Digital Transformation of Islamic Education: AI, Gamification, and Pedagogical Adaptation for Generation Z

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Islamic education is undergoing a significant transformation due to rapid technological advancements and the learning preferences of Generation Z. Traditional methods such as memorization, halaqah, and talaqqi remain fundamental, yet digitalization is becoming increasingly necessary to maintain engagement and relevance. This study aims to explore the integration of artificial intelligence and gamification into Islamic education, particularly in madrasahs, Islamic boarding schools, and modern Islamic schools in Bogor. Using a mixed methods approach, qualitative data were collected through in-depth interviews and observations, while quantitative data were gathered from surveys involving students, educators, and parents. The findings reveal that while modern Islamic schools have embraced digital learning, madrasahs and Islamic boarding schools face challenges in digital adoption due to resistance from educators, lack of infrastructure, and concerns over maintaining traditional values. Statistical analysis indicates no significant correlation between digital learning preferences and students' understanding of Islamic values, highlighting the need for a structured approach to digital integration. This study contributes to the field by proposing a hybrid learning model that combines traditional pedagogies with AI-driven personalized learning and interactive gamification techniques. While offering a framework for digital transformation in Islamic education, this study acknowledges limitations, including its focus on a single geographic region and the need for further research on the long-term effects of AI in religious education. Moving forward, strategic policies, educator training, and infrastructure development are essential to ensure that digitalization enhances, rather than compromises, the integrity of Islamic education.

Keywords: *Artificial Intelligence, Digital, Gamification, Islamic Education*

Abstrak

Pendidikan Islam sedang mengalami transformasi yang signifikan karena kemajuan teknologi yang pesat dan preferensi pembelajaran Generasi Z. Metode tradisional seperti hafalan, halaqah, dan talaqqi tetap menjadi hal yang fundamental, namun digitalisasi menjadi semakin penting untuk mempertahankan keterlibatan dan relevansi. Penelitian ini bertujuan untuk mengeksplorasi integrasi kecerdasan buatan dan gamifikasi ke dalam pendidikan Islam, khususnya di madrasah, pesantren, dan sekolah Islam modern di Bogor. Dengan menggunakan pendekatan metode campuran, data kualitatif dikumpulkan melalui wawancara mendalam dan observasi, sementara data kuantitatif dikumpulkan dari survei yang melibatkan siswa, pendidik,

dan orang tua. Temuan menunjukkan bahwa meskipun sekolah-sekolah Islam modern telah merangkul pembelajaran digital, madrasah dan pesantren menghadapi tantangan dalam adopsi digital karena adanya penolakan dari para pendidik, kurangnya infrastruktur, dan kekhawatiran untuk mempertahankan nilai-nilai tradisional. Analisis statistik menunjukkan tidak ada korelasi yang signifikan antara preferensi pembelajaran digital dan pemahaman siswa tentang nilai-nilai Islam, yang menyoroti perlunya pendekatan terstruktur untuk integrasi digital. Studi ini berkontribusi pada bidang ini dengan mengusulkan model pembelajaran hibrida yang menggabungkan pedagogi tradisional dengan pembelajaran yang dipersonalisasi berbasis kecerdasan buatan (AI) dan teknik gamifikasi interaktif. Meskipun menawarkan kerangka kerja untuk transformasi digital dalam pendidikan Islam, penelitian ini mengakui adanya keterbatasan, termasuk fokusnya pada satu wilayah geografis dan perlunya penelitian lebih lanjut tentang efek jangka panjang AI dalam pendidikan agama. Ke depannya, kebijakan strategis, pelatihan pendidik, dan pengembangan infrastruktur sangat penting untuk memastikan bahwa digitalisasi meningkatkan, alih-alih mengorbankan, integritas pendidikan Islam.

Kata kunci: Kecerdasan Buatan, Digital, Gamifikasi, Pendidikan Islam

Introduction

Islamic education has played an important role in maintaining the continuity of religious values and shaping the spiritual character of students. Traditional methods such as tahfidz of the Qur'an, halaqah, and talaqqi are still widely applied in various Islamic institutions, including madrassas and Islamic boarding schools (Intiha'ul Habibah, 2021). The effectiveness of this method has been studied in various studies that show that in addition to helping in memorization, this approach also strengthens students' spiritual and cognitive reflection (Ayyad, 2022). In addition, the existence of tahfidz houses and community-based education programs has played a role in strengthening Islamic values through a more flexible and personalized approach (Anonymous, 2023).

