



Innovations in Islamic Religious Education Assessment In The Society 5.0 Era at MAN 3 Padang Panjang

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Abstract

This study aims to explore innovations in Islamic Religious Education (PAI) assessment in the Society 5.0 era, focusing on integrating of technology and Islamic values at MAN 3 Padang Panjang. The research identifies various forms of assessment innovation, analyzes implementation challenges, and formulates relevant optimization strategies. A qualitative approach with a case study design was employed, involving PAI teachers, students, and the school principal as research subjects. Data were collected through in-depth interviews, participatory observation, and document analysis, and were analyzed thematically. The results show that assessment innovations at MAN 3 Padang Panjang include the using of digital platforms such as Google Forms and Quizizz, the applying of artificial intelligence (AI) technology, and the developing of virtual reality (VR)-based assessments. Islamic values are integrated through the application of digital honesty principles, the development of character-based assessments. Key challenges include infrastructure limitations, the readiness of teachers and students, and concerns about the impact of technology on traditional values. Proposed strategies include digital competency enhancement programs for teachers, interdisciplinary collaboration with technology experts, and a phased approach to innovation implementation.

Keywords: PAI Assessment, Educational Innovation, Society 5.0, Educational Technology, Islamic Values

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Introduction

The rapid development of technology has significantly transformed the landscape of human life, including in the field of education. Society 5.0, a concept introduced by the Japanese government, describes a human-centered society supported by advanced technology (Fukuyama, 2018). This concept emphasizes the integration of physical and cyber spaces to create better solutions for social challenges. In the educational context, Society 5.0 brings significant implications for how we teach, learn, and assess student progress. (Nastiti & Abdu, 2020).

Islamic Religious Education (PAI), as an integral component in the systems of predominantly Muslim countries like Indonesia, is not exempt from these changes. PAI plays a crucial role in shaping students' character and moral values based on Islamic teachings (Suyanto, 2019). However, in the Society 5.0 era, PAI faces challenges to remain relevant and effective in achieving its objectives while adopting technological innovations. Assessment, as a crucial part of the learning process, has become the primary focus in educational renewal efforts. Traditional assessment in PAI, often focused on memorization and textual understanding, is considered inadequate for preparing students to face the complexities of the modern world (Lubis, M. A., & Wekke, 2016). Therefore, the urgency of innovation in PAI assessment becomes increasingly pressing.

MAN 3 Padang Panjang, as one of the leading madrasah in West Sumatra, exemplifies how religious education attempts to adapt technological innovations in learning. This madrasah strives to integrate modern technology with Islamic values through various learning and assessment programs. One of the greatest challenges faced by this madrasah is the limitation of technological infrastructure that is not always sufficient to support digital-based assessment. Additionally, teachers' digital competencies vary, with most teachers requiring further training to be able to optimally utilize technology in assessment.

PAI assessment innovation in the Society 5.0 era is not just about adopting new technologies, but also about designing more holistic, authentic, and meaningful assessment methods. According to (Noor, 2021), PAI assessment needs to cover not only cognitive aspects but also affective and psychomotor dimensions, aligned with the comprehensive goals of Islamic education. Technology can facilitate more dynamic and personalized assessment, enabling teachers to track student development in real-time and provide faster and more specific feedback. However, integrating technology into PAI assessment also brings its own challenges. One major challenge is maintaining a balance between technological innovation and the Islamic values that are the core of PAI. According to (Hashim, C. N., & Langgung, 2018), the use of technology in Islamic education must always be evaluated from the perspective of *maqasid al-shari'ah* (purposes of Islamic law) to ensure that innovations do not conflict with Islamic principles.

Another challenge lies in PAI teachers' readiness to adopt and implement new technologies in assessment. Research by (Rahman, A. A., Sahidun, N. A., & Premanan, 2020) shows that many PAI teachers still struggle to integrate technology into their teaching and assessment practices. This indicates the need for continuous professional development programs to improve PAI teachers' digital literacy. Moreover, there are concerns that over-reliance on technology in assessment could reduce the personal and emotional aspects of religious learning. PAI is not just about knowledge, but also about character and spiritual formation. Therefore, PAI assessment innovations must be able to measure not only conceptual understanding but also students' moral and spiritual development (Tamuri, A. H., & Khairuddin, 2017). On the other hand, technology also opens new opportunities in PAI assessment. For instance, virtual reality usage could enable students to "visit" historical Islamic sites and be assessed based on their understanding and reflection. Artificial intelligence (AI) can help in deep analysis of students' essay answers, providing insights into their conceptual understanding of Islamic principles (Ally, M., & Wark, 2019).

