques and instruments, including tests, assignments, projects, portfolios, observations, reflections, and forms of performance-based assessment relevant to the characteristics of the learning objectives.

These conditions demonstrate that digital transformation in assessment requires a holistic managerial approach. The first stage is planning, which involves ensuring that assessment objectives and indicators align with PAI learning objectives. The second stage is instrument development, which involves ensuring that instruments possess content validity, appropriate difficulty levels, discriminative power, and alignment with the competencies being measured. The third stage is the administration of the assessment, taking into account accessibility, security, fairness, and academic integrity. The fourth stage is data processing and analysis. The fifth stage involves providing feedback and follow-up in the form of remediation, enrichment, adjustments to learning strategies, and interventions for students experiencing difficulties.

Thus, digital assessment management can be understood as a *closed-loop quality management system*. Information on assessment results does not end with the reporting of scores but is reused as input for planning subsequent learning. This cycle aligns with the principle of *continuous improvement* in quality assurance. At the madrasah level, assessment results can serve as evidence to evaluate the achievement of learning quality standards, while at the classroom level, teachers can use this data to make adaptive improvements to instruction. Previous research has extensively addressed the digitization of assessment, the use of technology in learning, and educational quality assurance separately. Research on digital assessment generally highlights the effectiveness of technology, the efficiency of test administration, *learning analytics*, or user experience. Meanwhile, studies on madrasah quality

assurance tend to focus on the implementation of the Madrasah Internal Quality Assurance System (SPMI), madrasah self-evaluation, leadership, and institutional management. A recent study on madrasah self-evaluation, for example, shows that evaluation can be a crucial tool for mapping and improving quality, but risks remain when evaluation is treated merely as an administrative activity. Research on digital-based SPMI also indicates that digitization can support the effectiveness of quality management, yet the integration of technology with quality management processes remains a significant challenge.

On the other hand, research on Islamic Education (PAI) learning assessments has primarily focused on assessment techniques, teacher competencies, or curriculum implementation, while the relationship between digital assessment management, learning outcome data, and internal quality assurance mechanisms in senior high madrasahs has not yet been comprehensively examined in an integrated manner. Thus, there is a *research gap* in the form of a disconnect between studies on digital assessment, Islamic Education (PAI) learning management, and SPMI.

This study aims to fill this gap by positioning digital assessment not merely as an instrument for evaluating learning outcomes, but as an integral part of the madrasah's quality management system. The novelty of this study lies in the development of an integrative perspective between digital-based learning assessment management and quality assurance of PAI learning outcomes at the senior high school level. The study not only examines whether digital technology has been used in assessment but also analyzes how this technology is managed from the planning stage, through instrument development, implementation, data processing, result interpretation, feedback provision, to follow-up actions for learning improvement.

Another novelty lies in the integration of three dimensions that have traditionally been studied separately: digital assessment management, Islamic learning assessment, and internal quality assurance. The integration of these three dimensions yields the perspective that the quality of PAI learning outcomes must be built through a cycle that links assessment data to pedagogical decisions and madrasah managerial decisions. From this perspective, the success of digital assessment is not measured solely by efficiency, speed, and ease of score processing, but by the system's ability to generate information that is valid, meaningful, actionable, and contributes to quality improvement.

Another innovation lies in the substantive context of PAI learning. This study incorporates the characteristics of PAI—which encompass the dimensions of knowledge, attitudes, character, ethics, and religious practice as considerations in digital assessment management. Therefore, digitization is not directed toward a narrow standardization of assessment but toward the development of an assessment system that remains capable of preserving the complexity of Islamic educational objectives. Conceptually, this study proposes the Digital Assessment–Quality Assurance Cycle framework, a management cycle consisting of: (1) alignment of learning objectives and assessment; (2) digital assessment design; (3) implementation and data capture; (4) data analysis and interpretation; (5) feedback and intervention; and (6) quality improvement. This cycle positions assessment data as *evidence* for improving learning as well as strategic information for quality control in madrasahs.

