International Journal on Advanced Science, Education, and Religion (IJoASER)
E-ISSN: 2614-8862 & P-ISSN: 2565-0836
Volume 9, Number 4, December 2026

The Paradox of Digital Transformation of Islamic Religious Education: Between the Demands of Artificial Intelligence Integration and the Limitations of Educational Infrastructure in the 3T Region of Papua

Alim Bakhri[1*], Musfirah Nadjamuddin[1], Zulfiyah Hijaz[1]
[1]IAIN Parepare, Indonesia

Corresponding Author alimbakhri67@gmail.com[1*]

ARTICLE INFO
Article history:
Received
August 20, 2026
Revised
October 21, 2026
Accepted
November 18, 2026

ABSTRACT

Digital transformation in education has driven a paradigm shift in curriculum development, including in Islamic Religious Education (PAI) learning through the utilization of digital technology and Artificial Intelligence (AI). However, the demands for technological integration present unique problems for educational units in Disadvantaged, Frontier, and Outermost (3T) regions, particularly Papua, which still face various challenges related to the availability of infrastructure, internet access, learning tools, and the digital competence of educators. This study aims to analyze the paradox of digital transformation in PAI education by examining the gap between the demands for AI integration and the condition of educational infrastructure, teacher readiness in utilizing digital technology, and strategies for adapting PAI learning in 3T regions. This study uses a qualitative approach with a case study design conducted at MTs DDI Bukit Cenderawasih Nabire, Central Papua. Data collection was conducted through in-depth interviews, direct observation, and documentation involving the principal, PAI teachers, education staff, and students as sources of research information. Data were analyzed using the interactive model of Miles, Huberman, and Saldaña through the stages of data condensation, data presentation, and drawing and verifying conclusions. This research aims to identify the digital divide, factors inhibiting AI integration, and strategies for developing Islamic Religious Education (PAI) learning that align with the characteristics and limitations of educational infrastructure in the 3T (third-to-third) regions. The research is expected to yield recommendations for developing an adaptive, inclusive, and digitally just Islamic Religious Education (PAI) curriculum through contextual use of technology, both online and offline, while simultaneously strengthening Islamic values, ethics, and the religious character of students.

Keywords: *Digital Transformation; Islamic Religious Education; Artificial Intelligence.*

Journal Homepage https://ojs.staialfurqan.ac.id/IJoASER/
This is an open access article under the CC BY SA license
https://creativecommons.org/licenses/by-sa/4.0/

INTRODUCTION

Digital transformation has brought fundamental changes to the delivery of education in various countries, including the development of Islamic Religious Education (PAI) curricula and learning processes. Advances in information technology, digital learning platforms, and Artificial Intelligence (AI) have opened up opportunities

for educational institutions to develop more interactive, flexible, and student-centered learning. The use of technology allows teachers to access various learning resources, develop learning materials, and conduct more varied evaluations. The OECD (2023) explains that a digital education ecosystem requires integration between infrastructure, learning tools, educator competencies, and technology governance. Thus, digital transformation is not simply a change in learning media, but rather a change in the education system that requires comprehensive readiness.

The development of Artificial Intelligence (AI) is increasingly expanding opportunities for innovation in education. Generative AI technology can help teachers compile teaching materials, develop evaluation questions, provide alternative explanations, and adapt learning resources to student characteristics. In the context of Islamic education, the use of AI has the potential to support the development of materials on the Qur'an and Hadith, Islamic Creed, Morals, Jurisprudence, and Islamic Cultural History. However, its use still requires educator supervision due to concerns regarding the accuracy of information, the validity of Islamic sources, data protection, and ethical responsibility. Miao and Holmes (2023) emphasize the importance of a human-centered approach in the use of AI for education and research. Therefore, the integration of AI in Islamic Religious Education (PAI) learning must consider pedagogical aspects, ethics, and the goal of developing students' religious character

