

Construction of Theory and Concept of Digital-Based PAI Learning Assessment

Abdul Muqtadir¹ S., Asmiatin², , Khoiri³, M. Fattahuddin⁴, Abdul Halik⁵

^{1,2,3,4}University Of Muhammadiyah Pare Pare, Indonesia

⁵University of IAIN Pare Pare, Indonesia

DOI: <https://doi.org/10.62872/0zb85m44>

Abstract

The development of information and communication technology (ICT) has brought significant changes to various aspects of life, including the field of education. One area that is directly affected is the learning assessment system, particularly in the subject of Islamic Religious Education (PAI). Digital-based PAI assessment has emerged as an innovative solution to address the demands of the times, which require efficiency, transparency, and accountability in evaluating learning outcomes. This article examines the theoretical and conceptual construction of digital-based PAI assessment, including its definition, implementation examples, and the challenges encountered. This study employs a qualitative approach through a literature review, with data collected from the latest relevant scientific literature, both national and international. The findings indicate that digitalization in PAI assessment can enhance the effectiveness of learning data collection, provide real-time feedback to students, and support a more adaptive and personalized learning approach. Commonly used platforms include Google Forms, Quizizz, Moodle, and other Learning Management Systems (LMS). Although it offers many advantages, several obstacles remain, such as limited technological infrastructure, low digital literacy among teachers and students, and resistance to shifting from traditional evaluation methods. Therefore, educational policy support is needed to ensure continuous teacher training, adequate technological facilities, and a curriculum that adapts to technological developments..

Keywords Assessment, Digital-Based, Islamic Religious-Education..

Copyright (c) 2024 Abdul Muqtadir¹ S., Asmiatin², , Khoiri³, M. Fattahuddin⁴, Abdul Halik⁵.

□ Corresponding author

Email Address : mqtdrs@gmail.com

Received February 18, 2025 Accepted March 13, 2025 Published March 24, 2025

Introduction

The development of information and communication technology (ICT) has revolutionized various sectors of life, including the education sector. The era of the industrial revolution 4.0 marked by the integration of the physical, digital, and biological worlds has direct implications for learning methods and evaluations in schools. Education in the digital era requires a transformation that not only touches aspects of learning methodology, but also the assessment system (Sudjana, 2023). Learning assessments are no longer limited to conventional



Creative Commons Attribution-ShareAlike 4.0 International License:

<https://creativecommons.org/licenses/by-sa/4.0/>

paper-based formats, but have evolved towards digital that is more flexible, responsive, and adaptive to the needs of the times (Sofyan & Salito, 2024).

In the context of Islamic Religious Education (PAI), assessment plays an important role in evaluating the success of students in understanding, internalizing, and implementing Islamic teachings in daily life. PAI assessment includes cognitive, affective, and psychomotor aspects, each of which has its own challenges in the digital measurement process (Ariza & Afifah, 2024). Therefore, the implementation of digital-based PAI assessments must be comprehensively designed to accommodate various dimensions of learning outcomes.

Digitization of PAI assessments provides a number of benefits such as time efficiency, ease of documentation and analysis of learning outcomes, and allows for quick and accurate feedback (Hadi et al., 2024). Platforms such as Google Forms, Moodle, Quizizz, and other Learning Management Systems (LMS) have become popular tools used to support digital-based assessment activities (Murdaningtias et al., 2024). The implementation of digital assessments also supports the Independent Learning policy launched by the Ministry of Education and Culture, which encourages more independent and flexible learning (Ministry of Education and Culture, 2023).

However, the implementation of digital-based PAI assessments cannot be separated from challenges. There are still many schools that face limitations in technological infrastructure, such as a lack of computer equipment, an unstable internet network, and a lack of training for teachers in the use of learning technology (Prayetno, 2025). In addition, teachers often have difficulties in designing digital assessment instruments that are able to measure spiritual and moral aspects authentically (Hidayati, 2024). Another challenge is the resistance of some educators and students who feel uncomfortable with technology because they are used to using manual methods (Manshur & Isroani, 2024).

