

Model Evaluasi Pembelajaran Berbasis Teknologi dalam Mata Kuliah Pembelajaran PAI di Era Digital

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ABSTRACT

In a continuously evolving digital era, learning evaluation systems are required to be more adaptive, efficient, and data-driven. This article aims to examine technology-based learning evaluation models relevant to the context of Islamic Religious Education (PAI) courses in the Digital Era. This research employs a literature study method by analyzing various references related to digital assessment, e-learning platforms, and technology-based evaluation innovations. The results show that technology-based evaluation, both formative and summative, can improve the effectiveness of measuring learning outcomes through the use of Learning Management Systems (LMS), interactive quizzes, e-portfolios, and learning analytics. The contribution of this research provides a conceptual framework for PAI educators in implementing objective, real-time, and personalized digital evaluation models.

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INTRODUCTION

The development of information and communication technology (ICT) has brought fundamental and comprehensive changes in various sectors of human life, including in the world of education. The application of digital technology in the world of education not only affects the way teachers teach and students learn, but also changes the overall education management and evaluation system (Huda, 2020). This transformation is further strengthened by the global education digitalization agenda that encourages educational institutions to integrate technology into all components of the learning process, from planning, implementation, to evaluation of learning outcomes (Alkhowarizmi et al., 2025). Digitization

of education allows for the creation of personalized learning, where students can learn according to their own pace and learning style (Kooli, 2023). In the context of higher education in Indonesia, this digital transformation is also expected to be able to encourage the effectiveness and efficiency of learning implementation, including in courses based on Islamic values such as Islamic Religious Education (IRE) (Kesuma et al., 2025).

In the rapidly evolving digital era, learning evaluation is required to shift from a conventional approach to a more adaptive and technology-based approach. Conventional paper-based and outcome-oriented evaluations are no longer able to describe the complexity of the competencies of 21st-century learners. An ideal evaluation system should be able to comprehensively measure learning outcomes not only cognitive, but also affective and psychomotor aspects while providing quick feedback and supporting data-driven decision-making. The principles of valid evaluation include objectivity (data-based, not perception), comprehensive (including cognitive, affective, and psychomotor), continuity (carried out continuously), and integration integrated with the education management system (Saidah & Muhid, 2025).

The reality on the ground shows a significant gap between these ideal conditions and the actual practice. If previously the assessment was carried out manually using paper and per subject, now ideally the assessment is carried out using existing technology, in line with the characteristics of 21st century learning which must be designed with the 4C skills: critical thinking, creative and innovative thinking, collaboration, and communication (Warsah & Habibullah, 2022). However, the reality shows that there are still many educational institutions, especially in PAI learning in universities, that survive with the conventional paper-based evaluation approach that has proven to have limitations in terms of efficiency, objectivity, and accessibility (Sobirin et al., 2023).

Several previous studies have examined the application of technology in learning evaluation. First, Supratama & Hilallaludin, (2025) examined the effectiveness of the use of Google Forms as a formative evaluation instrument in college, which showed an increase in student motivation and assessment efficiency. Second, Khan, (2025) analyzed Mentimeter's implementation in the evaluation of religious education learning in high school, finding that the gamification platform significantly increased student engagement. Third, Nurhayani et al., (2023) examined the use of LMS-based e-portfolios in PAI courses in colleges, which resulted in the findings that this approach supports authentic assessment and deeper learning reflection.

Although the research has made a significant contribution, there is a research gap that needs to be filled, namely a study that comprehensively integrates various technology-based evaluation models in the specific context of PAI Learning courses in the Digital Era. The novelty of this research lies in the preparation of a conceptual framework that combines formative and digital summative evaluation models in one coherent system for the context of PAI.

The purpose of this study is to identify appropriate technology-based learning evaluation models, analyze their characteristics and strengths and challenges, and formulate implementation recommendations in PAI learning in the digital era. The urgency of this research is increasingly relevant considering the digital transformation in higher education

which requires PAI educators to have competence in managing technology-based evaluation systems effectively and accountably.