From an Islamic educational perspective, digital transformation is inseparable from the primary goal of learning, namely to shape individuals who are faithful, knowledgeable, have noble character, and are responsible. The use of technology should be positioned as a means to strengthen the educational process, not as a replacement for teachers as educators and moral guides. UNESCO (2023), through its Global Education Monitoring Report, emphasized that educational technology must be assessed based on its benefits, suitability to needs, equitable access, and sustainable use. This principle is relevant to Islamic Religious Education curriculum development because learning success cannot be measured solely by students' ability to operate digital devices. Learning must also ensure the internalization of Islamic values, the strengthening of morals, and the development of critical and responsible thinking skills in the face of technological developments.

Despite offering numerous opportunities, digital transformation in education still faces the issue of disparities in access across regions. Differences in internet network availability, electricity supply, digital devices, and community economic capacity mean that each educational institution has varying levels of technological readiness. UNESCO (2023) indicates that disadvantaged groups often face greater barriers to benefiting from educational technology. This situation demonstrates that technology implementation cannot use a uniform approach across all educational units. Schools with adequate infrastructure can develop internet- and AI-based learning more freely, while schools with limited facilities require alternative strategies. This issue is crucial to examine in the context of equitable distribution of educational quality, particularly in underdeveloped, frontier, and outermost (3T) regions.

The Indonesian context demonstrates that digitalization of education requires consideration of the diversity of geographic, social, economic, and infrastructure conditions across regions. Digital transformation policies require schools and Islamic

schools (madrasahs) to increase the use of technology in learning, but implementation is not always balanced with the availability of facilities and the readiness of human resources. The OECD (2023) explains that the success of a digital education ecosystem depends on the relationship between infrastructure, governance, educator competence, and effective technology utilization. Meanwhile, UNESCO (2023) warns that technology investment does not automatically improve learning quality if it is not supported by clear pedagogical needs. Therefore, the development of Islamic Religious Education (PAI) curriculum in Indonesia needs to consider the principle of digital equity so that educational innovation is not only enjoyed by schools with better technological facilities.

This gap is of particular concern when linked to the state of education in the Papua region. Geographical characteristics, settlement distribution, transportation access, electricity availability, and telecommunications network coverage present unique challenges in implementing technology-based learning. In 2025, the Papua Provincial Government will continue to encourage strengthening internet services in the 3T (United, 3T) regions as part of its efforts to equalize telecommunications access, including to support educational services. Furthermore, the regional government is also strengthening connectivity by providing internet access devices in several areas lacking adequate networks (Papua Provincial Government, 2025; ANTARA, 2025). These conditions demonstrate that digital transformation in Papua cannot simply rely on the demands of technology, but must also be accompanied by meeting infrastructure needs and adapting learning strategies to local conditions.

The state of education in Papua also demonstrates the importance of a contextual technological approach that does not rely solely on internet connectivity. Weri et al. (2025), through research on the development of contextual educational technology in the 3T region of Papua, emphasized the importance of a community-based learning model that integrates digital content with offline-capable devices and limited network access. The study demonstrated that a technological approach tailored to local needs can be an alternative to addressing learning barriers in remote areas. These findings provide the perspective that digitalization of education must consider the social and geographical conditions of the community. In Islamic Religious Education (PAI) learning, a similar approach can be developed through offline digital modules, simple learning media, and the selective use of technology according to the availability of school facilities.

In the context of developing Islamic Religious Education, the issue of digital transformation is also related to teacher readiness to integrate technology into the learning process. Teachers are not only required to be able to operate digital devices but also must have the ability to select technology that is appropriate to learning objectives, material characteristics, and student needs. Fadel and Efendy (2026) through a study on the integration of digital technology in learning Akidah Akhlak explained that the use of learning applications, electronic platforms, interactive multimedia, and social media can support the delivery of Islamic values. Meanwhile, Efendy et al. (2023) identified various problems in the transformation of online Islamic learning, particularly limited internet access, data package costs, communication, and system readiness. Both studies show that technological innovation requires pedagogical readiness and adequate infrastructure support

