

The Dynamics Of Learning Difficulties Among Students At Islamic Boarding Schools In The Digital Age: Between Tradition And Technological Limitations

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Abstract: This study aims to reveal the dynamics of learning difficulties faced by students in traditional Islamic boarding schools in the digital age, which are caught between the preservation of Islamic values and the demands of technological modernization. Using a qualitative approach with a case study strategy, data was collected through in-depth interviews and focus group discussions with 15 senior high school students from various majors and levels of education. The results of thematic analysis show four main findings: technological limitations that impact access to learning resources; conventional teaching methods that are less adaptive to digital learning styles; differences in students' views on the integration of technology in learning; and adaptive strategies used by students through collaboration, informal discussions, and the utilization of limited resources. These findings reinforce the relevance of the Digital Divide and Social Constructivism theories in the context of Islamic education, emphasizing that the digital divide in Islamic boarding schools is not merely a matter of infrastructure, but also a matter of values and learning culture. The novelty of this research lies in its focus on the agency of students as adaptive actors in the transformation of Islamic education, showing that Islamic boarding schools have the potential to develop hybrid learning models that harmonize tradition and technology.

Keywords: Digital Adaptation; Santri Learning Dynamics; Educational Transformation; Islamic Pedagogy; Hybrid Pesantren Education

Abstrak: Penelitian ini bertujuan mengungkap dinamika kesulitan belajar santri di pondok pesantren tradisional pada era digital yang menghadapi ketegangan antara pelestarian nilai-nilai

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keislaman dan tuntutan modernisasi teknologi. Menggunakan pendekatan kualitatif dengan strategi studi kasus, data dikumpulkan melalui wawancara mendalam dan focus group discussion dengan 15 santri Madrasah Aliyah dari berbagai jurusan dan tingkat pendidikan. Hasil analisis tematik menunjukkan empat temuan utama: keterbatasan teknologi yang berdampak pada akses sumber belajar; metode pengajaran konvensional yang kurang adaptif terhadap gaya belajar digital; perbedaan pandangan santri terhadap integrasi teknologi dalam pembelajaran; serta strategi adaptif santri melalui kolaborasi, diskusi informal, dan pemanfaatan sumber daya terbatas. Temuan ini memperkuat relevansi teori Digital Divide dan Konstruktivisme Sosial dalam konteks pendidikan Islam, dengan menegaskan bahwa kesenjangan digital di pesantren bukan sekadar persoalan infrastruktur, melainkan persoalan nilai dan budaya belajar. Kebaruan penelitian ini terletak pada fokus terhadap agency santri sebagai aktor adaptif dalam transformasi pendidikan Islam, menunjukkan bahwa pesantren memiliki potensi untuk mengembangkan model pembelajaran hibrida yang selaras antara tradisi dan teknologi.

Kata Kunci: Adaptasi Digital; Dinamika Pembelajaran Santri; Transformasi Pendidikan; Pedagogi Islam; Pendidikan Pesantren Hibrida

A. Introduction

Islamic education in Indonesia is facing a wave of major changes marked by the penetration of digital technology into all aspects of life, including traditional institutions such as Islamic boarding schools. This digital transformation presents a paradox: on the one hand, technology offers great opportunities to expand access to information and improve learning effectiveness; on the other hand, it challenges the traditional values and conventional teaching patterns that have been at the heart of Islamic boarding schools for centuries. This phenomenon becomes even more complex in the era of Society 5.0, when humans are required to integrate technology with human values and spirituality. (Pamungkas, Nugroho, Hartawan, & Gupta, 2025; Permadi, Sya'ban, & Hilalludin, 2025). A number of Islamic boarding schools have begun experimenting with digital-based programs such as Computer-Based Tests and Multimedia Classes, but not all have been able to adapt optimally due to limitations in infrastructure and teacher

competence (Ramzi, Muhammad, & Asyari, 2023). Amidst the wave of educational globalization, Islamic boarding schools in Indonesia continue to play a strategic role as bastions of morality and intellectualism for the nation (Permadi, Sya'ban, et al., 2025; Suparta, 2024), but the digital divide among these institutions threatens the relevance of their learning systems in the modern era (Nasirudin, 2024).

