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The Pedagogical Impact of Technological Innovations on Qur'anic Learning: A Systematic Literature Review

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Abstract. This study aims to provide an overview of research trends, forms of implementation, and the impact of using technology in learning al-Qur'an. This research used the Systematic Literature Review method according to PRISMA guidelines. Watase Uake and Publish or Perish tools were used to search for articles with relevant keywords, resulting in 139 articles. After the identification, screening, and eligibility assessment process, 25 articles indexed in Q1, Q2, Q3, Q4, Sinta 1, and Sinta 2 were selected to be thematically mapped and analyzed. The results showed that 1) the main trends of the research include the development and use of innovative technologies in adaptive and interactive learning of al-Qur'an; 2) The use of technology is carried out by integrating various applications, platforms, and advanced systems in various aspects of Qur'anic learning; 3) the impact of using technology is shown by the inclusiveness of learning and the improvement of learning aspects comprehensively, while still involving the role of teachers to create meaningful learning. This research contributes to providing insights into the potential of technology to improve the effectiveness and quality of Quranic learning in various educational contexts.

Keywords: Mobile Learning App, Online Quran Learning, Technology for Quran learning

INTRODUCTION

Technology has become a transformative force that fundamentally reshapes the landscape of education, changing how knowledge is accessed, delivered, and experienced by learners worldwide. Its application has been shown to enhance accessibility, interactivity, skills, and student motivation, making learning more dynamic and inclusive (Fitria et al., 2023; Lin et al., 2017; Sutiyo et al., 2024). Various countries illustrate this transformation in different ways. In Japan, the concept of Digital Society 5.0 is integrated with STEAM education to prepare students for future challenges (Yamada, 2021). In the United States and the Czech Republic, international collaborative Digital Storytelling courses encourage metacognitive reflection and active student participation (Mackey & Aird, 2021). Meanwhile, in China, the emerging use of the Metaverse in education reflects new possibilities for expanding learning approaches (Yue, 2022).

In religious education, particularly in Qur'anic learning, technology has also shown significant potential to improve access and quality of Islamic education (Anam & Rusydiyah, 2021; Rashid et al., 2015). Whether in the form of e-learning (Ibrahim, 2020), m-learning (Isa et al., 2024) or online learning (Nigar et al., 2023a) Technology has opened up new opportunities for teaching and learning the Quran. Technology not only facilitates learning to read the Qur'an (Brata et al., 2022; Yahya et al., 2021) but also deepens understanding of the content and interpretation of the Qur'an (Alqahtani & Fayyoumi, 2015).

Various technology models have been integrated into the Qur'anic learning curriculum. Mujib and Marhamah (2020) Examined a model of learning the Qur'an at SMA Muhammadiyah 16 with e-learning-based blended learning to increase the engagement and motivation of Indonesian students. Research by Awang et al. (2022) Showed that the use of multimedia and mobile applications has made it easier for students in Malaysia to learn Tajweed and tarannum more interactively and interestingly. The results of Alsharbi et al.'s research (2021), which developed a simulator based on reinforcement learning to improve the teaching experience in Al-Quran and Islamic education for non-native Arabic-speaking children in Australia, showed that this technology can assist teachers in evaluating each child's progress, providing accurate feedback.

However, research that specifically examines the use of technology in learning the Qur'an still needs to be more robust when compared to science and social learning.