Based on this description, this study is important to gain an in-depth understanding of how

digital-based learning assessment management is implemented at MAN 18 Jakarta, how assessment data is used in ensuring the quality of Islamic Education (PAI) learning outcomes, what challenges teachers and madrasah administrators face, and what strategies have been developed to optimize the use of digital assessment. This study is expected to provide a theoretical contribution to the development of research on Islamic education management, particularly regarding the integration of technology, assessment, and quality assurance. Practically, the research findings are expected to serve as a foundation for madrasahs in developing a digital assessment system that is more well-planned, objective, transparent, educational, data-driven, and oriented toward *continuous quality improvement*. Thus, this study aims to address the central question of how the management of digital-based learning assessments can be integrated into the quality assurance system for student learning outcomes in Islamic Education (PAI) at MAN 18 Jakarta. This focus is crucial because the digital transformation of education should not stop at changes in devices and media but must lead to changes in governance, decision-making culture, the quality of learning, and mechanisms for continuous quality improvement.

## METHOD

This study employs a qualitative approach with a descriptive-analytical design to gain an in-depth understanding of the management practices of digital-based learning assessments in support of quality assurance for learning outcomes in Islamic Religious Education (PAI) at MAN 18 Jakarta. The qualitative approach was chosen because the study focuses on exploring the processes, experiences, practices, and meanings constructed by educational actors in their natural context, rather than on statistically measuring relationships between variables (Creswell & Poth, 2018). This design allows the researcher to identify how the planning, implementation, evaluation, and follow-up of digital assessments are integrated into the madrasah's quality assurance mechanisms. Research informants were selected through purposive sampling, taking into account their direct involvement and knowledge regarding the implementation of digital assessments. Informants included madrasah principals, vice principals for curriculum, the Madrasah Education Quality Assurance Team (TPMPS), Islamic Education (PAI) teachers, and student representatives. Informants were selected based on the principle of "information-rich cases" so that the data obtained could represent managerial, pedagogical, technical, and user perspectives in the implementation of digital assessments (Patton, 2015).

Data were collected through in-depth interviews, participatory observation, and document analysis. Interviews were used to explore policies, experiences, challenges, and strategies for managing digital assessments; observation was used to examine assessment practices within the learning environment; while documentation included instructional modules, assessment instruments and rubrics, assessment records, and portfolios of digital learning outcomes. Data validity was ensured through triangulation of sources and methods, as well as by checking the consistency of information across informants and data collection techniques (Lincoln & Guba, 1985). Data analysis followed the interactive model proposed by Miles, Huberman, and Saldaña (2014), which includes data condensation, data presentation, and the drawing and verification of conclusions. The analysis process was conducted iteratively from data collection until patterns, categories, and themes were

identified that explain the relationship between digital assessment management and the quality assurance of PAI learning outcomes.

## RESULTS AND DISCUSSION

### Planning of Digital-Based Learning Assessment in Islamic Religious Education

The planning stage constitutes the primary foundation of the learning assessment management cycle at MAN 18 Jakarta. Based on interviews with the Vice Principal for Curriculum Affairs and the Internal Quality Assurance Team (TPMPS), digital assessment planning for Islamic Religious Education (PAI) is no longer developed conventionally or independently by individual teachers. Instead, it is organized through a structured coordination mechanism at the beginning of each semester. The process begins with the formulation of Learning Objectives (Tujuan Pembelajaran/TP) and the Learning Objective Sequence (Alur Tujuan Pembelajaran/ATP), which are derived from the Learning Outcomes (Capaian Pembelajaran/CP) of the Merdeka Curriculum. Such alignment is essential because assessment quality depends not merely on the availability of digital tools but also on the extent to which assessment tasks correspond to intended learning outcomes.

PAI teachers at MAN 18 Jakarta design assessment instruments by explicitly mapping the digital platforms to be used according to the characteristics of the religious learning materials. For example, for Fiqh materials that require students to understand formal Islamic legal regulations, teachers develop objective assessment instruments using associative multiple-choice questions through Google Forms integrated with digital worksheets. In contrast, for Aqidah Akhlak materials emphasizing the internalization of faith-based values and moral conduct, assessment planning focuses on digital self-assessment and peer-assessment instruments through shared Google Drive documents that can be accessed periodically.