The main issue that arises in this context is the digital divide experienced by students in traditional Islamic boarding schools. Many institutions still impose restrictions on the use of gadgets and the internet, on the grounds of maintaining students' focus on learning and morality, even though access to technology is now an integral part of the modern learning process. (El zakir & Syam, 2023). These limitations make it difficult for students to understand learning materials that are integrated with digital media, and cause them to lag behind in terms of information literacy (Deni, Maemunah Sa'diyah, & Ouedraogo saidou, 2024). This inequality is not only technological but also epistemological, resulting in a gap in the ability to access, assess, and construct knowledge independently. In the context of Islamic education, the digital divide has a direct impact on the spirit of *tafaqquh fi al-din* or comprehensive deepening of religious knowledge (Ibda et al., 2023).

This gap is also reinforced by the low digital competence of educators in Islamic boarding schools, which causes the use of learning media to still be dominated by traditional lecture methods (Wahono, Budimansyah, Malihah, & Fitriasari, 2023). As a result, Islamic boarding schools face a dilemma: maintaining the purity of tradition or adapting to the inevitable digital reality (Yusutria, Charles, Yuliana, & Yuherman, 2024).

Theoretically, this study is based on the Digital Divide Theory, which explains the inequality of access and ability to utilize technology among certain social groups (Haryanto, 2022). In the context of Islamic boarding schools, this theory is relevant because limited access to digital devices has a direct implication on the process of knowledge construction, as explained in Constructivist Learning Theory, where students build understanding based on active learning experiences (Ritonga, Ananda, Lanin, & Hasan, 2019). In addition, this study is also based on the Theory of Traditional Islamic

Boarding School Education, which emphasizes the values of barakah, uswah hasanah, and tawadhu' in the teaching and learning process (Ghifari, 2021). This conceptual framework allows researchers to analyze how the clash between tradition and modernity occurs at the level of educational praxis in Islamic boarding schools. By combining these three theories, this study attempts to reveal the dynamics of santri learning difficulties as a complex socio-pedagogical phenomenon, not merely as a result of technology restriction policies, but also as a manifestation of the clash between text-based learning and tech-based learning paradigms (Hamid, Haniah, & Nursalam, 2023).

Based on this theoretical framework, this study attempts to answer four main questions: (1) what are the main learning difficulties experienced by students in Islamic boarding schools that limit access to technology, (2) how do these limitations affect understanding and motivation to learn, (3) how students view the relevance of traditional learning methods in the digital era, and (4) what strategies they develop to bridge the gap between tradition and modernity. This study aims to identify the forms of learning difficulties that arise due to technological limitations, analyze their impact on students' understanding and motivation to learn, and explore the views and solutions offered by the students themselves (El zakir & Syam, 2023). Using a qualitative case study approach, this research explores the perceptions and subjective experiences of santri through in-depth interviews and focus group discussions as a form of source triangulation (Intania & Haji Masri, 2023). This approach is expected to reveal the dynamics of santri learning difficulties in a more complete and contextual manner, reflecting the empirical reality of Islamic education that is undergoing transformation.

The scientific contribution of this study lies in its effort to broaden the discourse on the transformation of Islamic education in the digital age with a focus on santri agency, namely how santri interpret, negotiate, and adapt learning amid limited access to technology. Unlike previous studies that highlight institutional transformation and technology policies in Islamic boarding schools (Prabowo, Pratiwi, Pambudi, Coriala, & Aziz, 2022), this study emphasizes the micro experiences of santri as active subjects in the dynamics of the digital divide. This study also makes a conceptual contribution by linking the theories of the digital divide and learning constructivism in the context of

traditional Islamic education, an approach that is still rarely done empirically. Practically, the results of this study are expected to form the basis for the development of pesantren learning policies that are more adaptive to changing times without sacrificing Islamic values (Susanto, Ritonga, & Desrani, 2023). Thus, this study offers a new perspective on how Islamic boarding schools can interpret technology not as a threat to tradition, but as an opportunity to enrich the learning process and strengthen the relevance of Islamic education in the 21st century (Herniawati, Basri, & Suhartini, 2025).