However, while these traditional methods remain relevant, the rapid development of digital technology and the changing learning preferences of the younger generation, especially Generation Z, require adaptation in the Islamic education system to remain relevant and effective. In the digital era, Generation Z, known as digital natives, is more likely to access information quickly and utilize technology in the learning process. Studies on digital literacy for Generation Z confirm that digital technology can improve the quality of teaching through technical, cognitive, and social aspects (Dewi et al., 2021). In this context, the application of AI-based technology and cloud computing is becoming increasingly crucial. Research shows that Generation Z is more comfortable with technology-based learning methods, such as mobile apps, interactive videos, and virtual learning environments than conventional methods such as reading textbooks (Taufiq Hail et al., 2024) (Szymkowiak et al., 2021).

In the world of Islamic education, digitalization has also begun to be adopted through hybrid learning that combines a face-to-face model with Learning Management System (LMS)-based e-learning (Alturise, 2020). However, the application of digital technology in Islamic education still faces various obstacles, such as the lack of a systematic framework, resistance

from teaching staff, and challenges in balancing traditional Islamic education with a digital approach (Mulyadi, 2024); Matos et al., 2019).

Despite digitalization efforts, Islamic education still faces some significant challenges. One of the main challenges is the incompatibility of traditional pedagogical models with the learning styles of Generation Z. Generation Z is more interested in interactive and technology-based learning methods compared to traditional memorization methods that are more passive (Hampton & Welsh, 2019). In addition, the lack of a reflection and discussion-based approach in the Islamic education system reduces students' active involvement in understanding Islamic values more deeply (Altinyelken, 2021). Another challenge is the lack of a clear framework in the integration of digital technologies. Although various e-learning platforms have been introduced, their adoption is still sporadic without an integrated system (Mulyadi, 2024). In addition, resistance from educators and limited infrastructure are the main obstacles in the application of technology in Islamic education, hindering a more systematic and effective transition (Alojail & Khan, 2023).

Furthermore, the influence of secular ideology and social media disruption on Islamic values is also a significant challenge. Social media has become a major source of religious information for Generation Z, who often trust the narratives of influencers more than traditional clerics (Zaid et al., 2022). As a result, Generation Z is increasingly exposed to global ideologies that are contrary to Islamic values, which poses challenges in maintaining their religious identity ((Tirocchi, 2023); (Hu et al., 2022).

To address these challenges, several approaches have been proposed. The integration of AI in Adaptive Learning can be used to personalize Islamic learning materials according to the level of understanding and interest of learners (Strielkowski et al., 2024); (Wang et al., 2023). In addition, Gamification and Virtual Reality (VR) in Islamic Education are other solutions that can increase student involvement in understanding Islamic values in a more interactive and engaging way (Acosta et al., 2021) (Hutson et al., 2024). Another approach is Strengthening Digital Literacy and Social Media-Based Islamic Counter-Narrative, where Islamic education must include digital literacy in its curriculum and utilize social media as a tool for da'wah and education (Dewi et al., 2021); (Mohamed et al., 2024). Thus, Islamic education can remain relevant and able to compete with modern technology-based education systems.

This research offers a model of AI-based digital transformation and gamification in Islamic education that has not been widely studied in a systematic approach. In contrast to previous research that focused more on conventional e-learning, this study will develop a hybrid-learning model that integrates AI, VR, and gamification strategies in Islamic education. In addition, this study will analyze the impact of the application of AI in supporting adaptive learning based on Islamic values and design a systematic framework that can be adopted by various Islamic educational institutions to improve the effectiveness of digital learning. With the increase in digitalization and changes in the learning preferences of Generation Z, this research is urgent to be carried out so that Islamic education remains relevant and able to provide an effective and meaningful learning experience. Without proper innovation, Islamic education risks stagnation and loss of appeal for the younger generation of Muslims living in the digital age.