This differentiation indicates that digital assessment at MAN 18 Jakarta is not implemented through a one-size-fits-all approach. Rather, the selection of assessment media is adjusted to the cognitive, affective, and psychomotor characteristics of the intended learning outcomes. This is particularly important in PAI because assessment needs to capture not only students' conceptual understanding but also their ability to demonstrate religious values, attitudes, and practical competencies. The assessment planning documents are formally incorporated into teaching modules and validated by the principal and relevant educational supervisors. Quality assurance at this stage is implemented through the review of assessment instruments using content-validity criteria to ensure that questions and digital assignments adequately represent the indicators of student learning achievement. Such alignment represents an important quality-control mechanism because digitalization alone does not guarantee valid assessment.

**Table 1.** Planning Matrix for Digital Assessment by PAI Subject Area

| PAI SUBJECT AREA | PRIMARY DOMAIN | DIGITAL PLATFORM/ INSTRUMENT | INSTRUMENT QUALITY INDICATOR |
|------------------|----------------|------------------------------|------------------------------|
|------------------|----------------|------------------------------|------------------------------|

|                                 |                         |                                                                           |                                                       |
|---------------------------------|-------------------------|---------------------------------------------------------------------------|-------------------------------------------------------|
| <b>QUR'AN AND HADITH</b>        | Cognitive & Psychomotor | Quizizz (Tajwid); audio upload via Google Forms (memorization submission) | Accuracy of makhraj and fluency in digital submission |
| <b>AQIDAH AKHLAK</b>            | Affective (Attitudes)   | Google Forms (self- and peer-assessment) with spreadsheet integration     | Measurable scale and data consistency                 |
| <b>FIQH</b>                     | Cognitive & Practical   | Madrasah CBT / Google Forms (contextual cases in worship and muamalah)    | Contextual validity item                              |
| <b>ISLAMIC CULTURAL HISTORY</b> | Cognitive & Creativity  | Canva (infographics); video presentations via YouTube/Google Drive        | Product-assessment rubric and originality             |

### Implementation of Digital-Based Learning Assessment

The implementation of digital assessment at MAN 18 Jakarta requires dual readiness: reliable digital infrastructure and students' procedural compliance. In practice, the madrasah applies a **blended assessment ecosystem**, in which students complete assessment instruments using smartphones or laptops under close teacher supervision and according to established digital assessment procedures. Field observations indicate that daily formative assessments frequently employ gamification platforms such as Quizizz and Kahoot. The use of these platforms appears to facilitate active engagement and participation during PAI learning activities. Competitive elements, including real-time leaderboards, encourage students to prepare more seriously before assessment sessions. However, these observations should be interpreted primarily as evidence of increased participation rather than as definitive evidence of improved learning outcomes, unless supported by longitudinal or comparative achievement data.

For summative assessments, such as the End-of-Semester Assessment (Asesmen Akhir Semester/AAS), the madrasah uses an independently managed Computer-Based Test (CBT) platform integrated with the school's local server. This arrangement is intended to reduce opportunities for digital misconduct, including opening unauthorized browser tabs or copying and pasting answers. Such mechanisms demonstrate that digital assessment management involves not only pedagogical considerations but also issues of academic integrity and assessment security. Nevertheless, implementation remains subject to technical constraints. Internet connectivity fluctuations and limited server capacity during peak assessment periods may disrupt students' ability to complete examinations consistently. In response, the management of MAN 18 Jakarta has established contingency procedures, including access to a dedicated computer laboratory for students experiencing device-related problems and proportional extensions of examination-token validity. These measures demonstrate that effective digital assessment requires institutional resilience and alternative delivery mechanisms rather than reliance on technological infrastructure alone.