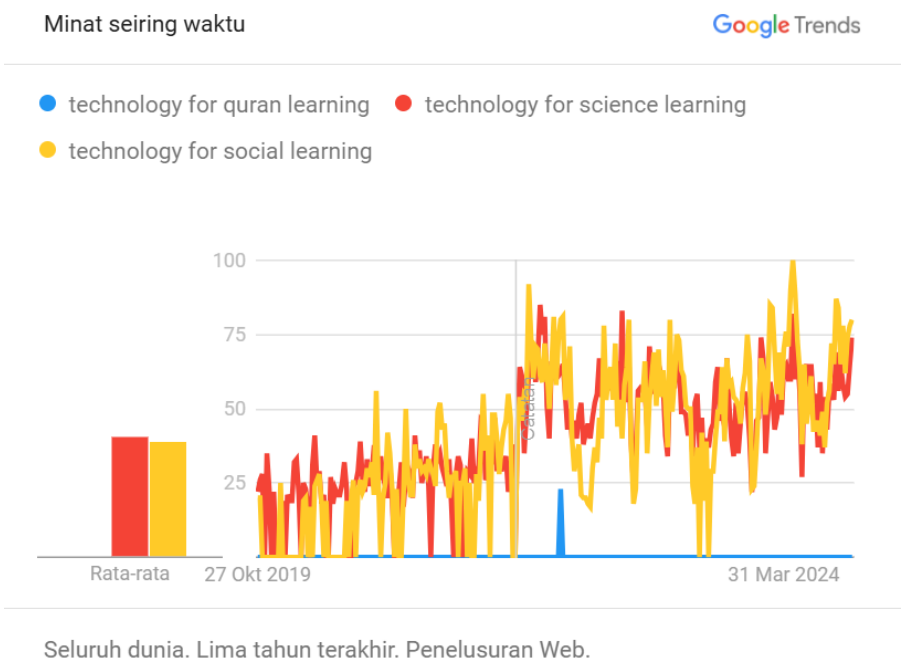

Figure 1. Google Trends Graph of Research Interest in Technology in Learning (accessed on 29/09/2024)

The five-year trends extracted from Google Trends in Figure 1 show a stable interest in using technology in Quran learning (blue line), contrasting with dynamic and fluctuating patterns in technology for science and social science learning. The stability in the Quranic context may suggest that technological adaptation has not kept pace with the pace of innovation in digital education in general (Granić, 2022; Sarker et al., 2019) Therefore, researching technology in Qur'anic learning is crucial because it will provide new insights into various adaptive and interactive approaches to learning the Qur'an through technology. Research related to this topic also needs to be carried out using the Systematic Literature Review method to understand the use of technology

in learning the Qur'an comprehensively, given that most previous research focuses on field research and case studies that are limited in scope and depth.

This study aims to answer three research questions: First, what is the research trend on utilizing innovative technology in learning the Qur'an? Second, how is technology implemented in learning the Qur'an? Third, what is the impact of using technology in learning the Qur'an? This research is expected to enrich the literature on the utilization of technology in Qur'anic learning and provide helpful guidance for educational practitioners to optimize Qur'anic teaching methods using more effective digital tools in the future.

METHOD

This study uses the Systematic Literature Review method with a descriptive qualitative approach. This method will explore research on the use of technology in Qur'anic learning with systematic procedures. The research process consisted of three stages: identification, screening and eligibility assessment, and data inclusion and extraction (Hijriyah et al., 2024). Data was collected using the Web of Science and Publish or Perish tools and following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Watase Uake is a web-based search utility designed to access Scopus-indexed articles efficiently using ScimagoJR journal rankings (Q1–Q4) (Wahyudi, 2020). Publish or Perish, on the other hand, is a bibliometric analysis software developed by Anne-Wil Harzing that retrieves and analyzes academic citations from various databases, including Scopus and Google Scholar (Bensman, 2011).

For both tools, search strings were constructed based on the keywords in Table 1 and combined using Boolean operators such as AND and OR to refine the results. For instance, in Watase Uake, the queries included combinations like "Quran Learning" OR "Quran Teaching", "Quran e-learning" OR "Quranic Education" OR "Quran m-learning". Meanwhile, in Publish or Perish (PoP), search strings were developed with additional terms to capture variations, such as "Quran" AND ("e-learning" OR "digital" OR "online"), "Quran m-learning" OR "Quran Mobile Learning". These operators ensured both broader coverage and targeted retrieval of literature relevant to Qur'anic learning and technology.