Research Method

This research aims to explore digital transformation in Islamic education, especially in integrating AI, gamification, and pedagogical adaptation for Generation Z in Bogor City. To achieve this goal, this study uses a mixed method, which is a combination of qualitative and quantitative approaches, with data collection techniques that include surveys, in-depth interviews, and case studies. The research approach used is exploratory-sequential, where research begins with qualitative studies to gain an in-depth understanding of the challenges and opportunities in the digital transformation of Islamic education. Next, the research is followed by a quantitative study to measure the extent to which the findings of the qualitative study can be generalized.

This research was conducted in Bogor Regency, which has a variety of Islamic educational institutions, including madrasas, Islamic boarding schools, and modern Islamic schools, with varying levels of technology adoption. The selection of this location is based on several key factors. First, the high population of Generation Z Muslims, which is the main target of the study. Second, the diversity of Islamic education models, both traditional and modern, allows for comparisons in the implementation of digitalization. Third, the availability of digital infrastructure, which supports the analysis of the readiness of educational institutions in applying AI-based technology and gamification as innovations in Islamic learning.

To obtain comprehensive data, this study involved three main informant groups with a predetermined number of samples. The research informants consisted of qualitative and quantitative groups selected based on relevance to the research objectives. In qualitative informants, in-depth interviews and case studies will be conducted on the leaders of Islamic educational institutions consisting of 10 heads of madrasas, Islamic boarding schools, and modern Islamic schools that have policies related to digitalization. This interview aims to understand the strategy for managing digital transformation in Islamic educational institutions. In addition, this research also involved 15 teachers and educators, both those who teach in a digital-based and traditional environment. The focus of the interview will be to discuss the challenges they face in adapting Artificial Intelligence (AI)-based learning methods and gamification. In addition, 5 Islamic educational technology experts, consisting of academics and practitioners who develop technology for Islamic education, will also be interviewed to explore the potential development of AI and Virtual Reality (VR) technology in Islamic education.

Meanwhile, the quantitative informants in this study consisted of 200 Muslim Generation Z students from various madrasas, Islamic boarding schools, and modern Islamic schools in Bogor Regency. The survey of students will measure their preference for digital learning, their level of engagement with AI and gamification, and its impact on understanding Islamic values. In addition, this study also involved 50 parents of students to understand their perceptions of the influence of digitalization in Islamic education, both in terms of benefits and challenges posed. By involving various groups of informants, this research is expected to be able to provide a comprehensive overview of the implementation of digitalization in Islamic education and its impact on Generation Z Muslims.

In this research, data is analyzed using qualitative and quantitative methods to gain a deeper understanding of digital transformation in Islamic education. In the qualitative analysis,

this study uses thematic coding techniques with the help of NVivo software to identify patterns that emerge from in-depth interviews and observations in the field. This approach aims to group data based on key themes related to challenges, opportunities, and strategies for the implementation of digital technology in Islamic education. In addition, a case study analysis was conducted to compare the effectiveness of the application of digital technology in various Islamic educational institutions, such as madrasas, Islamic boarding schools, and modern Islamic schools. This analysis allows the identification of best practices as well as specific constraints in each type of educational institution.

Meanwhile, quantitative analysis was carried out by descriptive and inferential statistical tests using SPSS or SmartPLS software. This statistical test aims to evaluate the relationship between the level of digitalization and the effectiveness of Islamic learning in Generation Z students. With this approach, the research can provide strong data-driven findings to formulate a more effective and relevant digital transformation model for Islamic education in the digital era.

Result And Discussion
Result
Data collection
The following are the results of interviews, observations, and documentation based on qualitative methods in the research "Digital Transformation in Islamic Education: Integration of AI, Gamification, and Pedagogical Adaptation for Generation Z" in Bogor City.

Tabel 1 : Interview Results

Aspects	Key Findings
Digitalization Readiness	Most leaders recognize the importance of digitalization, but not all have a clear roadmap for the implementation of AI or gamification technologies. Islamic boarding schools tend to be more skeptical.
Implementation Constraints	Cost and infrastructure are the main challenges. Some institutions complain about the lack of training for teachers.
Response to Generation Z	Modern Islamic schools are quicker to adopt technology, while Islamic boarding schools are more selective with concerns about reducing direct interaction and spiritual values.
Teachers' Interest in Technology	The majority of teachers feel that further training is needed to understand AI and gamification in learning.
The Effectiveness of Gamification in Learning	Students are more responsive to interactive quizzes or game simulations, but there are concerns that students are more focused on games than understanding Islamic values.