This issue becomes even more compelling when examined at MTs DDI Bukit Cenderawasih Nabire, Central Papua, the educational institution serving as the research location. Madrasas have a responsibility to provide quality Islamic Religious Education (PAI) learning while adapting to developments in educational technology. On the one hand, the development of AI and digital learning presents demands for innovation in material development, media use, and learning evaluation. On the other hand, the madrasa's ability to meet these demands needs to be assessed based on the actual conditions of facilities, network access, device availability, and teachers' digital competencies. Therefore, field research is necessary to obtain a factual picture of madrasa readiness and PAI learning practices. These conditions should not be assumed from the outset but must be verified through interviews, observation, and documentation.

The paradox of digital transformation in this study lies in the discrepancy between educational demands, which increasingly favor the use of advanced technology, and the ability of educational units to provide the necessary supporting conditions. AI integration can benefit Islamic Religious Education (PAI) learning, but its implementation has the potential to be suboptimal if teachers and students lack access to devices, internet connections, and adequate digital competencies. Efendy and Mahrusah's (2026) study on the development of the Eco-Deep Aqidah Learning Model demonstrates a focus on reconstructing Aqidah and Akhlak learning through an in-depth learning approach oriented toward theological values and life practices. This perspective reinforces the importance of learning innovation that remains grounded in the goals of Islamic education. Therefore, digital transformation needs to be directed toward innovation that is realistic, contextual, and tailored to the needs of madrasas.

Based on the description, this research is important to analyze the paradox of digital transformation of Islamic Religious Education between the demands of Artificial Intelligence integration and the limitations of educational infrastructure in the 3T region of Papua, by taking a case study at MTs DDI Bukit Cenderawasih Nabire, Central Papua. This research aims to identify the condition of technological infrastructure, analyze the readiness and digital competence of Islamic Religious Education teachers, uncover factors inhibiting the use of technology and AI, and formulate learning adaptation strategies appropriate to the conditions of the madrasah. The research uses a qualitative approach with a case study design through interviews, observations, and documentation. The novelty of the research is directed at developing a perspective on adaptive Islamic Religious Education curriculum transformation based on digital justice that integrates the use of AI, online and offline learning, and strengthening Islamic values. The results of the research are expected to contribute to the development of an Islamic Religious Education curriculum that is inclusive, contextual, and responsive to educational needs in the 3T region.

METHOD

A. Types and Approaches to Research

This research uses a qualitative approach with a case study design. This approach was chosen to deeply understand the paradox of digital transformation in Islamic Religious Education (PAI), particularly the demands of Artificial Intelligence (AI) integration and the condition of educational infrastructure in the

3T (third-most remote) region. The research focuses on the real-life context of MTs DDI Bukit Cenderawasih Nabire, Central Papua. Case studies allow researchers to examine phenomena contextually through various data sources (Mtisi, 2022).

B. Location and Focus of Research

The research was conducted at MTs DDI Bukit Cenderawasih Nabire, Central Papua. The focus of the study included the condition of digital infrastructure, the digital competence of Islamic Religious Education (PAI) teachers, the application of technology in learning, readiness for AI integration, and strategies for developing an adaptive Islamic Religious Education (PAI) curriculum to address limited educational facilities.

C. Research Informants

Informants were selected using purposive sampling, based on their involvement and knowledge of the research focus. Informants included madrasah principals, Islamic Religious Education teachers, vice principals for curriculum, administrative staff or operators, and students. The number of informants was adjusted to meet data needs until sufficient information was obtained.

D. Data Collection Techniques

Data is collected through the following three techniques:

1. Interviews, to obtain information about teachers' experiences, readiness, and obstacles in using digital technology and AI.
2. Observation, to observe the condition of infrastructure and the implementation of Islamic Education learning.
3. Documentation, to collect curriculum documents, learning tools, facility data, and other supporting documents.