Table 1. Article search keywords with Watase Uake and Publish or Perish tools

No.	Keyword	Quantity		
		Watase Uake	PoP Scopus	PoP Google Scholar
1	Quran Learning	37	35	-
2	Quran Teaching	20	27	-
3	Quranic Education	13	40	-
4	Quran e-Learning	6	45	9
5	Quran m-Learning	3	9	8
6	Quran Learning Online	22	48	6
	Total (319)	92	204	23

Table 1 shows that the keywords used focus on technology in learning the Quran. Three hundred nineteen articles were found by searching the Scopus Database, Google Scholar, and the Watase Uake tool. The same articles (duplicates) were removed, and the inclusion and exclusion criteria for the articles are as in Table 2. Regarding duplicates, Watase Uake automatically identified and removed duplicate records within its system, thereby reducing redundancy at the point of retrieval. In contrast, the results exported from PoP were processed manually using Microsoft Excel, where duplicates were identified by comparing article titles, author names, and publication years. This twofold strategy—automatic deduplication in Watase Uake and manual cross-checking in Excel for PoP results—enhanced the accuracy and reliability of the dataset used in this study.

Table 2. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Journal Article, Proceedings of a Conference	Book Chapter Article, Review Article
Articles published between 2014 and 2024	Articles published before 2014
Article indexed Q1-Q4, Sinta 1, or 2	Article not indexed Q1-Q4, Sinta 1, 2
Articles relating to the use of technology in Quran learning	Articles relating to Quran learning but not using technology

The second stage involved screening and assessing the eligibility of articles. Of the initial 319 articles, 161 were eliminated as they needed to fulfill the inclusion criteria. A total of 158 articles were screened based on the relevance of the title and abstract to the keywords and inclusion-exclusion criteria, resulting in 57 articles that were further checked for eligibility using Mendeley to ensure full-text access. Twenty-five articles were deemed eligible and relevant to answer the research questions. The third stage involved data inclusion and extraction. These 25 articles were extracted and analyzed thematically based on the research questions, with aspects categorized under the themes: research trends, implementation forms, and impact of using technology in Qur'anic learning. The process from identification to data inclusion and extraction is described in the flowchart in Figure 2.

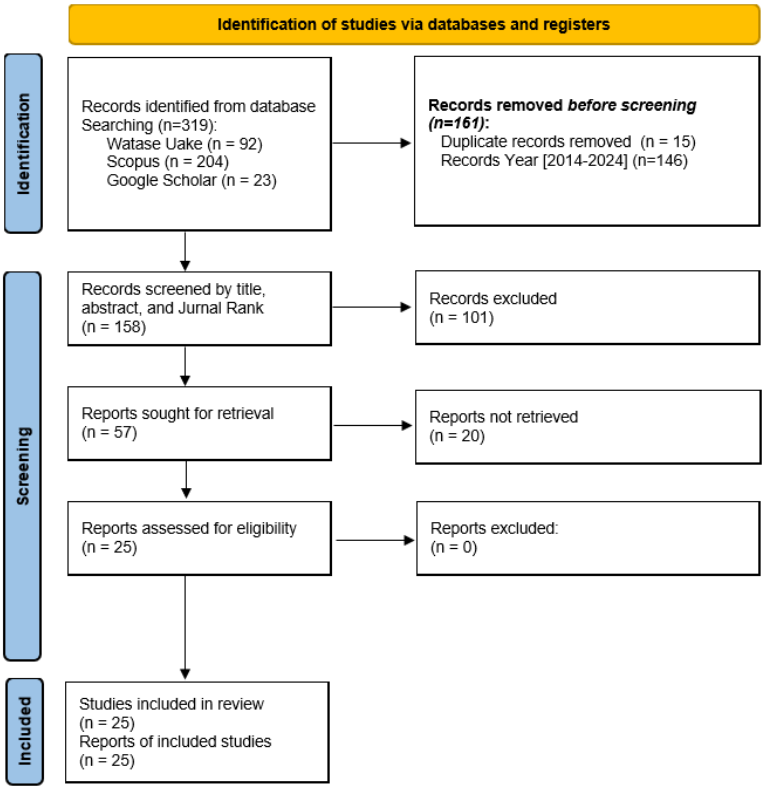

Figure 2. PRISMA Flow Diagram

After selecting the 25 articles, the completeness of the data needs to be verified again using the Mendeley application and saved in RIS format. The articles were then imported into VoSviewers software version 1.6.17 to map the theme network of articles on technology in Quranic learning that met the inclusion-exclusion criteria from 2014 to 2024.