METHODS

Penelitian ini menggunakan pendekatan kualitatif dengan jenis penelitian studi literatur. Pendekatan ini dipilih karena fokus kajian adalah analisis konseptual terhadap model evaluasi pembelajaran berbasis teknologi berdasarkan sumber-sumber pustaka yang relevan (Subakti et al., 2022). Penelitian ini dilaksanakan sepanjang semester genap tahun akademik 2023/2024 sebagai bagian dari penugasan mata kuliah Pembelajaran PAI di Era Digital. Objek penelitian ini adalah konsep, model, dan implementasi evaluasi pembelajaran berbasis teknologi yang didokumentasikan dalam jurnal ilmiah, buku teks, dan sumber digital terpercaya. Teknik pengumpulan data dilakukan melalui telaah dokumen dan analisis konten terhadap berbagai sumber literatur yang relevan dengan topik evaluasi digital dan teknologi pendidikan. Instrumen penelitian berupa lembar analisis literatur yang memuat kategori aspek evaluasi, jenis teknologi yang digunakan, kelebihan, dan tantangan implementasi. Teknik analisis data yang digunakan adalah analisis konten deskriptif dengan tahapan: (1) reduksi data melalui seleksi literatur berdasarkan relevansi dan kredibilitas sumber; (2) penyajian data dalam bentuk klasifikasi model evaluasi; dan (3) penarikan kesimpulan melalui sintesis temuan dari berbagai sumber (Moleong, 2021). Proses ini dilakukan secara sistematis untuk memastikan validitas dan reliabilitas hasil kajian.

RESULTS AND DISCUSSION

This study concludes that technology-based learning evaluation models, both formative and summative digital, are an effective solution to improve the quality of measuring learning outcomes in PAI courses in the digital era. The integration of LMS platforms, interactive quizzes, e-portfolios, and learning analytics enables objective, efficient, real-time, and data-driven evaluation. The limitation of this research lies in its theoretical-conceptual scope without direct empirical testing in the field. For this reason, it is recommended that follow-up research be carried out through classroom action research or real implementation case studies in Islamic educational institutions, especially to measure the effectiveness of the digital evaluation model in improving PAI learning outcomes in a measurable and sustainable manner (Saekoko et al., 2025). These findings are in line with the e-assessment framework developed by Crisp dalam Sandika et al., (2025), which emphasizes that the digitization of evaluation opens up space for more authentic, adaptive, and evidence-based assessments.

1. Digital Formative Evaluation Model

The digital formative evaluation model functions to monitor learning progress continuously during the learning process. Black and Wiliam in their classic study emphasized that effective formative assessments can significantly improve learning achievement,

especially if accompanied by quick and specific feedback to students (Esrimurti, 2025). This principle is operationalized through various interactive platforms.

Rachmawati & Fadhilawati, (2025) proving that gamification-based platforms like Quizizz and Kahoot! Not only does it significantly increase learner engagement, but it also provides real-time analytics data that helps educators dynamically adjust learning strategies. The Supratama & Hilallaludin (2025) shows that Google Forms as a formative evaluation instrument is able to improve the efficiency of student assessment and motivation, with the advantage of automatic data integration into Google Sheets that facilitates the analysis of results.

Table 1. Digital Formative Evaluation Model, Functions, and Supporting References

Platforms/Method	Main Functions	Supporting References
Quizizz / Kahoot!	Gamification-based interactive quizzes; Real-Time Feedback	Rachmawati & Fadhilawati, (2025)
Google Forms	Collection of answers & online questionnaires; Automated data integration	Supratama & Hilallaludin (2025)
Interactive Poll (Mentimeter)	Direct response during learning sessions; Instant results visualization	Habibah et al., (2025)
AnalyticsLMS (Google Classroom)	Monitoring student activities & progress; Comprehensive automated reports	Rafi et al., (2024)

The use of interactive polls such as Mentimeter in PAI learning sessions also showed a positive impact on student active participation. Khan (2025) In a systematic review of 40 peer-reviewed studies, Mentimeter as a student response system (SRS) has been proven to increase student engagement, encourage collaboration, and increase participation through its interactive and anonymous response features. In addition, Mentimeter supports active learning while facilitating formative assessment in real-time, making it a valuable tool in both face-to-face and online learning. Meanwhile, Rafi et al., (2024) prove the effectiveness of LMS in PAI learning in college, especially in integrating student progress monitoring functions with secure and structured data storage.