Recent evidence from Islamic education contexts similarly indicates that digital assessment platforms can improve efficiency and facilitate objective learning-outcome data, while limitations in digital competence, training, and infrastructure remain important barriers to sustainable implementation (Nurohmah & Ma'rifah, 2025).

### **Utilization of Learning Outcome Data for Internal Quality Assurance**

A major advantage of digital assessment management lies in the speed and accessibility of student learning-outcome data. Unlike conventional assessment systems that may require substantial time for scoring and item analysis, digital platforms can generate assessment statistics immediately after an examination has been completed. Digital assessment therefore provides opportunities for teachers and quality-assurance teams to move from score-based reporting toward more systematic data-informed instructional decision-making. The analytical outputs generated by digital assessment, including item difficulty, discrimination, response distributions, and the percentage of students achieving the established learning criteria, are transferred into spreadsheet-based datasets for further analysis by PAI teachers and the curriculum team.

The utilization of these data is organized into three major internal quality-assurance programs.

#### **1. Adaptive Remedial Program**

Students who fail to achieve the Learning Objective Achievement Criteria (Kriteria Ketercapaian Tujuan Pembelajaran/KKTP) are identified according to the learning clusters or competencies they have not yet mastered. Teachers subsequently provide targeted reinforcement through synchronous or asynchronous digital learning modules, followed by remedial assessments using equivalent digital question banks.

#### **2. Project-Based Enrichment Program**

Students whose achievement exceeds the class average are provided with enrichment activities based on contextual religious problem-solving. Examples include the development of digital da'wah content, Islamic educational infographics, or short educational videos distributed through appropriate digital platforms.

#### **3. Instructional Strategy Recalibration**

When assessment data indicate that the proportion of students achieving mastery in a particular class falls below the internally established threshold of 60%, the result is treated as a diagnostic signal that the instructional strategy used for the relevant module may require revision. Teachers are therefore expected to undertake reflective evaluation and modify the instructional approach during the subsequent learning cycle.

This process demonstrates an important shift from assessment of learning toward assessment for learning. Assessment data are not treated merely as final scores but as evidence for instructional improvement, remedial intervention, enrichment, and teacher reflection.

**Table 2.** Utilization Patterns of Digital Assessment Analytics at MAN 18 Jakarta

| ASSESSMENT | ANALYTICS | MANAGERIAL ACTION | EXPECTED |
|------------|-----------|-------------------|----------|
|------------|-----------|-------------------|----------|

| OUTPUT                                                             |  | IMPACT ON GRADUATE QUALITY                                                                        |                                                             |
|--------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>REAL-TIME RECAPITULATION SCORE (&lt; KKTP)</b>                  |  | Implementation of synchronous and asynchronous remedial classes through dedicated digital modules | Alignment with minimum competency standards                 |
| <b>RESPONSE-DISTRIBUTION STATISTICS (MASS INCORRECT RESPONSES)</b> |  | Teacher instructional reflection and revision of assessment-item wording                          | Improved validity and reliability of assessment instruments |
| <b>STUDENT ASSESSMENT-DURATION ACTIVITY LOGS</b>                   |  | Early detection of students' learning patterns and concentration levels during assessments        | Development of self-regulated learning                      |

### Analysis of the PPEPP Cycle in Digital Assessment Governance

The management of digital assessment at MAN 18 Jakarta is evaluated through an adapted PPEPP cycle, consisting of Determination, Implementation, Evaluation, Control, and Improvement. The framework provides a cyclical mechanism for ensuring that the transition from conventional to digital assessment does not compromise assessment objectivity, fairness, and continuous quality improvement.

#### 1. Determination

The madrasah establishes Standard Operating Procedures (SOPs) for digital assessment, covering minimum device requirements, data-security procedures, and institutional learning-quality indicators. One institutional target is that at least 85% of students achieve scores above the established KKTP.

#### 2. Implementation

PAI teachers implement instruction and assessment through digital platforms that have been incorporated into the Madrasah Work Plan (Rencana Kerja Madrasah/RKM). Platform selection is adjusted to the characteristics of the learning materials and assessment objectives.