B. Research Methods

This study uses a qualitative approach with a case study strategy that aims to explore in depth the dynamics of learning difficulties experienced by students in traditional Islamic boarding schools in the digital age. This approach was chosen because it is able to capture the social reality and subjective experiences of students in the context of complex Islamic education, where interpretation of meaning is more important than measurement of quantitative variables (Lumban Gaol et al., 2023). The research data consisted of primary data in the form of in-depth interviews with 15 individual students from various majors and levels (11th grade IT, 11th grade Religion, and 12th grade Religion) and one Focus Group Discussion (FGD) group, as well as secondary data in the form of pesantren documents such as rules for the use of electronic devices, curriculum structure, and academic activity reports. Data collection techniques were carried out using semi-structured interviews to maintain focus on the research questions while allowing room for in-depth exploration of participants' experiences (Khalaila, 2014). Participants were selected using purposive sampling, namely boarding school students who had been active for more than one year, understood the boarding school learning system, and had direct experience with restrictions on technology use (Marzulina et al., 2021). Data analysis was conducted through thematic analysis based on Braun and Clarke's stages: reading the data, performing open coding, grouping codes into themes, reviewing and naming themes, then compiling interpretations of the results (Aziz, Mahboob, & Sethi, 2020). To

maintain the validity of the results, source and method triangulation was carried out by comparing data from individual interviews, group discussions, and pesantren documents (Irawan, Priatna, Gustini, & Mulyani, 2023). The analysis was conducted with the help of NVivo 12 Plus software to manage interview transcripts and identify patterns of meaning. In addition, the reliability of the interpretation was strengthened through member checking by confirming the analysis results with the participants, as well as the researchers' reflection on personal bias during the research process (Noermanzah, Wardhana, & Awalludin, 2022). This procedure was chosen because it is in line with the qualitative research paradigm, which places the researcher as the main instrument in understanding the social context and producing data that is rich in meaning and contextually valid.

C. Results and Discussion

Results

This study explores the dynamics of learning difficulties experienced by students in a traditional Islamic boarding school (pesantren) that applies strict limitations on the use of digital technology. Using a qualitative approach with thematic analysis, data were collected through individual and group interviews involving 15 Madrasah Aliyah students (Grade 11 IT, Grade 11 Religion, and Grade 12 Religion). The analysis resulted in four major themes: (1) technological limitations and their impact on the learning process, (2) teacher quality and teaching methods, (3) students' perceptions of the relevance of traditional learning in the digital era, and (4) students' adaptive strategies in responding to technological constraints.

The participants had diverse educational backgrounds, with learning experiences in the pesantren ranging from one to six years. Most students had studied for more than one year, allowing them to internalize pesantren routines and values. While this long-term exposure contributed to discipline and learning habituation, many students expressed boredom and cognitive fatigue due to monotonous instructional patterns and tightly packed schedules. Informants such as Labib, Syafiq, and Uziel emphasized that extended lesson hours, combined with limited variation in instructional delivery, reduced their concentration and hindered optimal information processing. These

individual accounts were reinforced in group discussions, where students highlighted unconducive learning conditions caused by dense schedules, delayed textbook distribution, and incomplete explanations from teachers.

Theme 1: Technological limitations and their impact on the learning process.

All informants confirmed that the policy restricting the use of cell phones and the internet in Islamic boarding schools caused significant difficulties in accessing additional learning resources. Some students, such as Syafiq and Imran, admitted that they had difficulty finding references outside of the available textbooks, especially for subjects that required contextual understanding or updated material. Some students, such as Ben and Nasmi, even considered that the boarding school was not ready to meet the demands of digital learning due to the lack of supporting facilities. This condition also caused disparities in digital literacy among students: some students who were already familiar with technology at their previous schools were able to adapt better, while others experienced confusion when faced with technology-based materials such as books equipped with QR codes.