The use of several techniques helps researchers obtain an overview of phenomena from various data sources (Mtisi, 2022).

E. Data Analysis Techniques

Data analysis was conducted systematically through data management, coding, grouping information, and drawing themes. The researchers employed the interactive analysis model of Miles, Huberman, and Saldaña, which encompasses data condensation, data presentation, and drawing and verifying conclusions. The analysis process was repeated from data collection until findings aligned with the research focus were obtained. A systematic qualitative analysis approach helps maintain traceability during the data interpretation process (Bingham, 2023).

F. Data Validity Test

Data validity was checked through source and technique triangulation. Source triangulation was conducted by comparing information from the

madrasah principal, teachers, education staff, and students. Technique triangulation was conducted by comparing the results of interviews, observations, and documentation. This step helped increase the credibility and transparency of the research findings (2024).

G. Research Ethics

The research was conducted with permission from the madrasah. The researcher explained the research objectives to the informants, obtained consent before the interviews, and maintained the confidentiality of their identities and the information provided. All data will be used for academic purposes.

RESULTS AND DISCUSSION

RESULTS

This research was conducted at MTs DDI Bukit Cenderawasih Nabire, Central Papua. Data were obtained through interviews with three informants: Dwi Lestari, S.Pd., the principal, Alief Reynika Rahman, S.Ag., and Nayara, S.Pd., teachers. The research focused on the condition of digital infrastructure, teachers' digital competencies, technology implementation in Islamic Religious Education (PAI) learning, readiness for Artificial Intelligence (AI) integration, and adaptive Islamic Religious Education (PAI) curriculum development strategies.

1. Condition of Madrasah Digital Infrastructure

Interviews revealed that MTs DDI Bukit Cenderawasih Nabire has adequate facilities to support digital learning. The school has its own electricity source and technological equipment, including laptops and projectors. These facilities are available to support the activities of the principal, teachers, and operators.

The principal of the school, Dwi Lestari, S.Pd., explained that: "The school already has its own electricity source. Facilities such as laptops and projectors are also available to support school activities, from the principal to teachers and operators."

This statement demonstrates that the availability of digital infrastructure has become one of the strengths of madrasas in supporting learning transformation. This situation provides teachers with the opportunity to utilize technological tools to develop Islamic Religious Education (PAI) learning processes.

2. Digital Competence of Islamic Education Teachers

Interviews with Sukma Wulandari, S.Pd., and Lesthari Koemala Dewie, S.Pd., revealed that teachers are already proficient in using digital technology to support learning activities.

One teacher explained: "We can already use digital technology to support learning. However, each teacher's abilities vary. Some are already fluent, while others are still learning at their own pace."

These findings indicate that teachers' digital competencies have developed but still require improvement. Strengthening teachers' skills is necessary so that technology utilization extends beyond basic use to support the development of more effective learning materials and strategies.

3. Implementation of Digital Technology in Islamic Education Learning

Interview results indicate that digital technology has been used as a supplementary reference source in Islamic Religious Education (PAI) teaching. Teachers utilize digital resources to find information and enrich learning materials. This use of technology is integrated with textbooks and Student Worksheets (LKS).

One teacher stated, "We use digital technology to find learning resources. We also continue to use textbooks and worksheets as teaching materials. So, digital resources complement our learning materials."

These findings demonstrate that the use of digital technology does not replace conventional learning resources. Instead, technology serves as a supporting tool, helping teachers access broader resources. This combination provides an alternative learning resource for delivering Islamic Religious Education (PAI) material to students.

4. Artificial Intelligence Integration Readiness

Interview results indicate that teachers are generally familiar with and use AI to support learning activities. AI use is primarily directed at finding references and supporting material development. There were relatively few significant obstacles to AI use. However, each teacher's level of mastery varies depending on their individual abilities.

One teacher explained that: "Teachers are generally already using AI to support learning. There aren't many obstacles to its use, but each teacher's skills vary. Some are already proficient, while others are still using it according to their individual abilities."