#### 3. Evaluation

The TPMPS conducts periodic internal quality audits at the end of each semester. Evaluation focuses on technical and pedagogical aspects, including connectivity, assessment administration, data management, and the quality of digital questions. One recurring pedagogical concern is the presence of assessment items that have not sufficiently incorporated Higher-Order Thinking Skills (HOTS).

#### **4. Control**

Based on internal audit findings, the principal implements corrective measures, including digital HOTS-item-writing workshops for PAI teachers and administrative monitoring of teachers' compliance with assessment-data submission procedures.

#### **5. Improvement**

Following corrective actions, the madrasah raises assessment-quality standards for the subsequent academic year. One proposed improvement is the integration of video-based e-portfolios and interactive presentations as complementary evidence of student achievement. Thus, the improvement stage does not merely correct deficiencies but establishes higher quality expectations for the next assessment cycle.

The PPEPP structure reflects the logic of continuous improvement: standards are established, implemented, evaluated, controlled, and subsequently improved. This cyclical orientation is consistent with the broader conception of internal quality assurance in Indonesian education, in which PPEPP functions as a continuous quality-improvement cycle rather than a one-time compliance mechanism.

Through the consistent implementation of this cycle, digital assessment management at MAN 18 Jakarta has developed into an instrument for data-driven decision-making. However, claims concerning improvements in graduation quality should be interpreted cautiously unless supported by longitudinal achievement data. The available qualitative findings primarily demonstrate an improved mechanism for monitoring, responding to, and improving learning quality.

### **DISCUSSION**

The findings demonstrate that digital assessment at MAN 18 Jakarta has evolved beyond the simple replacement of paper-based tests with online instruments. The central finding is that digital assessment has become increasingly embedded within a broader management system involving planning, implementation, analytics, quality control, and instructional improvement. This finding is theoretically significant because it positions digital assessment not merely as a technological innovation but as an organizational and pedagogical infrastructure for continuous quality improvement.

The first important finding concerns the alignment between assessment planning and learning objectives. The planning process at MAN 18 Jakarta begins with learning outcomes and proceeds toward the selection of assessment methods and digital platforms. This sequence is consistent with the principle of constructive alignment, whereby learning outcomes, instructional activities, and assessment procedures should be designed as mutually reinforcing components of the learning system. In PAI, such alignment is particularly important because learning outcomes extend beyond cognitive mastery to include affective and practical dimensions.

The differentiated use of digital instruments across Qur'an and Hadith, Aqidah Akhlak, Fiqh, and Islamic Cultural History indicates that digitalization does not necessarily require uniformity. Instead, technology should follow pedagogy. For example, audio submissions may be more appropriate for evaluating Qur'anic recitation and memorization, whereas self-

and peer-assessment may be more suitable for reflecting on affective learning. Product-based digital assessment may be more appropriate for evaluating creativity in Islamic Cultural History. This finding supports the argument that the effectiveness of educational technology depends on pedagogical fit rather than technological sophistication alone.

This finding is also consistent with recent research on digital assessment in Islamic education. Nurohmah and Ma'rifah (2025) reported substantial adoption of digital assessment applications among PAI teachers, particularly Google Forms, Quizizz, and Kahoot, while simultaneously identifying digital competence, training, and infrastructure as continuing challenges. The present findings extend this observation by demonstrating that the critical issue is not merely whether teachers use digital tools, but whether platform selection is integrated into a systematic assessment-management process.

The second finding concerns the integration of formative and summative digital assessment. The use of gamification platforms during formative assessment illustrates a shift toward more interactive assessment practices. Real-time feedback and immediate performance visibility can enable students and teachers to identify learning gaps during instruction. However, the pedagogical value of gamification should not be reduced to competition or leaderboard ranking. If improperly designed, competitive mechanisms may emphasize speed and performance rather than conceptual understanding. Therefore, digital formative assessment should be designed around feedback, reflection, and learning improvement rather than competition alone.