Digitalization Sustainability	Some teachers support the application of technology but emphasize that Islamic values must remain a top priority.
AI in Islamic Education	AI can be used for personalization of learning, such as voice-based Qur'an memorization, but not many developers have focused on Islamic values yet.
Gamification and Virtual Reality (VR)	VR has great potential in the simulation of Islamic history, but it is still underdeveloped. Gamification needs limitations so that it is not just entertainment without Islamic substance.

Tabel 2 : hasil Observasi

Enviroment	Key Findings
Madrasah	Some madrasas already use e-learning, but only digital materials and online exams. Interaction is still dominated by lectures, and there is limited access to technology for students.
Pondok Pesantren	The halaqah and talaqqi methods are still dominant. Some Islamic boarding schools prohibit smartphones, so digitalization is limited to administration. Students often look for religious materials through social media.
Modern Islamic School	The use of AI and gamification is more visible. Students are more active in discussions thanks to technology-based participatory learning methods. Infrastructure is not an obstacle because Wi-Fi and digital devices are available.

Tabel 3 : Hasil Dokumentasi

Category	Category
Digital Curriculum of Madrasah and Modern Islamic School	Digital-based curriculum has begun to be implemented in several madrassas but there is no uniform standard yet. Some modern Islamic schools have AI-based modules for Qur'an learning.
Islamic Education Technology Implementation Report	Most institutions are still in the early stages of digitization, with the main use of administration and online exams. Student

	participation in e-learning increases but is uneven.
Statistical Data on the Use of Technology in Islamic Education Institutions	Islamic boarding schools have the lowest technology adoption rate, while modern Islamic schools are the most progressive. Madrassas are in the middle with the implementation of e-learning but have not yet fully adopted AI or gamification.

Based on the results of interviews, observations, and documentation, it was found that digital transformation in Islamic education in Bogor Regency faces several main challenges. One of the significant obstacles is the resistance of educators, especially in madrassas and Islamic boarding schools, who still rely on traditional learning methods. In addition, inadequate digital infrastructure in some Islamic educational institutions also hinders the application of technology in learning. The imbalance between digitalization and traditional Islamic values is also a major concern, as some institutions are still hesitant to adopt new technologies so as not to shift the essence of adab-based learning and direct interaction between teachers and students.

However, digitalization also presents great opportunities for Islamic education in Bogor City. Generation Z who are already familiar with technology has the potential to be more involved in the learning process if digital methods are applied effectively. The use of artificial intelligence (AI) and gamification can also be innovative strategies, especially in the personalization of Islamic learning, such as in Qur'an memorization and interactive-based simulations of Islamic history. In addition, modern Islamic schools have proven that digitalization can improve the quality of learning and student engagement. This success can serve as a model for madrassas and Islamic boarding schools to develop a digital approach that still maintains Islamic values in their education systems.

Quantitative results

Generation Z Statistics (Students)

1. Digital Learning Preferences, The majority of students have a high preference for digital-based learning, with a range of 50% to 100%.
2. Engagement with AI and Gamification, The level of student engagement with AI-based learning technologies and gamification varies between 30% to 95%.
3. Despite the increase in digitalization, the understanding of Islamic values remains high in the range of 40% to 90%.
4. Satisfaction with Digitalization, The satisfaction scale with the digitization of education ranges from 1 to 5, indicating a diverse distribution.