Thus, an in-depth study is needed on the construction of the theory and concept of digital-based PAI assessment to provide a complete picture of the form, strategy, and challenges faced in its implementation. This study is expected to contribute to designing an assessment system that is adaptive to technological developments while maintaining the substance of Islamic educational values.

Methodology

This study uses a qualitative approach with the library research method as a basis for analyzing the construction of theories and concepts of digital-based Islamic Religious Education (PAI) learning assessment. Literature studies were chosen because they provide flexibility in exploring various relevant sources of scientific information, both in the form of books, national and international journal articles, and the latest education policy documents (Zed, 2004).

The data source was obtained through a systematic search of literature published in the last five years, especially those that discuss digital assessment, Islamic religious education, technology-based education transformation, and national education policies in the digital era. Data is collected from reliable databases such as Google Scholar, DOAJ, Sinta, and university journal portals. Literature selection is made based on its relevance, actuality, and contribution to the research topic.

Data analysis is carried out through content analysis techniques, which focus on identifying key themes in the literature, such as definition, forms of implementation, benefits, challenges, and solutions in digital-based PAI assessments (Krippendorff, 2018). Findings from various sources are comparatively reviewed and synthesized to build a comprehensive theoretical narrative.

In maintaining the reliability of the data, the author uses a source triangulation strategy by comparing data from various different literatures. In addition, the validity of the content is maintained by examining the results of previous studies that have gone through the peer-review process or official scientific publications (Creswell & Poth, 2018).

Through this approach, it is hoped that a deep and reflective understanding of the reality of the implementation of digital-based PAI assessments in the context of Indonesian education will be obtained, as well as theoretical constructions that can be used as a reference by education practitioners and policymakers

Result and Discussion

Construction of Theory and Concept of Digital-Based PAI Learning Assessment

Assessment in digital-based Islamic Religious Education (PAI) is an integral part of educational transformation in the digital era. This concept not only includes the use of technology to measure learning outcomes, but also to support a learning process that is more effective, efficient, and relevant to the times. Some of the main theories and concepts underlying the implementation of digital assessment in PAI include:

1. Constructivism Theory

The theory of constructivism, developed by Piaget and Vygotsky, emphasizes that learning occurs through an active process in which students build knowledge based on experience and social interaction. In the context of digital assessment, technology allows students to engage in more interactive and collaborative learning. For example, the use of apps like Google Forms and Quizizz allows students to access materials and take assessments independently, which supports constructive and reflective learning.

2. Assessment as Learning

The concept of assessment as learning places students as active subjects in the assessment process. Students not only receive feedback from teachers, but also reflect on their own learning process. The implementation of digital assessments in PAI allows students to access the assessment results directly and reflect on their understanding, which encourages deeper and more meaningful learning.

3. TPACK (Technological Pedagogical Content Knowledge)

The TPACK model emphasizes the importance of integration between content knowledge (PAI materials), pedagogy (teaching strategies), and technology in learning design. In the context of digital assessment, PAI teachers need to develop competencies in these three aspects to design effective and meaningful assessments. Research by Robi Aroka (2023) shows that the TPACK approach can improve students' digital literacy in PAI learning, with the use of digital media such as interactive videos and presentation applications that support the understanding of the material more effectively.

4. Digital Transformation in Islamic Religious Education

Digital transformation in Islamic religious education includes changes in learning strategies, curriculum management, and learning evaluation. Research by Restalia and

Khasanah (2024) identified challenges and opportunities in the integration of technology in Islamic religious education, including the importance of digital literacy for educators and students, as well as the need for a curriculum that is adaptive to technological developments. Digital assessments in PAI must consider these aspects to ensure their relevance and effectiveness in the context of religious education.

5. Authentic and Holistic Assessment

Authentic assessments emphasize evaluations that reflect real-life situations in learners' lives. In the context of PAI, assessment measures not only cognitive aspects, but also affective, psychomotor, and spiritual aspects. The implementation of digital assessments allows teachers to design assignments and projects that reflect the application of Islamic values in daily life, such as the creation of da'wah videos or reflective essay writing, which supports holistic and contextual learning.