The data also shows that around 70% of students only use digital devices (laptops/computers) in the context of exams or official assignments, not for independent study. For example, Imran and Ben only use laptops for Arabic exams, while Uziel and Fadil never access computers at all during the learning process. From the discussion groups, it was revealed that technological limitations make it difficult for santri to deepen their understanding of the material and limit their interaction with developments in general knowledge outside the study of classical Islamic texts. These limitations create a sense of academic “lag” compared to non-pesantren students.

Theme 2: Teacher quality and teaching methods.

In addition to technological limitations, another major problem identified was the lack of variety in teaching methods and pedagogical competence among some teachers. Many students, such as Nasmi, Fadil A., and Rafif, assessed that the teachers' teaching styles were still teacher-centered and lacked innovation. Nasmi mentioned that

some teachers “taught in strange ways” and did not adjust their methods to the characteristics of the students, while Fadil A. stated that the methods used were “too old-fashioned” and difficult for the younger generation, who were accustomed to visual and digital learning, to understand. Similar complaints also emerged in group interviews, where participants mentioned frequent empty hours and inadequate explanations from teachers. This condition reduces students' motivation to learn, especially when there are no alternative resources such as learning videos or online modules that can replace the role of teachers.

The following table summarizes the findings related to students' perceptions of teaching quality and the impact of technological limitations on the learning process.

Table 1. Impacts on Students' Learning

Main Aspect	Field Findings	Impact on Students
Technology Access	Restrictions on mobile phone and internet use in the pesantren	Students experience difficulties in accessing additional learning resources and deepening subject understanding
Teaching Methods	Predominantly lecture-based instruction with minimal innovation	Students become easily bored and demonstrate low levels of comprehension
Supporting Facilities	Limited and poorly functioning computer laboratories	Increased reliance on manual learning methods and rote memorization
Learning Motivation	Affected by monotonous learning practices	Some students lose interest in independent learning
Students' Attitudes	Divided perceptions toward technology integration	Differences in perspectives emerge among students across generations

Theme 3: Santri's views on the relevance of traditional learning in the digital age.

From individual and group interviews, a sharp difference in views was identified between santri who are pro-technology integration and those who continue to maintain the traditional system. About two-thirds of respondents stated that technology-based learning is essential so that Islamic boarding schools do not fall behind public educational institutions. For example, Thoriq and Uziel believe that the use of digital

devices will help broaden their horizons and increase the effectiveness of learning without having to abandon the values of Islamic boarding schools. However, a small minority, such as Faral and Gatfan, argue that gadget-based learning can interfere with their focus on learning and potentially reduce their discipline. These differing views reflect an epistemological tension between salafiyah values (traditionalism in scholarship) and the need for modernization in Islamic education.

In group interviews, the majority of participants considered that the policy of restricting technology needed to be revised, arguing that limited internet access could be regulated through time controls and the use of devices under teacher supervision. This opinion shows a reflective awareness among students of the importance of the selective integration of technology in Islamic value-based education.

Theme 4: Adaptive strategies of santri in facing technological limitations.

Despite facing limitations, the santri demonstrated diverse adaptive abilities (Permadi, Hilalludin, et al., 2025). Some santri, such as Fadil, Uziel, and Rafif, used their time in the library to read additional books or use the limited computers available at the pesantren. Meanwhile, santri such as Imran and Bintang utilize social networks to discuss with friends across classes or ask for additional explanations from ustaz outside of class hours as a strategy to deepen their understanding. Santri also develop informal collaborative learning systems such as small halaqah in dormitories that allow for the exchange of information between departments. Interestingly, some students (e.g., Fahmi and Ben) showed a proactive attitude by compiling digital notes using the boarding school's computers, even though their use was very limited.

An overview of the analysis results is presented in the following table to clarify the relationship between the themes, sub-themes, and main findings of this study.