At MAN 3 Padang Panjang, digital-based assessment has begun to be implemented through platforms like Google Forms and Quizizz to measure student learning achievements formatively. However, teachers still face technical constraints in managing these assessments, such as limited stable internet access and insufficient supporting devices. To address this, the madrasah has initiated strategic steps like intensive training for teachers and collaboration with educational technology experts to support more effective assessment implementation.

Technology also opens new opportunities in PAI assessment. For example, at MAN 3 Padang Panjang, virtual reality is being explored for simulating worship practices like Hajj pilgrimage, where students can experience near-authentic experiences. Virtual reality is also applied to teach the procedures for *shalat fardhu* (compulsory prayers), including movements and recitations, as well as *shalat jenazah* (funeral prayers), among others. Additionally, artificial intelligence (AI) usage has enabled teachers to analyze student answers more deeply, provide personalized feedback, and identify areas for improvement (Suhartini, I., & Rahman, 2023). This approach demonstrates how innovation can transform assessment methods from conventional approaches to being more relevant to modern students' needs.

In the Society 5.0 context, PAI assessment must also prepare students to face ethical challenges emerging from technological advancements. This involves developing critical and ethical thinking abilities when confronting moral dilemmas in the digital era. According to Bunt Islamic education in the digital era must equip students with the ability to apply Islamic principles in continuously changing technological and societal contexts. MAN 3 Padang Panjang utilizes assessment not only to measure student knowledge but also to shape their

Islamic character through value-based assessments, such as honesty and responsibility (Bunt, 2018), Online collaborative assessments can be designed to evaluate not just final outcomes but also students' collaboration processes and communication ethics (Hamid, S., Waycott, J., Kurnia, S., & Chang, 2020).

Assessment innovations at MAN 3 Padang Panjang also consider inclusivity, striving to accommodate various learning styles and students' special needs (Abubakar, 2022). Digital technologies are used to create fair and meaningful assessment environments. For instance, developing digital portfolio-based assessment rubrics allows students to reflect on the application of Islamic values in daily life (Al-Saggaf, Y., & Islam, 2020). This step not only enhances fairness in assessment but also strengthens students' moral character in the digital era.

This research aims to explore various forms of PAI assessment innovations implemented at MAN 3 Padang Panjang, analyze the challenges faced, and identify relevant optimization strategies. Using a qualitative approach and case study design, this research is expected to provide in-depth insights into how technology and Islamic values can be integrated to create effective, relevant, and meaningful assessment in the Society 5.0 era.

Methodology

This research employs a qualitative approach (Rivauzi, 2023); (Febrian, Y., Utami, A. E., Rijalallah, R., & Arifudin, 2024) with a case study design (Creswell, J. W., & Poth, 2018); (Yin, 2018); (Kusmarni, 2012) to comprehensively understand the phenomenon of PAI assessment innovation at MAN 3 Padang Panjang. This approach was selected because it allows researchers to explore the complexities of technology implementation within the specific context of Islamic religious education at the madrasah. MAN 3 Padang Panjang was chosen as the research location due to its significant potential as a madrasah committed to technology integration in learning, while simultaneously facing unique challenges such as infrastructure limitations and digital competency gaps among educators. The research subjects comprised Islamic Religious Education (PAI) teachers, students, and the madrasah principal, each playing a strategic role in the successful implementation of assessment innovations. PAI teachers were selected because they are at the forefront of assessment implementation, while students represent those directly experiencing the impact of these innovations. The madrasah principal was involved due to their crucial role in directing policy and providing support for digital transformation.

Data collection was conducted through three primary techniques. First, in-depth interviews (Fadli, 2021); (Seidman, 2019) were performed to explore the perspectives of teachers, students, and the madrasah principal regarding the benefits, challenges, and impacts of technology-based assessment. These interviews were designed to capture the personal experiences and critical viewpoints of the respondents. Second, participatory observation (Spradley, 2016) was conducted during learning and assessment activities. Researchers documented how technology was used in PAI assessment, including interactions between teachers and students, and students' responses to innovative assessment methods. Third, document analysis involved a comprehensive review of learning materials, assessment instruments, madrasah policies, and student learning outcome reports. The collected data were thematically analyzed using steps recommended (Braun, V., & Clarke, 2021). The analysis process began with data familiarization through repeated reading of interview transcripts, observation notes, and related documents (Adelliani, N., Sucirahayu, C. A., & Zanjabila, 2023). Subsequently, coding was performed to identify primary patterns and themes, such as innovations in assessment methods, implementation constraints, and solution strategies. The analysis results were interpreted to provide a comprehensive understanding of how PAI assessment innovations were implemented at MAN 3 Padang Panjang. This research aimed not only to map the existing situation but also to provide strategic recommendations that could help the madrasah overcome technology-based assessment implementation challenges. By highlighting the digital transformation narrative at MAN 3