These findings indicate that AI acceptance in madrasahs has grown. However, differences in technological proficiency are a concern in teacher competency development. In addition to AI operational skills, Islamic Religious Education teachers also need to ensure the accuracy of the information they produce, particularly regarding the Quran, Hadith, Islamic jurisprudence, and Islamic history.

5. Adaptive Islamic Education Curriculum Development Strategy

Interview results indicate that Islamic Religious Education (PAI) learning is developed through a combination of digital technology, AI, textbooks, worksheets, and hands-on practice. This strategy aims to ensure that students not only understand the material theoretically but also apply their religious knowledge in worship activities.

One teacher explained that: "PAI learning doesn't just involve AI, textbooks, and worksheets, but also through hands-on practice. For example, practicing ablution, performing the funeral prayer, performing the Hajj and Umrah rituals, and other religious practices."

This statement demonstrates that hands-on practice remains a crucial part of Islamic Religious Education (PAI) learning. Digital technology and AI are used as supporting media, while religious practices provide a real-life learning experience. Thus, learning combines knowledge acquisition, technology utilization, and religious skills.

B. Discussion

1. Digital Infrastructure as a Supporter of Islamic Education Learning Transformation

The research results show that MTs DDI Bukit Cenderawasih Nabire has digital facilities that support learning. The availability of its own electricity source, laptops, and projectors are crucial for implementing digital transformation. These findings illustrate that the condition of madrasas in the 3T (third-most remote) regions is not always synonymous with limited infrastructure. In the case of this madrasa, the challenges of developing digital learning are more related to optimizing facilities and improving user capabilities. Therefore, digital transformation needs to consider the actual conditions of each educational institution.

2. Teacher Competence in Adopting AI Technology

Differences in teachers' abilities in using technology indicate that digital readiness is determined not only by the availability of facilities but also by individual competencies. This finding can be analyzed using UTAUT theory, particularly the aspects of performance expectancy, effort expectancy, and supporting conditions. Teachers utilize AI because it can help them obtain learning resources, while differences in skills indicate the need for continuous competency improvement. This is in line with Taheri et al. (2025), who explained that AI adoption by educators is influenced by AI literacy, individual beliefs, self-efficacy, and institutional support. Therefore, teacher competency development is crucial for successful AI integration.

3. Integration of Digital Technology in Islamic Education Learning Resources

The use of AI and digital resources, along with textbooks and worksheets, demonstrates a combination of learning resources in Islamic Religious Education (PAI) teaching. Teachers not only rely on printed materials but also utilize technology to expand their resources. This approach allows teachers to develop more varied materials. However, information obtained through AI still needs to be verified for accuracy, especially material related to Islamic teachings. Thus, the use of technology can enrich learning without compromising the accuracy of religious sources.

4. Worship Practices as Strengthening of Islamic Religious Education Learning

The hands-on learning strategy demonstrates that madrasas maintain a balance between religious knowledge and skills. Materials covering ablution, funeral prayers, and Hajj and Umrah rituals require practical experience so students not only understand the concepts but also are able to perform their religious duties. In this context, AI and digital media facilitate information delivery, while hands-on practice strengthens students' skills. This approach demonstrates that digital transformation can coexist with conventional learning while remaining relevant in religious education.

5. Development of an Islamic Education Curriculum that is Adaptive to Digital Transformation

Based on the overall findings, the development of Islamic Religious Education (PAI) learning at MTs DDI Bukit Cenderawasih Nabire demonstrates a pattern of integration of digital technology, AI, printed teaching materials, and religious practices. This pattern demonstrates that technology does not have to replace all existing learning methods. Instead, technology can be used as a supporting tool to strengthen the learning process. Curriculum development needs to consider teacher capabilities, the accuracy of digital information, and PAI learning objectives. Thus, AI integration can support effective learning while maintaining character building and worship skills.