The use of an independently managed CBT system for summative assessment further illustrates the institutionalization of digital assessment. The system provides advantages in terms of standardized administration, faster data processing, and greater control over assessment procedures. Nevertheless, the findings reveal that technological standardization does not automatically eliminate assessment risks. Connectivity disruptions, server limitations, device inequality, and digital misconduct remain potential threats to validity and fairness.

The third finding relates to digital assessment analytics as a mechanism for quality assurance. The availability of real-time scores, response distributions, and item-level information enables the madrasah to move toward evidence-based decision-making. This is arguably the most strategically important contribution of digital assessment to quality management. Assessment data become meaningful when they trigger pedagogical action.

The remedial program represents one manifestation of this process. Rather than simply recording that students have failed to achieve the KKTP, the digital system enables teachers to identify areas of incomplete mastery and assign targeted reinforcement. This transforms assessment from an endpoint into an intervention mechanism. Similarly, enrichment activities for high-achieving students prevent assessment from being limited to identifying students who require remediation.

The findings also show that item-level data can become a mechanism for teacher professional reflection. When a substantial proportion of students answers an item incorrectly, the problem may not necessarily lie exclusively with the students. It may indicate ambiguous wording, inappropriate difficulty, weak alignment with the learning objective, or

ineffective prior instruction. Consequently, assessment analytics can support teachers in questioning the quality of their own instructional design.

This finding reinforces the concept of assessment literacy, in which teachers are expected not only to administer assessment but also to interpret evidence and use it to improve instruction. In a digitally enabled environment, assessment literacy increasingly includes the ability to understand basic analytics, interpret patterns, distinguish meaningful signals from technical artifacts, and convert evidence into pedagogical decisions.

The fourth finding concerns the integration of digital assessment with an internal quality-assurance cycle. The adaptation of PPEPP at MAN 18 Jakarta demonstrates that digital assessment is positioned within a broader organizational mechanism. The Determination stage establishes standards; Implementation operationalizes them; Evaluation identifies deviations; Control introduces corrective action; and Improvement raises standards for the next cycle.

Theoretically, this structure is important because it prevents digital assessment from becoming an isolated innovation dependent on individual teachers. When assessment standards, procedures, audit mechanisms, and improvement plans are institutionalized, digital assessment becomes part of the school's organizational quality culture.

The findings also demonstrate that quality assurance requires both technological and pedagogical control. Technical quality includes connectivity, server capacity, device availability, data security, and platform reliability. Pedagogical quality includes content validity, alignment with learning objectives, HOTS orientation, feedback quality, and the appropriateness of assessment methods. A digital assessment system can be technically reliable while remaining pedagogically weak. Therefore, quality assurance must evaluate both dimensions simultaneously.

The fifth finding concerns digital equity and assessment fairness. The contingency plan involving computer laboratories and extended examination tokens represents an institutional response to technological inequality. This is important because digital assessment can unintentionally reproduce educational inequalities when students have unequal access to devices, stable internet connections, or digital competencies. Consequently, assessment governance must incorporate accessibility and contingency planning as elements of assessment validity and fairness.

Another significant finding concerns the assessment of affective and character dimensions in Islamic Religious Education. Digital environments provide efficient mechanisms for measuring cognitive performance, but the assessment of religious attitudes, character, and spiritual internalization is more complex. Self-assessment and peer-assessment can provide useful evidence, but these methods are susceptible to social desirability bias and subjective interpretation. Accordingly, digital assessment in PAI should employ triangulation of evidence, combining tests, observations, performance tasks, reflective journals, portfolios, and teacher assessments whenever appropriate.

This issue is especially relevant because recent scholarship on digital assessment in Islamic education has increasingly emphasized the need to integrate religious-character dimensions

rather than limiting assessment to academic achievement. A recent digital assessment model, for example, explicitly proposes integrating religious-character values into assessment design in Islamic Religious Education. This supports the present finding that digitalization should preserve the substantive educational objectives of PAI rather than simply digitizing conventional tests.