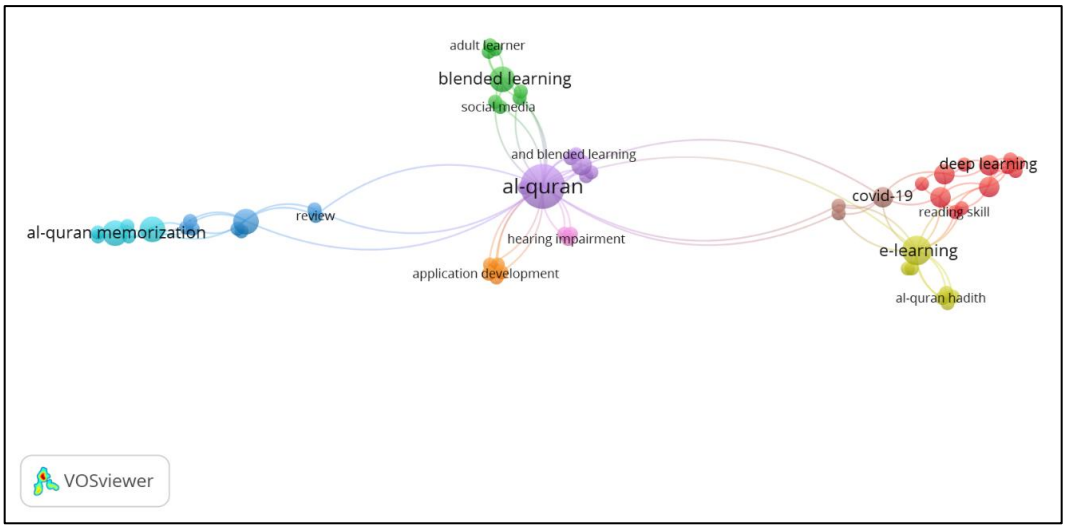

Figure 3. Initial Network Visualisation VoSviewers

Figure 3 above is the theme network of the inclusion articles, showing that the cluster related to "blended learning" refers to research that integrates traditional and digital learning methods, often involving "adult learners" and the use of "social media". The rise of "COVID-19" has triggered an increase in research in "e-learning," with "deep learning" emerging as a potential tool for enriching Quran reading skills. Meanwhile, "hearing impairment" and "application development" appear intertwined, indicating research on developing applications to assist learners with hearing impairment. This overview informs us of a significant link between Qur'anic learning and technology adapted to enrich the learning experience through various applications that support independent and interactive learning.

FINDINGS

The articles included in the inclusion stage were then mapped based on their relevance to the research objectives. Of the 25 articles, the authors were from Indonesia with 14 articles, followed by Malaysia with 6 articles, Australia and Saudi Arabia with 2 articles each, and Pakistan with 1 article. Research related to the use of technology in learning al-Qur'an in the last 10 years can be classified as follows:

Figure 4. Article Distribution Data Based on Year of Publication

The graph in Figure 4 illustrates significant fluctuations in the distribution of articles that met the inclusion criteria from 2014 to 2024. In 2014, articles still needed to meet the criteria, and only one was found each year from 2015 to 2018. The number of articles increased in 2019 to 4, but then decreased to 2 in 2020. The upward trend occurred again in 2021 with 6 articles, followed by a decrease to 3 articles in 2022. The year 2023 again recorded an increase with 6 articles, while in 2024, only 1 article has been found. On average, the number of eligible articles published per

year during the period 2014–2024 was 2.5 articles, with a median of 2 articles per year. The two peak years, 2021 and 2023, each recorded six publications, representing the highest levels of research productivity in this field. These peaks are likely linked to the global acceleration of online learning during and after the COVID-19 pandemic, which stimulated scholarly attention to Qur'anic learning technologies (Mujib & Marhamah, 2020a; Nigar et al., 2023b). This pattern not only reflects temporary shifts caused by the pandemic but also signals a sustained increase in the recognition of technology's role in Qur'anic learning.