Definition of Digital-Based PAI Learning Assessment

Digital-based Islamic Religious Education (PAI) learning assessment is a process of evaluating student learning outcomes in PAI subjects which is carried out by utilizing information and communication technology (ICT). In this context, assessment is no longer limited to conventional methods such as written exams on paper, but has transformed using various digital platforms such as Learning Management Systems (LMS), interactive quiz applications, online learning media, and the use of learning outcome analysis software. The main goal of digital assessment is to create an evaluation process that is more effective, efficient, objective, and easily accessible to both teachers and learners.

Islamic religious education, which has cognitive, affective, and psychomotor dimensions, requires an assessment method that not only measures aspects of knowledge, but also attitudes and skills. With the help of digital technology, teachers can develop more varied and contextual assessment instruments, such as online quizzes, practical assignment videos, digital portfolios, online discussion forums, and project-based assessments that can be documented and analyzed automatically. This kind of assessment provides flexibility in monitoring student learning progress, as well as supporting the principles of continuous formative assessment.

In addition to increasing the effectiveness of the evaluation process, digital-based assessments also support the principles of transparency and accountability in the world of education. Learning outcome data collected through digital platforms can be stored, processed, and displayed systematically, making it easier for teachers to analyze learning outcomes in depth. This provides an opportunity to reflect and improve learning strategies in a targeted manner. Darmawan (2014) stated that the use of technology in educational assessment is able to improve the quality of learning, especially in terms of delivering quick and personalized feedback to students.

In addition, the integration of digital assessment in PAI learning is in line with national policies in the education sector that encourage digitalization as part of the transformation of the education system in Indonesia. The Merdeka Learning Program launched by the Ministry of Education and Culture (Kemendikbud) emphasizes the importance of technological adaptation in all aspects of learning, including in the assessment process. In the guidebook for digital transformation of education, the Ministry of Education and Culture (2020) emphasized that the

digitization of assessments is a strategic step to realize a learning system that is more adaptive, innovative, and relevant to the needs of the times.

Thus, digital-based PAI learning assessment is not just replacing stationery with electronic devices, but is a paradigm transformation in evaluating student learning outcomes. This approach requires teachers to have adequate digital competencies, as well as pedagogical skills in designing meaningful assessments. Through the proper use of technology, assessments in PAI subjects can become more contextual, participatory, and lead to the formation of students' religious character holistically.

Examples of Digital Assessment Implementation in PAI

The implementation of digital assessments in Islamic Religious Education (PAI) subjects is increasingly relevant in the era of digital transformation of education. The use of various digital platforms and applications allows PAI teachers to evaluate learning in a more creative, interactive, and efficient manner. Some examples of concrete applications of digital assessments include a variety of popular tools that can be easily accessed by teachers and students, both in limited face-to-face learning and distance learning.

One of the most widely used platforms in the context of digital assessment is Google Forms. This application allows teachers to create quizzes, multiple-choice questions, short fills, and description questions that can be immediately corrected automatically. The advantage of Google Forms lies in its ease of use and integration with Google Drive, so that the results of assessments can be documented and analyzed quickly. In addition, teachers can take advantage of the "automatic feedback" feature that allows students to get direct discussions after answering questions (Suparman, 2021).

Furthermore, Quizizz is an interesting choice in the formative assessment process. The platform offers gamification elements such as points, leaderboards, and avatars, which can increase student motivation and engagement. In PAI learning, Quizizz can be used to evaluate students' understanding of materials such as the pillars of faith, the history of the prophet, or verses of the Qur'an through fun interactive questions. Assessment with Quizizz is perfect for measuring basic comprehension quickly and fun (Ramadhani et al., 2022).

For more complex assessments, teachers can use Moodle, a Learning Management System (LMS) that supports various evaluation features such as assignment collection, quizzes, discussion forums, and digital portfolios. Moodle allows PAI teachers to track student progress thoroughly over time. The LMS also allows the integration of multimedia materials such as lecture videos, e-books, and presentations that can support in-depth and contextual PAI learning.