Padang Panjang, this study is expected to inspire other madrasahs to adopt similar approaches in supporting value-based Islamic learning in the Society 5.0 era.

Result and Discussion

A. Forms of PAI Assessment Innovations in the Society 5.0 Era

1. Digital Platform Usage for Assessment

This research found that the use of digital platforms for PAI assessment has begun to be implemented at MAN 3 Padang Panjang. Teachers utilize platforms such as Google Forms and Quizizz to conduct formative assessments that enable assessment efficiency and provide quick feedback to students (Nuryana, 2020). As a madrasah prioritizing value-based Islamic learning, these platforms are also used to integrate Quranic verses, hadiths, and other Islamic materials into interactive quiz formats. This not only enriches assessment content but also helps students understand Islamic contexts more practically.

This system provides real-time data to teachers regarding students' success rates in answering questions or areas that need improvement, thus enabling more personalized and targeted feedback.

2. Artificial Intelligence (AI)-Based Assessment Implementation

Although still in its early stages, MAN 3 Padang Panjang has begun exploring artificial intelligence (AI) usage to support PAI assessment. One implementation is the use of chatbots for formative assessment. These chatbots are programmed to provide questions related to PAI materials and offer automatic feedback based on student responses (Rahman, F., & Aziz, 2022). Additionally, AI systems are used to analyze student answer patterns in online exams, helping teachers identify student difficulties and provide remedial learning recommendations (Sari, N. R., & Priatna, 2023).

MAN 3 Padang Panjang is also considering an adaptive artificial intelligence (AI)-based learning system, where each student receives questions tailored to their level of understanding. This approach enhances learning effectiveness by providing challenges appropriate to individual capabilities while maintaining the integration of Islamic values in assessment.

3. Virtual dan Augmented Reality Based Assessment Development

MAN 3 Padang Panjang has developed virtual reality (VR)-based assessments for Hajj pilgrimage practice materials. Students can perform tawaf and sa'i simulations in a virtual environment, allowing them to understand worship practices more deeply before actual implementation. Moreover, augmented reality (AR) is used for prayer procedure assessments. The AR system provides immediate feedback to students about the accuracy of their movements, effectively supporting understanding and worship practice.

This technology is also leveraged for exploring historical Islamic sites, such as the Grand Mosque (Masjidil Haram). Students are asked to answer reflective questions about the historical and spiritual significance of these locations, which not only supports conceptual learning but also strengthens students' Islamic values.

B. Integration of Islamic Values in Technology Based Assessment

1. Implementing Principles of Honesty and Integrity in Online Assessment

At MAN 3 Padang Panjang, the integration of Islamic values, particularly honesty and integrity, has become a primary focus in developing online assessment. Several strategies have been implemented, including: Using online proctoring systems that monitor student activities during exams (Alimni, A., Suparta, M., & Jaya, 2022). Implementing a digital "honesty pledge" before starting online assessments (Nashir, A., & Hidayat, 2023). Developing large question banks with randomized questions for each student to reduce cheating possibilities (Wahid, A. H., & Karimah, 2022); (Fadlillah, N., & Kusaeri, 2024).

In some cases, integration of opening prayers before online exams is also conducted to remind students of their spiritual responsibilities, ensuring that technology serves not just as a tool, but as a means of supporting Islamic values in assessment.

2. Developing Assessments that Promote Noble Character

PAI teachers at MAN 3 Padang Panjang have also utilized digital portfolio-based assessments (Mustafa, R., & Hanavi, 2022) to evaluate students' reflections on applying Islamic values in daily life. Online collaborative projects, which assess students' abilities to apply Islamic values in society, have also been implemented. These approaches not only support the development of students' noble character but also motivate them to actively practice Islamic values. Guided social media usage represents another form of innovation (Arifin, Z., Mulyono, H., & Sari, 2023). Students are encouraged to create educational dakwah content and spread positive values on social media platforms. This strengthens the integration of technology and Islamic values in assessment.