6. The Paradox of Digital Transformation of Islamic Religious Education in the 3T Region of Papua

Research findings show that the challenges of Islamic Religious Education (PAI) digital transformation at MTs DDI Bukit Cenderawasih Nabire are not entirely due to limited infrastructure. The school has supporting facilities, and teachers have utilized digital technology and AI. However, teachers' ability to operate these technologies is not yet fully equitable. This situation indicates a shift in challenges from providing facilities to equitable competency and optimizing technology utilization. Therefore, strengthening Islamic Religious Education (PAI) digital transformation needs to be directed at improving AI literacy, mentoring teachers, and using technology critically and responsibly.

7. Research Limitations and Contributions

This study involved three informants: the madrasah principal and two teachers. Therefore, the results specifically describe the digital transformation practices of Islamic Religious Education (PAI) learning at MTs DDI Bukit Cenderawasih Nabire. The findings are not intended to represent all madrasahs in the 3T (Underdeveloped) region of Papua.

The contribution of this research lies in the finding that the madrasahs in which the study took place already have digital facilities and have begun integrating AI into Islamic Religious Education (PAI) learning. The challenges identified are more related to differences in teachers' digital competencies and the need to optimize technology utilization. These findings can be used as considerations for developing Islamic Religious Education (PAI) learning that is adaptive to the conditions of madrasahs in the 3T (third-third) regions.

CONCLUSION

The digital transformation of Islamic Religious Education (IRE) in the 3T (frontier, outermost, and underdeveloped) regions of Papua reveals a fundamental paradox between the growing demands for artificial intelligence (AI) integration in education and the limited availability of supporting educational infrastructure. On the one hand, AI offers significant opportunities to improve the quality, accessibility, and effectiveness of Islamic Religious Education through personalized learning, interactive teaching materials, digital learning platforms, and more adaptive assessment systems. On the other hand, the implementation of these technologies remains constrained by inadequate internet connectivity, limited access to digital devices, insufficient electricity infrastructure, and the low level of digital literacy among educators and students. These conditions demonstrate that technological advancement does not automatically translate into equitable educational transformation, particularly in geographically isolated and resource-constrained communities.

This study highlights that the challenges of digital transformation in Islamic Religious Education extend beyond technological limitations. They also involve

pedagogical, institutional, socioeconomic, and cultural dimensions. Islamic Religious Education teachers in Papua's 3T regions face the dual responsibility of maintaining the relevance of religious learning while adapting to rapidly evolving technological developments. Consequently, AI integration should not be understood merely as the adoption of advanced digital tools but as a comprehensive educational transformation that considers local realities, teachers' professional capacities, students' learning needs, and the values of Islamic education. In this context, AI must function as a supporting instrument that strengthens the roles of teachers, rather than replacing their pedagogical authority, moral guidance, and spiritual responsibilities.

Furthermore, the findings emphasize the importance of developing an inclusive, contextual, and infrastructure-sensitive model of digital transformation. The integration of AI in Islamic Religious Education should be implemented gradually through strategies that prioritize basic educational infrastructure, equitable internet access, affordable digital devices, teacher training, and the development of offline-compatible learning resources. Collaboration among government institutions, Islamic educational organizations, universities, local communities, and technology providers is also essential to ensure that digital innovation responds to the actual needs of educational institutions in Papua's 3T regions. Such collaboration should prioritize sustainable solutions rather than short-term technological interventions.

Ultimately, the paradox of digital transformation in Islamic Religious Education reflects a broader challenge of educational justice in the digital era. The success of AI integration should not be measured solely by the sophistication of technological applications but by its ability to reduce educational disparities, expand learning opportunities, and strengthen the quality of religious education for marginalized communities. Therefore, the transformation of Islamic Religious Education in Papua's 3T regions requires a balanced approach that places technological innovation alongside infrastructural readiness, pedagogical development, and Islamic educational values. Digital transformation must not create a new form of educational inequality in which technologically advanced communities progress while geographically marginalized communities are left behind. Instead, AI should become an instrument of educational empowerment that promotes equitable access, inclusive learning, and the sustainability of Islamic Religious Education across Indonesia, including its most remote regions.