In addition, in the context of collaborative-based learning, Miro Boards can be used for the muhadharah (religious speech practice) method digitally. Through these interactive digital boards, students can structure lectures, share ideas, and provide feedback to each other in real-time. This is in line with PAI learning which not only emphasizes cognitive aspects, but also communication skills and character development. Miro allows students to collaborate on religious projects such as da'wah presentations or discussions of Islamic values digitally.

Overall, these various digital platforms enrich the assessment methods in PAI, making them more adaptive to the times and the needs of students. PAI teachers need to continue to develop digital literacy competencies in order to be able to choose and utilize the right tools according to learning goals and student characteristics. Thus, the assessment in PAI is not only

administrative, but really becomes an integral part of the formation of students' character and spirituality.

Challenges in PAI Digital Assessment

Although digital assessments in Islamic Religious Education (PAI) offer various benefits such as efficiency, speed, and flexibility in the evaluation process, its implementation still faces various challenges that need serious attention from various parties. These challenges are not only technical, but also touch on cultural aspects, human resource competence, and overall readiness of the education system.

One of the main challenges is the limitation of technological infrastructure, especially in remote or underdeveloped areas. Not all schools in Indonesia have adequate access to digital devices such as computers, tablets, or smartphones, as well as a stable internet network. In fact, the availability of proper infrastructure is an absolute requirement for the implementation of digital-based assessments. According to data from the Ministry of Education and Culture (2021), there is still a significant digital gap between schools in urban areas and in 3T (Frontier, Outermost, and Disadvantaged) areas. This condition hinders the equitable distribution of the implementation of digital assessments in PAI, which is ideally accessible to all students without exception.

The second challenge has to do with the digital skills of PAI teachers. Not all teachers have adequate competence in using technology for learning and assessment. Many teachers are not familiar with digital assessment applications such as Google Forms, Quizizz, or Moodle, both from a technical and pedagogical perspective. This is due to the lack of relevant ongoing training, as well as the lack of technical support that can assist teachers in applying technology in the learning evaluation process. As stated by Surya (2020), teachers' digital literacy is a key factor in the success of digital transformation of education, including in the aspect of assessment.

Furthermore, resistance to change is also an obstacle in itself. The change from conventional assessment methods to digital systems requires adaptation, both from teachers and students. Some educators feel that digital assessments are not as effective as manual methods, especially in assessing the affective and psychomotor aspects that are typical of PAI learning. On the other hand, some students feel uncomfortable with technology-based assessments, especially if they are not used to using digital devices in their daily lives. Psychological factors such as anxiety about technology (technophobia) can also affect the effectiveness of the digital evaluation process.

In addition to these three main challenges, data security and privacy issues also need to be considered. The use of digital apps means that teachers and students share their personal data online, so it's important to ensure that the platforms used have high security standards and comply with data protection regulations.

To overcome these challenges, a comprehensive and collaborative approach is needed. The government needs to accelerate the development of digital education infrastructure, provide technical training for teachers, and develop policies that encourage inclusive ICT integration. In addition, a digital literacy culture must be built from an early age so that students and teachers are familiar with the use of technology in academic activities, including in assessments.

Solutions and Strategies for Implementing Digital Assessment in PAI

To overcome various challenges in the implementation of digital assessments in Islamic Religious Education (PAI), holistic and integrated solutions and strategies are needed. This effort not only involves teachers as learning implementers, but also requires support from the government, educational institutions, and the community. The following strategic steps can be a foothold in optimizing the implementation of effective, inclusive, and sustainable digital assessments.

First, improving teacher competence through training and professional development is the main foundation. This training not only focuses on the technical aspects of using digital applications or platforms, but also includes a pedagogical approach in compiling technology-based assessment instruments. PAI teachers need to be equipped with the ability to design questions based on higher-order thinking skills (HOTS), utilize assessment data for formative analysis, and apply the principles of authentic assessment in a digital context. According to Huda et al. (2022), continuous and practice-based training has proven to be more effective in increasing teachers' readiness to face the era of educational digitalization.