Distribution of Digital Learning Preference and AI & Gamification Engagement (Generation Z)
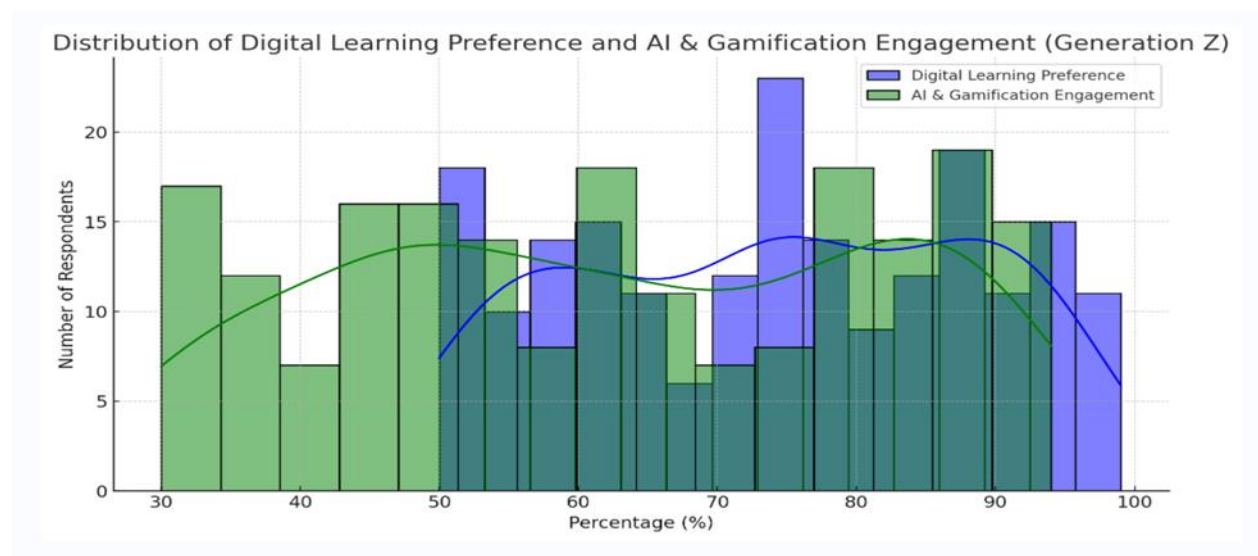
Parent Statistics
1. Support for Digitalization: The average parent supports the digitization of Islamic education with a score of 66.9%, despite significant differences (40% - 95%).
2. Concerns about Negative Influences: The average concern about the negative impact of digitalization was 61.6%, indicating that there are still concerns related to the influence of technology on Islamic values.

Correlation between Digital Learning Preferences and Understanding of Islamic Values
1. Correlation Value: -0.002 (almost zero)
2. P-Value: 0.977 (insignificant)
3. Interpretation: There was no significant relationship between preference for digital learning and understanding of Islamic values. This shows that the use of digital learning does not directly affect the understanding of Islamic values in Generation Z Muslims.

Correlation between Engagement with AI & Gamification and Understanding Islamic Values
1. Correlation Value: 0.048 (weak)
2. P-Value: 0.503 (insignificant)
3. Interpretation: Student involvement in AI and gamification does not have a significant correlation with the understanding of Islamic values. This could mean that while technology attracts students' attention, it does not necessarily contribute to a substantial increase in understanding of Islamic values.

A Comparative Test between Parental Support and Concerns About Digitalization
1. T-Stats: 1,558
2. P-Value: 0.126 (insignificant)
3. Interpretation: There was no significant difference between parents' support for the digitization of Islamic education and their concerns about its negative impact. This suggests

that parents tend to be in a balanced position between accepting Islamic educational technology and remaining concerned about its impact on their children's religious values.

Discussion

Digital transformation in Islamic education still faces various challenges related to the integration of technology in traditional learning systems. The results of this study show that although some institutions have started to adopt technologies such as e-learning and LMS, their implementation is still limited and does not include AI or gamification optimally. This research is in line with previous research that confirmed that Islamic education still faces challenges in the adoption of digitalization due to limited infrastructure, resistance of educators, and concerns about the imbalance between technology and Islamic values (Mulyadi, 2024); Matos et al., 2019).