REFERENCES

ANTARA. (2025, April 17). The provincial government continues to strengthen internet services in the 3T regions of Papua. ANTARA News.

Bingham, A. J. (2023). From data management to actionable findings: A five-phase process of qualitative data analysis. International Journal of Qualitative Methods, 22.https://doi.org/10.1177/16094069231183620

Efendy, R., & Mahrusah, L. (2026). Eco-Deep Aqidah Learning Model (EDALM): Reconstruction of Aqidah and Akhlak learning based on ecotheology and

deep learning. Referensi Islamika: Journal of Islamic Studies, 4(1), 122–134.https://doi.org/10.66053/ri.v4i1.780

Efendy, R., Hamdanah, & Mahrusah, L. (2025). Institutionalizing Bugis Makassar local wisdom in Islamic Religious Education curriculum at Indonesian Islamic higher education. Scaffolding: Journal of Islamic Education and Multiculturalism, 7(1), 925–942.https://doi.org/10.37680/scaffolding.v7i1.9063

Efendy, R., Pratiwi, D., Rama, B., Saprin, & Herdah. (2023). Digital transformation and policy anomalies in Islamic online education: A policy study on the use of online applications at the Islamic education department of IAIN Parepare. In Proceedings of the 1st International Conference on Science and Islamic Studies (ICOSIS 2023) (pp. 946–958).https://proceedings.uin-alauddin.ac.id/index.php/icosis/icosis2023/paper/view/1064

Fadel, M., & Efendy, R. (2026). Integration of digital technology in Akidah Akhlak learning in the modern era. El-Fakhru, 5(2), 63–74.https://doi.org/10.46870/elfakhru.v5i2.2227

Miao, F., & Holmes, W. (2023). Guidance for generative AI in education and research. UNESCO.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, 108(6), 1017–1054.

Mtisi, S. (2022). The qualitative case study research strategy as applied on a rural enterprise development doctoral research project. International Journal of Qualitative Methods, 21.https://doi.org/10.1177/16094069221145849

OECD. (2023). OECD digital education outlook 2023: Towards an effective digital education ecosystem. OECD Publishing.https://doi.org/10.1787/c74f03de-en

Papua Provincial Government. (2025). Papua supports accelerated digitalization, focusing on areas with minimal operator services.

Sarbaini, W., Sulasmi, E., & Amini, A. (2026). School digitalization policy and learning inequality in Indonesia's 3T regions: A systematic literature review. AL-ISHLAH: Jurnal Pendidikan, 18(2), 2899 2913.https://doi.org/10.35445/alishlah.v18i2.9111

Schlunegger, M. C., Zumstein-Shaha, M., & Palm, R. (2024). Methodologic and data-analysis triangulation in case studies: A scoping review. Western Journal of Nursing Research, 46(8), 611–622.https://doi.org/10.1177/01939459241263011

Siemens, G. (2005). Connectivism: A learning theory for the digital age. International Journal of Instructional Technology and Distance Learning, 2(1).

Taheri, R., Nazemi, N., Pennington, S.E., Clark, J.A., & Dadgostari, F. (2025). Factors influencing educators' AI adoption: A grounded meta-analysis review.

Computers and Education: Artificial Intelligence, 9, 100464.https://doi.org/10.1016/j.caeai.2025.100464

UNESCO. (2023). Global education monitoring report 2023: Technology in education: A tool on whose terms?https://doi.org/10.54676/UZQV8501

Weri, F., Nino, RDF, Mangando, W., & Amri, H. (2025). Contextual educational technology for 3T regions: A community-based blended learning implementation model in a remote Papuan region. International Journal of Inspire Educational Technology, 4(2), 215–232.https://doi.org/10.55849/jiiet.v4i2.1030