Table 2. Field findings

Main Theme	Subtheme	Key Field Findings
Technological Limitations	Access to digital devices	Most students do not own mobile phones and only use computers during examinations
	Academic impact	Students experience difficulties in accessing

	learning references, which slows down the learning process	
Teaching Quality	Traditional teaching methods	Teachers predominantly rely on lecture-based instruction with limited methodological variation
	Teachers' digital competence	Some teachers are not yet able to integrate digital technology into learning activities
Students' Perspectives	Pro–contra attitudes toward technology	The majority support technology integration, while a minority oppose it due to moral and disciplinary concerns
Adaptive Strategies	Collaborative learning	Students form informal study groups to support one another
	Limited use of facilities	Students utilize the library and pesantren computer facilities as alternative learning resources

These findings generally answer the research question that the learning difficulties experienced by students in traditional Islamic boarding schools are not only caused by technological limitations, but also by the poor quality of teaching and institutional unpreparedness for the digital era. However, the students showed high adaptability and a strong desire to balance Islamic boarding school traditions with the needs of educational modernization. These findings also emphasize the importance of developing policies based on a balance between traditional values and digital competencies, so that Islamic boarding schools remain relevant and competitive educational institutions within the national education ecosystem.

Discussion

The findings of this study reveal an epistemological tension between the idealism of Islamic boarding school education, which is rooted in classical Islamic tradition, and the demands of modernization, which are characterized by the digitization of education. Conceptually, this phenomenon can be explained through the digital divide theoretical framework, which not only highlights limited access to technology

but also differences in the ability to utilize and integrate technology into the learning process (Nafisah, Rohaya, & Effendy, 2024; Permadi & Hilalludin, 2025). In the context of this study, santri are faced with a dilemma between compliance with institutional norms that restrict the use of digital devices and academic needs that require access to digital knowledge sources. This condition shows that Islamic boarding schools still operate within a traditional learning paradigm that emphasizes verbal knowledge transmission and memorization, while the modern world of education demands active participation and independent learning based on digital sources.

From the perspective of social constructivism theory, learning should take place as an active process in which students construct knowledge through social interaction and reflection on experience. Limited access to technology in Islamic boarding schools restricts students' opportunities for independent and collaborative knowledge exploration, thereby hindering the process of meaning construction. These findings are in line with the results of a study (Ramzi et al., 2023) which shows that the weak implementation of ICT-based learning media in Islamic boarding schools results in low adaptability of teachers and students to innovative learning methods. However, this study also shows that these limitations do not necessarily dampen the students' enthusiasm for learning; on the contrary, they develop adaptive strategies based on collaboration and small group discussions (halaqah), which strengthen the collective learning character typical of Islamic boarding schools.

From a policy perspective, the results of this study indicate that Islamic boarding schools have not yet been fully integrated into the national education system based on Merdeka Belajar (Freedom of Learning). In fact, as found in a study (Wasehudin, Rohman, Wajdi, & Marwan, 2023), the implementation of the Merdeka curriculum in Islamic boarding schools can be a catalyst for the emergence of learning innovations that are relevant to the needs of the times without sacrificing Islamic values. In this context, restrictions on the use of technology in traditional Islamic boarding schools can be understood as an effort to maintain the moral integrity of students (Permadi, Hilalludin, et al., 2025), but this policy has the potential to create a learning gap if it is not balanced with controlled, value-based digital learning strategies.

The findings regarding the low variation in teaching methods also reinforce the argument that Islamic boarding schools need to strengthen the pedagogical capacity of teachers. Teachers still play a central role in shaping the learning atmosphere, but most of them have not yet mastered digital literacy competencies. This is in line with the results of a study (Ibda et al., 2023) which shows that the digitization of learning through applications such as Maktabah Syumilah NU 1.0 can improve teachers' ability to integrate Islamic values with religious moderation through technology-based learning. However, the main challenge lies in the gap between the readiness of infrastructure and the readiness of the pesantren's human resources.

From a theoretical perspective, these findings enrich the literature on the integration of tradition and modernity in Islamic education. (Slamet Riyadi, Muhammad Ridha, Mowafg Abraham Masuwd, Naser Ali Abdulghani, & Suhendri, 2024) asserts that Islamic educational institutions that are able to combine traditional pesantren values with modern educational approaches will become ideal models for the development of Islamic education in Indonesia. The results of this study show that although traditional Islamic boarding schools appear resistant to technology, there is an awareness among students to balance the two. This indicates that there is bottom-up awareness emerging from students, not merely encouragement from institutions.