Furthermore, this study reveals that one of the main factors that hinder the adoption of technology is the resistance of educators, especially in madrassas and Islamic boarding schools. This is in line with previous findings that teaching staff are still more comfortable with lecture and memorization methods compared to interactive technology-based methods. However, on the other hand, the results of the study show that modern Islamic schools have proven the effectiveness of digitalization in increasing student engagement. This is in line with research (Alturise, 2020) showing that the implementation of the Learning Management System (LMS) in Islamic education has helped improve the accessibility of learning Thus, the model that has been successfully applied in modern Islamic schools can be a reference for madrassas and Islamic boarding schools in designing digital transformation strategies that still maintain Islamic values. These findings reinforce a study (Strielkowski et al., 2024) that confirms that AI in education can be used to tailor material according to students' level of understanding, including in Qur'an memorization

Additionally, the study found that Generation Z Muslims show a high preference for digital learning, with varying engagements in AI and gamification. However, the results of statistical tests show that involvement with this technology does not have a significant correlation with understanding Islamic values. These findings indicate that although digitalization can increase students' interaction and involvement in the learning process, its application must still be directed at strengthening the substance of Islamic education so that it does not just become entertainment without deepening their religious understanding.

In the context of digitalization opportunities, the results of this study support the idea that AI and gamification can be effective tools in personalizing Islamic learning. The implementation of technologies such as AI for voice-based Qur'an learning as well as VR-based simulations for Islamic history offer innovative alternatives to Islamic education. However, this study also emphasizes the importance of developing a more systematic framework so that digitalization is not only used for administration and online exams, but also truly supports Islamic pedagogy that is adaptive to the changing times.

In addition, research on gamification in Islamic education is growing, especially in improving student motivation and engagement (Acosta et al., 2021). However, the study found that although gamification has been shown to improve student interaction in learning, there are concerns from educators that this method can distract students from understanding Islamic

values. This is in line with the findings (Hutson et al., 2024) which show that the use of gamification in education must have limitations to remain learning-oriented and not just entertainment. Therefore, this study emphasizes the need to develop gamification strategies that maintain the substance of Islamic education.

In the context of the digitalization of Islamic education, (Mohamed et al., 2024) highlights the importance of digital literacy for educators so that they can be more adaptive to technological changes. This study supports the findings of this study that resistance from educators is one of the main obstacles in the digitization of Islamic education. To address these challenges, this study proposes intensive training for teachers and ustaz in adopting digital technology, as recommended by (Alojail & Khan, 2023).

Thus, this research contributes to answering the existing gap by proposing a more structured AI-based and gamification digital transformation model for Islamic education. In contrast to previous studies that focused more on conventional e-learning, this study offers a hybrid-learning approach that combines advanced technology with traditional Islamic education methods. With this strategy, it is hoped that Islamic education can remain relevant in the digital era without losing the essence of Islamic values.

CONCLUSIONS

This research aims to explore digital transformation in Islamic education, especially in integrating artificial intelligence (AI), gamification, and pedagogical adaptation for Generation Z in Bogor Regency. The results show that although some Islamic educational institutions have started to adopt digital technology, their implementation is still limited and not optimally structured. These findings make it clear that the main challenges in the digitalization of Islamic education include resistance from educators, limited infrastructure, and concerns about the imbalance between technological innovation and traditional Islamic values.

This research reveals that modern Islamic schools have shown success in implementing digital technology to increase student engagement. However, adoption in madrassas and Islamic boarding schools is still hampered by the lack of readiness of educators and limited access to digital infrastructure. These findings are in line with previous research that stated that LMS and AI can improve the accessibility of Islamic learning, but there are still challenges in their widespread implementation. In addition, student engagement in AI and gamification does not have a significant correlation with the understanding of Islamic values, which confirms that technology must be integrated with a pedagogical approach that maintains Islamic values.

The main contribution of this research is the development of AI-based digital transformation models and gamification in Islamic education. This model is expected to be a solution that combines traditional learning methods with a more interactive and personalized digital approach. In contrast to previous research that focused more on conventional e-learning, this study offers a hybrid-learning approach that integrates advanced technology with Islamic values.

However, this study has some limitations. First, this study only focuses on Islamic educational institutions in Bogor City, so the results cannot necessarily be generalized to other areas with different social and technological conditions. Second, this study has not in-depth examined the long-term effectiveness of AI and gamification in shaping the understanding of

Islamic values. Therefore, more research is needed to develop a more holistic implementation strategy and measure its long-term impact on Islamic education.

In the future, digital transformation in Islamic education needs to continue to be developed with a more systematic approach, involving intensive training for educators, and strengthening digital infrastructure so that technology can be used optimally. Thus, Islamic education can remain relevant and competitive in the digital era without losing the essence of its Islamic values. It is not the summary of the research results.

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