Second, improving technological infrastructure is a crucial aspect that cannot be ignored. The government and schools must be committed to providing basic facilities such as computers, tablets, a stable internet network, and access to safe and reliable online learning platforms. This investment must be directed evenly, especially for schools in 3T (Frontier, Outermost, and Disadvantaged) areas so that there is no digital divide that exacerbates the inequality in the quality of education between regions (Ministry of Education and Culture, 2021).

Third, the integration of technology into the PAI curriculum is also an important strategy to form a digital learning culture from an early age. The use of ICT is not only used as a tool, but also as an integral part of a contextual learning approach. In this case, teachers can design project-based learning that requires students to use technology to complete assignments, reflect, or create digital portfolios. This will encourage students to become active, critical, and adaptive learners to the development of the times.

Fourth, the implementation of a blended learning approach—which combines face-to-face and online learning—can be a realistic transitional solution, especially in schools that are not yet fully digitally ready. Through blended learning, teachers can conduct offline assessments for psychomotor or attitude aspects, and online assessments for cognitive aspects, so as to maintain the integrity of PAI learning assessments. This model provides flexibility in adapting the evaluation method to the diverse conditions and needs of students (Graham, 2019).

Overall, these strategies will be more effective if they are implemented synergistically and sustainably. Collaboration between educational institutions, local governments, teacher communities, and parents is needed to create a learning ecosystem that supports comprehensive digital assessments. With the right approach, the digitization of assessments in PAI can be a means to improve the quality of religious education that is not only modern, but also rooted in spiritual and moral values.

Conclusion

Digital-based Islamic Religious Education (PAI) learning assessment is an innovation in the world of education that aims to increase the effectiveness, efficiency, and accuracy in evaluating students' learning outcomes. By leveraging various digital platforms such as Google Forms, Quizizz, Moodle, and Miro, teachers can conduct more varied, interactive, and

contextual assessments. The implementation of digital assessments also allows for a more inclusive and personalized learning approach, in line with the principles of Freedom of Learning and the development of educational technology. However, the implementation of digital assessment in PAI is inseparable from a number of challenges. Among them are the limitations of technological infrastructure, low digital literacy of teachers, and resistance to change from both educators and students. This condition requires comprehensive solutions, such as the provision of continuous training for PAI teachers, the improvement of technology facilities in schools, the integration of ICT in the curriculum, and the implementation of a flexible blended learning model. With collaboration between the government, educational institutions, and the community, as well as the commitment of teachers to continue learning and innovation, digital assessments in PAI learning can be a strategic means to form a religious, critical, and technologically literate generation. This transformation is not just a technical change, but part of a great effort to create an Islamic education system that is adaptive to the demands of the times without losing Islamic spiritual values and ethics.