The use of technology in PAI assessment provides significant opportunities to measure moral and ethical dimensions more comprehensively. For instance, some assessment platforms are now designed to evaluate students' collaboration in group projects based on Islamic values, such as social care, mutual cooperation, and responsibility. These systems allow teachers to provide assessments not only on final outcomes but also on students' processes and attitudes during project implementation. Additionally, video-based reflections, where students record their experiences in applying Islamic values in their surroundings, are becoming part of digital portfolio assessments. This approach not only reinforces students' noble character but also encourages them to more actively practice Islamic values in daily life.

C. Challenges in Implementing PAI Assessment Innovation

1. Limited Infrastructure and Resources

The lack of internet access and digital devices remains a major obstacle at MAN 3 Padang Panjang, affecting the smooth implementation of technology-based assessments. Challenges include unstable internet connections, insufficient technological devices such as computers or tablets, and inadequate learning spaces to support digital assessments. These issues hinder not only the execution of assessments but also the opportunities for students and teachers to optimally utilize technology in the learning process. To address these challenges, MAN 3 Padang Panjang has initiated several strategic steps. One effort is collaborating with external parties, such as local government and technology companies, to obtain better infrastructure support. Additionally, the school maximizes the efficient use of existing resources, for example, by scheduling the shared use of technology devices among all students. The school also encourages students to use personal devices, such as smartphones, to support technology-based assessments while ensuring their use aligns with Islamic values. Overcoming these obstacles is an ongoing challenge to ensure that the transformation toward technology-based assessments at MAN 3 Padang Panjang is effective and inclusive. This effort aligns with the school's vision to become a pioneer in integrating technology and Islamic values into education in the Society 5.0 era.

2. Readiness of Teachers and Students to Embrace Change

The study found that some PAI teachers feel unprepared to implement technology-based assessments. The main factors are a lack of digital competence and resistance to change (Firdaus, M., & Pratiwi, 2023); (Sidqi, N., Ikhwanasyah, M. F., & Erawati, 2023). On the other hand, some students struggle to adapt to new forms of assessment, especially those with limited access to technology at home. The transition to technology-based assessments presents new challenges for PAI teachers, particularly in mastering technology. Many teachers express feeling underprepared due to a lack of relevant and ongoing training. Senior teachers tend to face more difficulty adapting compared to younger teachers, who are more familiar with digital technology. For students, unequal access to technology at home leaves some feeling disconnected from the digital learning

process, creating a significant experiential gap between students with technological facilities and those without. To address this, practical-based training programs for teachers and technology subsidies for students must be implemented promptly to ensure the readiness of all parties in facing these changes

3. Concerns About the Impact of Technology

Some stakeholders, particularly parents and religious leaders, have expressed concerns about the potential over-reliance on technology in PAI assessments. They worry that focusing too much on technology may detract from the spiritual aspects and traditional values in religious education (Mulyani, A., & Azhar, 2022). In implementing technology-based assessment innovations, there is a concern that excessive reliance on technology might eliminate the personal aspects of religious education. Parents and religious leaders often emphasize the importance of human touch in religious education, particularly in instilling spiritual and moral values. An unbalanced use of technology risks shifting students' focus away from the core of religious education, which is character and moral development. Therefore, the integration of technology in PAI assessments must adopt a thoughtful approach that maintains harmony between traditional Islamic values and modern technological advancements. A combination of conventional and digital methods should be implemented to ensure innovation remains relevant without losing the spiritual essence of religious education.

D. Strategies to Address Challenges and Optimize Assessment Innovation

1. Digital Competence Improvement Programs for PAI Teachers

To address teacher readiness challenges, several initiatives have been implemented, including: intensive workshops and training on digital assessment technologies (Diani, P., & Rapono, 2024); (Nurrochman, T., Darsinah, D., & Wafroaturrohman, 2023), mentoring programs where younger, tech-savvy teachers guide senior teachers (Aminah, S., & Rukman, 2022), and collaborations with universities to support continuous professional development in Islamic educational technology (Farhani, A., & Wahyuddin, 2023). In addition to workshops, some schools have begun utilizing online platforms to offer self-paced training courses for PAI teachers. These courses include video lessons, interactive tutorials, and simulations of digital assessment tools. Teachers can participate flexibly, fitting training into their schedules without disrupting teaching duties. Furthermore, professional teacher organizations, such as the Association of Islamic Education Teachers (AGPAI), have played a strategic role in organizing nationwide digital training programs, reaching more teachers in various regions. Through these efforts, PAI teachers gain not only technical skills but also insights into best practices for implementing technology-based assessments.