The practical implications of these findings confirm that Islamic boarding schools need to undergo an adaptive and gradual digital policy transformation. This transformation can be achieved through digital literacy training programs for teachers and students, the provision of controlled internet access, and the integration of digital devices into the curriculum with ethical and spiritual supervision. Such strategies have been effectively implemented in several modern Islamic boarding schools, as shown by research (Kawakip, 2020) which found that Islamic boarding schools in East Java were able to balance globalization with Islamic values through the development of a skills-based and digital literacy-based curriculum.

However, the results of this study also show that not all Islamic boarding schools can immediately adopt this model. Internal factors such as limited funds, cultural resistance, and attachment to traditional leadership patterns are significant

obstacles. As noted by (Safiudin, Muhtarom, Qurtubi, & Masfu'ah, 2023), the existence of the Islamic Boarding School Law has created new challenges for traditional institutions to adapt to national education quality standards without losing their identity. Therefore, efforts to modernize Islamic boarding schools must take into account the sociocultural context and spiritual values that form the foundation of these institutions.

On a theoretical level, the results of this study also confirm the theory of institutional adaptation, which explains that traditional educational institutions tend to adapt gradually to external pressures, such as globalization and technological modernization. This adaptation occurs not through drastic structural changes, but through gradual innovations that are in line with established values and belief systems. This phenomenon is evident in how the students in this study formed an informal collaborative learning system and developed independent initiatives to access information sources even without personal digital devices.

Critically, this study has several limitations. First, because it is qualitative and based on a case study of one Islamic boarding school, the findings must be generalized with caution. Second, this study did not conduct longitudinal observations to observe changes in students' attitudes toward technology over time. Third, technical limitations in transcribing interviews may affect the accuracy of data interpretation. For future research, it is recommended that a comparative study be conducted between traditional and modern Islamic boarding schools to identify factors that facilitate or hinder the process of digitizing Islamic education.

Nevertheless, the contribution of this study lies in its ability to reveal the reality of cultural adaptation in Islamic education amid the global trend of digitization. The results of this study reinforce the understanding that Islamic boarding schools, despite being rooted in tradition, have great potential to become social laboratories for the integration of religious values and technological progress. Thus, future Islamic education policies need to be oriented towards empowering Islamic boarding schools as centers of transformative learning, not merely as preservers of tradition, but also as agents of change relevant to the needs of the times.

D. Conclusion

This study confirms that students' learning difficulties in traditional Islamic boarding schools (*pesantren*) in the digital era result from a complex interaction of structural, pedagogical, and cultural factors that shape learning dynamics within Islamic educational environments. Limited access to digital technology, the continued dominance of conventional teaching methods, and the low level of digital literacy among educators directly affect students' learning autonomy and effectiveness. Nevertheless, despite these constraints, the findings reveal strong adaptive potential among students, manifested through collaborative learning strategies, the utilization of limited resources such as libraries, and the formation of informal discussion groups that reflect the *pesantren* values of *ta'awun* (mutual cooperation) and *ijtihad* (intellectual effort).

From a theoretical perspective, these findings extend the application of Digital Divide Theory and Social Constructivism within the context of Islamic education, demonstrating that digital transformation in *pesantren* is not merely a matter of infrastructure but also involves the construction of new learning cultures that integrate spiritual values with twenty-first-century competencies. The scholarly contribution of this study lies in its articulation of students as agents of cultural adaptation amid systemic constraints, as well as in illustrating how Islamic traditional values can be reinterpreted within modern educational contexts without losing their moral substance. Accordingly, this study provides a conceptual foundation for reforming *pesantren* education toward a more hybrid, contextual, and humanistic learning model. Future efforts are recommended to focus on developing value-based digital learning policies, strengthening teachers' pedagogical capacity through digital literacy training, and encouraging longitudinal research to examine the long-term impacts of digitalization on students' character development and learning quality.

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