The findings therefore suggest a conceptual shift from digital assessment as a tool to digital assessment as a quality-assurance ecosystem. The ecosystem consists of five interconnected components: (1) outcome-aligned assessment planning, (2) pedagogically appropriate digital implementation, (3) real-time assessment analytics, (4) data-informed corrective action, and (5) continuous institutional improvement.

This model can be conceptualized as:

Learning Outcomes → Assessment Design → Digital Implementation → Data Analytics → Remedial/Enrichment → Instructional Reflection → Quality Control → Standard Improvement.

The contribution of this finding lies in the integration of these components into a single managerial framework within Islamic secondary education. Previous discussions of digital assessment often emphasize platform adoption, usability, or student engagement. The present study shifts attention toward the governance dimension: how digital assessment data are converted into quality-assurance decisions and how those decisions are incorporated into an iterative institutional improvement cycle. The practical implication is that madrasahs should avoid measuring digital transformation merely by the number of teachers using online platforms. More meaningful indicators include the alignment of assessment instruments with learning outcomes, the validity and reliability of digital items, the speed and quality of feedback, the use of analytics for remedial and enrichment programs, teacher assessment literacy, accessibility, academic integrity, and evidence of instructional improvement.

The findings also imply that teacher professional development should move beyond basic digital literacy. PAI teachers need digital assessment literacy, including competence in assessment design, rubric construction, item analysis, interpretation of digital analytics, feedback design, data ethics, and the assessment of affective and practical competencies. Institutional professional development should therefore be designed around the complete assessment cycle rather than around isolated software training. Overall, the study indicates that the strategic value of digital assessment at MAN 18 Jakarta lies in its capacity to connect assessment evidence with institutional quality improvement. Digital technology provides the infrastructure, but quality improvement depends on how educators interpret and act upon the evidence generated by that infrastructure. The most significant transformation is therefore managerial and pedagogical rather than technological.

The proposed conceptual contribution of this study is the Digital Assessment Quality Assurance Ecosystem for Islamic Education (DAQAE-IE), in which digital assessment functions as an integrated mechanism connecting curriculum alignment, assessment practice, learning analytics, pedagogical intervention, and continuous quality improvement. This framework extends conventional understandings of e-assessment by positioning digital assessment within an institutional quality-assurance architecture that is sensitive to the

distinctive cognitive, affective, practical, and religious-character objectives of Islamic Religious Education.

## CONCLUSION

Based on the results of the research and discussion regarding the management of digital-based learning assessments in the Islamic Religious Education (PAI) subject at MAN 18 Jakarta, it can be concluded that the implementation of digital assessments has evolved into an integral part of the madrasah's learning management and Internal Quality Assurance System (SPMI). Assessment management is carried out through systematic stages, ranging from the planning of assessment instruments aligned with Learning Outcomes (CP), the administration of assessments via various digital platforms, the analysis of learning outcome data, to follow-up actions aimed at improving the quality of learning.

Collaboration between Islamic Education (PAI) teachers, the curriculum team, and the Madrasah Education Quality Assurance Team (TPMPS) is a key factor in ensuring that digital assessment serves not only as a tool for measuring learning outcomes but also as an instrument for quality control. The use of real-time analytical data enables teachers to identify competency attainment, detect learning difficulties, implement remedial and enrichment activities, and reflect on the effectiveness of learning strategies. Thus, assessment data serves as the foundation for more objective and evidence-based educational decision-making.

The implementation of the PPEPP cycle (Planning, Implementation, Evaluation, Control, and Improvement) further strengthens accountability and the sustainability of digital assessment management. Although challenges remain—such as variations in teachers' digital literacy, infrastructure limitations, and connectivity issues—the madrasah has developed mitigation strategies through ongoing training, the provision of backup devices and laboratories, and contingency procedures. Therefore, digital assessment management at MAN 18 Jakarta can be viewed as a strategic approach to fostering a culture of quality, strengthening data-driven decision-making, and continuously improving the quality of PAI learning outcomes.

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