2. Collaboration with Technology Experts in Assessment Development

This study found that collaboration between PAI teachers and technology experts is crucial in developing effective assessments aligned with Islamic values. Some schools have established interdisciplinary teams comprising PAI teachers, educational technology specialists, and Sharia experts to develop and evaluate assessment innovations (Nurdin, L., & Safitri, 2023).

These interdisciplinary collaborations have resulted in innovations tailored to the needs of Islamic education. For example, some schools have implemented Islamic value-based assessment applications designed with input from technology experts and Sharia scholars. These applications integrate the assessment of Islamic values, such as noble character and proper etiquette, into a user-friendly digital format. Collaboration with educational technology companies has also provided PAI teachers with access to the latest assessment tools and software for free during pilot phases, accelerating technology adoption while ensuring alignment with Islamic principles.

3. Gradual Implementation Approach for Innovation

To overcome resistance and ensure a smooth adaptation process, many schools have adopted a gradual approach to implementing assessment innovations. This includes pilot projects in select classes before full implementation (Rahmat, A., & Fauzi, 2022), a combination of traditional and digital assessment methods during the transition period (Izzah, A., & Mahmud, 2023), and ongoing evaluation and adjustments based on feedback from teachers, students, and parents (Janah, B. U., & Ristianah, 2024). A phased approach has proven effective in addressing resistance to change. For instance, some schools have adopted a hybrid method during the transition, combining traditional assessments, such as written exams, with digital assessments like interactive online quizzes. This strategy allows teachers and students to adapt gradually without feeling overwhelmed. Additionally, schools have begun involving parents in this transition process through workshops introducing digital assessment technologies. This effort aims to foster understanding and support from parents for the implemented innovations. Periodic evaluations involving various stakeholders are conducted to review the effectiveness of each implementation stage and gather feedback. These strategies demonstrate that modernizing PAI assessments can be done inclusively, engaging all stakeholders, while staying rooted in Islamic values. A careful, collaborative, and development-focused approach ensures that technology-based assessments not only enhance efficiency but also enrich the overall religious learning experience.

The success of these strategies relies on the sustained commitment of all parties involved. Investment in teacher competence development, interdisciplinary collaboration, and a well-planned gradual approach have created an ecosystem that supports PAI assessment innovation. More importantly, these strategies show that modernizing PAI assessments can preserve fundamental Islamic educational values, even strengthening their application in modern learning contexts.

E. Stakeholder Perceptions of PAI Assessment Innovation

This study also explored stakeholder perceptions of PAI assessment innovation. In general, students expressed enthusiasm for new assessment formats, particularly those incorporating interactive and gamified elements (Syarifuddin, S., Zulyadaini, Z., & Pertiwi, 2023). Teachers, initially hesitant, began recognizing the benefits of digital assessments, such as improved efficiency and deeper data analysis (Hadi, S., & Putri, 2022). Parents had mixed views, with some supporting innovations as a way to prepare their children for the digital era, while others expressed concerns about the potential erosion of traditional values (Kusuma, A. H., & Rasyid, 2023). School administrators and policymakers generally saw PAI assessment innovations as an inevitable necessity to meet the demands of Society 5.0 but emphasized the importance of balancing technological innovation with the preservation of Islamic values (Anwar, S., & Hidayati, 2023); (Hakim, L., Irsali, A. N. R., & Watsiqoh, 2023).

Stakeholder perceptions were also influenced by their level of understanding and involvement in the innovation process. Some students reported that technology-based assessments provided a more engaging learning experience, especially through interactive visual features unavailable in traditional methods. However, students from economically disadvantaged backgrounds felt marginalized due to limited access to digital devices, highlighting the need for inclusive approaches in implementing assessment innovations. From the teachers' perspective, while many began appreciating the efficiency and ease of data analysis, some remained concerned about additional workloads, such as mastering new tools or preparing digital content. These concerns were most common among senior teachers less familiar with technology, underlining the importance of continuous support through training and mentoring programs. Meanwhile, supportive parents emphasized the significance of digital assessments in preparing their children for a tech-driven job market. Conversely, concerned parents viewed these innovations as a potential threat to Islamic values, which they felt might not be fully represented in technology-based assessments.