2. Digital Summative Evaluation Model

The digital summative evaluation model is applied to assess the overall learning outcomes. The findings of the study identified three main approaches: (1) Computer-Based Test (CBT) through the Moodle and Google Forms platforms; (2) Digital e-portfolio as documentation of learning processes and outcomes; and (3) Digital projects as authentic evidence of competency achievements. The implementation of CBT in PAI evaluation has been shown to improve the objectivity of assessment as it reduces the subjectivity of examinations and allows for automatic correction. Zakariya et al., (2026) In a phenomenological study of college students, it was found that CBT was seen as useful for the speed of assessment and reduction of administrative errors, with a positive ease of use, especially for digitally literate students. Zakariya, (2026) in a follow-up study of lecturers also revealed that CBT was perceived to be beneficial in improving efficiency, feedback speed, and overall assessment management.

The e-portfolio approach has strong support from the literature. Nurhayani et al., (2023) proves that the portfolio assessment model in PAI courses is very suitable to be applied to subjects that demand learning outcomes in the form of knowledge, skills, and attitudes, because the aspects measured include three domains of child psychological development, namely cognitive, affective, and psychomotor. In line with that, Zainuddin et al., (2026) in a study published in *Education and Information Technologies* (Springer) showed that e-portfolios support the practice of deep reflection and authentic assessment, with the finding that the use of e-portfolios is proven to strengthen the continuous development of students' professional identities and competencies even after graduation.

3. Characteristics, Advantages and Challenges of Implementation

Overall, the study identified five key characteristics of technology-based evaluation: (1) high objectivity through automated assessment; (2) real-time data analysis capabilities; (3) cross-device access flexibility; (4) data storage efficiency; and (5) support for personalized learning. This last characteristic is in line with the principle of universal design for learning (UDL) which emphasizes the importance of providing diverse representation, expression, and engagement for learners.

These findings are in line with the idea Martín-Lucas & García del Dujo, (2023) About digital constructivism which emphasizes that digital technology transforms the educational spaces we inhabit as well as the way we process information, so that an interactive and responsive technology-based learning environment becomes an important foundation for the active construction of students' knowledge. Compared to studies Supratama & Hilallaludin, (2025) focusing on a single platform, this study expands the scope by integrating various

evaluation platform models comparatively, resulting in a more comprehensive map of the e-assessment ecosystem in PAI learning.

The implementation of technology-based evaluation is inseparable from a number of challenges. Miras et al., (2023) In the systematic review, three main variables were identified that are obstacles to e-learning: (i) problems of access to technological infrastructure (digital divide); (ii) use problems related to the low digital literacy of educators and students; and (iii) inequality related to socio-economic factors. Recommended improvement measures include teacher training, institutional policy response, and the development of digital literacy programs and technology infrastructure. Related to academic cheating, Kofinas et al., (2025) warned that the emergence of generative artificial intelligence further complicates the determination of the authorship of student assignments, because AI can produce high-quality works that are difficult to distinguish from students' own writings, so digital evaluation systems must be designed with a strong academic integrity mechanism.

The implications of these findings for PAI learning practices are significant. Mintasih et al., (2024) emphasized that the transformation of the competencies of PAI educators in the digital era includes not only content mastery, but also digital pedagogical competence, with strategic recommendations in the form of intensive training in digital content creation, equitable access to technology in remote areas, and the implementation of hybrid learning models. Thus, there is a need for continuous professional development programs for PAI educators, as well as institutional policies that ensure the availability of infrastructure and fair access for all students.

CONCLUSION

This study concludes that technology-based learning evaluation models, both formative and summative digital, are an effective solution to improve the quality of measuring learning outcomes in PAI courses in the digital era. The integration of LMS platforms, interactive quizzes, e-portfolios, and learning analytics enables objective, efficient, real-time, and data-driven evaluation. The limitation of this research lies in its theoretical-conceptual scope without direct empirical testing in the field. For this reason, it is recommended that follow-up research be carried out through classroom action research or real implementation case studies in Islamic educational institutions, especially to measure the effectiveness of the digital evaluation model in improving PAI learning outcomes in a measurable and sustainable manner.

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