References

- Ariza, N., & Afifah, Q. K. (2024). Penggunaan Teknologi Dalam Pengembangan Asesmen PAI. *Belajea*, 9(1). <https://doi.org/10.29240/belajea.v9i1.8840>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (4th ed.). Thousand Oaks, CA: Sage Publications.
- Aroka, R. (2023). Efektivitas Pendekatan TPACK dalam Pembelajaran PAI untuk Meningkatkan Literasi Digital Siswa di SMAN 9 Padang. *Jurnal Pendidikan Tuntas*, 7(5), 2920–2927. <https://doi.org/10.31004/basicedu.v7i5.4669>
- Darmawan, D. (2014). *Teknologi Pembelajaran*. Bandung: Remaja Rosdakarya.
- Graham, C. R. (2019). *Blended Learning Systems: Definition, Current Trends, and Future Directions*. *Handbook of Blended Learning*.
- Hadi, H., Muhammad, M., & Al Idrus, A. J. (2024). Inovasi Kurikulum PAI di Era Digital. *Jurnal Ilmiah Pendidikan Citra Bakti*, 12(1). <https://doi.org/10.38048/jipcb.v12i1.4933>
- Hidayati, I. N. (2024). Optimalisasi Pembelajaran PAI di Era Society 5.0. *Insaniyyah*, 1(1).
- Huda, M., Kartanegara, M., & Hashim, R. (2022). Professional development strategy for digital-based Islamic education: A case study of PAI teachers. *Jurnal Pendidikan Islam*, 14(1), 88–102.
- Kemendikbud. (2021). *Profil Pendidikan Indonesia Tahun 2020/2021*. Jakarta: Kementerian Pendidikan dan Kebudayaan.
- Kemendikbudristek. (2021). *Peta Jalan Digitalisasi Pendidikan*. Jakarta: Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.
- Kemendikbudristek. (2023). *Panduan Merdeka Belajar*. Jakarta: Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.
- Kementerian Pendidikan dan Kebudayaan. (2020). *Merdeka Belajar: Kebijakan Transformasi Digital Pendidikan*. Jakarta: Kemendikbud.
- Kementerian Pendidikan dan Kebudayaan. (2020). *Merdeka Belajar: Kebijakan Transformasi Digital Pendidikan*. Jakarta: Kemendikbud.
- Krippendorff, K. (2018). *Content Analysis: An Introduction to Its Methodology* (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Manshur, A., & Isroani, S. (2024). Respon Guru terhadap Pembelajaran Berbasis Teknologi. *Jurnal Pendidikan Islam Digital*, 5(2).
- Murdaningtias, S., Fahmi, M. F., & Hidayat, M. T. (2024). Tantangan Guru dalam Pembelajaran Digital. *AJER*, 2(1). <https://doi.org/10.52166/ajer.v2i1.8825>

- Prayetno, I. (2025). Tantangan Pembelajaran PAI Digital. *Jurnal Kajian Islam dan Sosial Keagamaan*, 2(3), 616–622.
- Ramadhani, R., Umam, R., Abdurrahman, A., & Syazali, M. (2022). Gamification-based assessment using Quizizz in learning PAI: An effective strategy to increase student motivation. *Jurnal Pendidikan Agama Islam*, 19(1), 45-55.
- Restalia, W., & Khasanah, N. (2024). Transformasi Pendidikan Agama Islam di Era Digital: Tantangan dan Peluang. *Tadibia Islamika*, 4(2), 85–92. <https://doi.org/10.28918/tadibia.v4i2.8964>
- Santoso, M. M., Reziana, B., Yusuf, M., Irawan, D., & Ashari, H. (2023). Implementasi Penggunaan Teknologi Informasi dan Komunikasi untuk Penilaian Kognitif pada Pembelajaran PAI Di Sekolah Dasar. *Jurnal Basicedu*, 7(5), 2920–2927. <https://doi.org/10.31004/basicedu.v7i5.4669>
- Sofyan, A., & Salito, S. (2024). Pengembangan Penilaian Pembelajaran PAI Berbasis Kecerdasan Buatan. *Al-Qalam*, 16(2), 236-243. <https://doi.org/10.47435/al-qalam.v16i2.3290>
- Sudjana, N. (2023). *Penilaian Hasil Proses Belajar Mengajar*. Bandung: Remaja Rosdakarya.
- Suparman, U. (2021). Pemanfaatan Google Forms dalam Penilaian Pembelajaran Daring PAI di Masa Pandemi. *Jurnal Pendidikan Islam*, 10(2), 122-130.
- Surya, H. (2020). Literasi Digital Guru dalam Pembelajaran Abad 21. *Jurnal Teknologi Pendidikan*, 22(1), 55-64.
- Yuliati, A. S., Ernawati, S., Saputra, H., & Kurniawan, M. A. (2024). Strategi Manajemen Pendidikan Agama Islam di Era Digital: Transformasi Tata Kelola untuk Meningkatkan Efektivitas dan Aksesibilitas. *International Journal of Islamic Educational Research*, 1(4), 27–44. <https://doi.org/10.61132/ijier.v1i4.67>
- Zed, M. (2004). *Metode Penelitian Kepustakaan*. Jakarta: Yayasan Obor Indonesia.