This underscores the need for effective communication between schools and parents, including education on how technology can be integrated with Islamic values.

G. Strengths and Weaknesses of PAI Assessment Innovation

The innovation of Islamic Religious Education (PAI) assessment using artificial intelligence (AI)-based technology at MAN 3 Padang Panjang brings several notable strengths and weaknesses. In terms of strengths, AI enables time and process efficiency, such as automatic grading for formative assessments, which saves teachers significant time in evaluation (Nuryana, 2020). Additionally, artificial intelligence (AI) can provide personalized and specific feedback to students, helping them identify weaknesses and areas for improvement (Rahman, F., & Aziz, 2022). This technology also supports in-depth data analysis, where students' answer patterns can be analyzed to identify comprehension trends and offer appropriate learning recommendations (Sari, N. R., & Priatna, 2023). AI further facilitates adaptive assessments, where questions are tailored to students' competency levels, making the assessment process more effective and relevant. Furthermore, artificial intelligence (AI)-powered technology such as virtual reality brings new innovations to the practical learning of worship, including simulations of *manasik haji* and *shalat*, providing students with a more interactive and immersive learning experience (Abdurrahman, A., Priatna, T., & Herlambang, 2022). On the other hand, there are several weaknesses in implementing AI-based technology. One major issue is the reliance on infrastructure, such as technological devices and stable internet access, which remains a challenge in areas with limited facilities (Rosyada, D., & Zulyanty, 2022). Additionally, digital skills among teachers and students vary significantly, often hindering the optimal use of this technology, which necessitates intensive training and continuous mentoring (Firdaus, M., & Pratiwi, 2023). The use of AI also risks reducing the personal touch in religious education, where emotional and spiritual interactions between teachers and students play a crucial role in PAI learning (Mulyani, A., & Azhar, 2022). Another concern relates to ethical and Islamic values, where excessive reliance on technology raises fears of eroding traditional values that are central to religious education (Bunt, 2018). Moreover, the cost of implementing artificial intelligence (AI) technology, including hardware procurement, software development, and maintenance, poses a significant challenge for educational institutions with limited budgets (Rahmat, A., & Fauzi, 2022).

From the explanation above, the use of artificial intelligence (AI) technology in PAI assessment at MAN 3 Padang Panjang holds great potential to enhance the effectiveness and quality of learning. However, technical and ethical challenges must be addressed through strategic approaches, such as improving digital literacy, ensuring adequate infrastructure, and implementing technology in ways that remain aligned with Islamic values. Technology integration must be conducted in balance, not only to support efficient and modern assessment methods but also to preserve the spiritual and characteristic essence of Islamic education.

Conclusion

Islamic Religious Education (PAI) assessment innovation in the Society 5.0 era has demonstrated significant development through the integration of various technologies, including simple digital platforms (Google Forms, Quizizz, Kahoot), artificial intelligence (AI) technologies, virtual reality for practical learning, and digital assessment systems that maintain Islamic values. These innovations offer more dynamic, personalized, and interactive methods of student assessment, thereby enhancing student engagement in PAI learning. Digital platforms, for instance, enable teachers to monitor student progress in real-time, while artificial intelligence (AI) technologies help identify areas where students struggle and provide tailored remedial solutions. Virtual reality also opens new possibilities, such as Hajj pilgrimage simulations, providing students with immersive experiences that enhance their understanding of religious rituals. However, several major challenges still persist in implementing these innovations, including infrastructure and resource limitations, teachers'

and students' readiness to adopt technology, and concerns about the potential loss of traditional values. These constraints can impede the maximum integration of technology in assessment processes and require strategic efforts to overcome them. The successful implementation of PAI assessment innovations heavily depends on balancing technological innovation with the preservation of Islamic values, involving all stakeholders (teachers, students, parents), and implementing gradual and continuous evaluation of these innovations.

For future development, further research is needed on the long-term impacts of these innovations, developing more comprehensive frameworks, and strategies to address digital disparities between regions. This is crucial to ensure that technology-based assessment innovations can be adopted equitably and provide optimal benefits for all students. Fundamentally, PAI assessment innovation is not merely about adopting technology, but about how to leverage it to strengthen understanding and application of Islamic values in the digital era. These findings demonstrate that technology-based assessment innovations at MAN 3 Padang Panjang are capable of improving learning efficiency, although some challenges remain that need to be addressed to ensure optimal implementation.

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