The graph shows that, although there are year-to-year variations, there is a general trend of an increasing number of articles over time, which may reflect an increasing interest in and recognition of the importance of technology in Qur'anic learning. The 25 articles cover several main topics, as illustrated in the following graph:

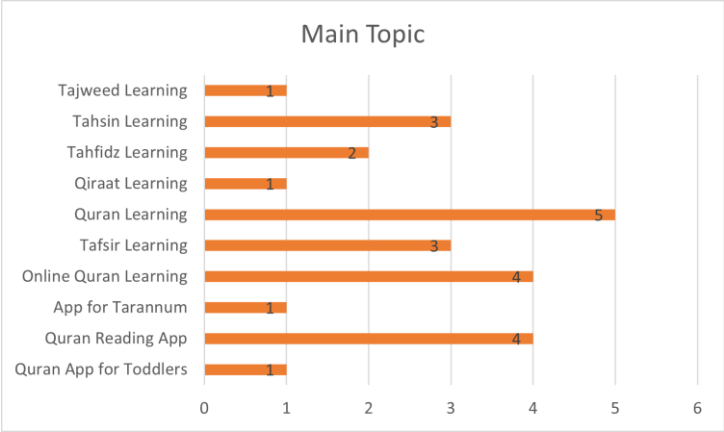

Figure 5. Article Distribution Data Based on Main Topic

The main topic distribution graph of the inclusion stage articles shows the variation in the use of technology for Qur'anic learning. With a dominance on the topic of Quran Learning, five articles include articles that examine innovations in learning the Qur'an through Blended Cooperative e-learning (Mujib & Marhamah, 2020; Zumaro, 2023), learning the Qur'an through the TikTok Platform (Ghozali et al., 2022a), and reinforcement learning technology (B. Alsharbi et al., 2021; B. et al., et al., 2021). The topics of Online Quran Learning and Quran Reading App include four articles each, related to the use of online platforms and mobile applications to facilitate the learning process (Aripudin, 2023; Faidah et al., 2023; Nigar et al., 2023a; Yahya et al., 2021).

While the topic of applications for learning to read the Quran is found in research on the QUR'ANI application for students with hearing impairments (Hanafi et al., 2019), mobile Quran applications (Isa et al., 2024), mobile learning for learning Iqro' (Brata et al., 2022), and the development of Quran applications with voice recognition algorithms and techniques (Al-Fadhli et al., 2023). The topic of Tafsir learning refers to research on the mobile application "Say Quran." (Alqahtani & Fayyoumi, 2015), Digital Quran Thematic V.3.2 computer program (Affandi et al., 2021), and M-Learning Tafsir Science Laboratory (Puspitasari et al., 2020).

The topic of Tahsin learning is found in three articles that discuss the use of social media and video conferencing for Tahsin learning innovation (Romadhon et al., 2019; Shabrina et al., 2021; Tiarawati et al., 2023). At the same time, the topic of Tahfidz al-Quran learning refers to research on the use of various applications, such as E-Hafiz, Mobile Quranic Memorization System, Quran Companion Application, and CourseLab to increase interest, frequency, and speed of memorizing the Qur'an (Aziz et al., 2019a; Purbohadi et al., 2019). As for the topics of Quranic Applications for Toddlers (Zainuldin et al., 2017a), Tajweed Learning (Yasin et al., 2018), Qiraat (Zaki et al., 2021), and applications for learning Tarannum are each only discussed in one article (Awang et al., 2022).

DISCUSSION

Research Trends in the Utilization of Innovative Technology in Quran Learning

From these articles, some significant research trends reflect innovations and new approaches in technology integration for Quran learning, as shown in the following diagram:

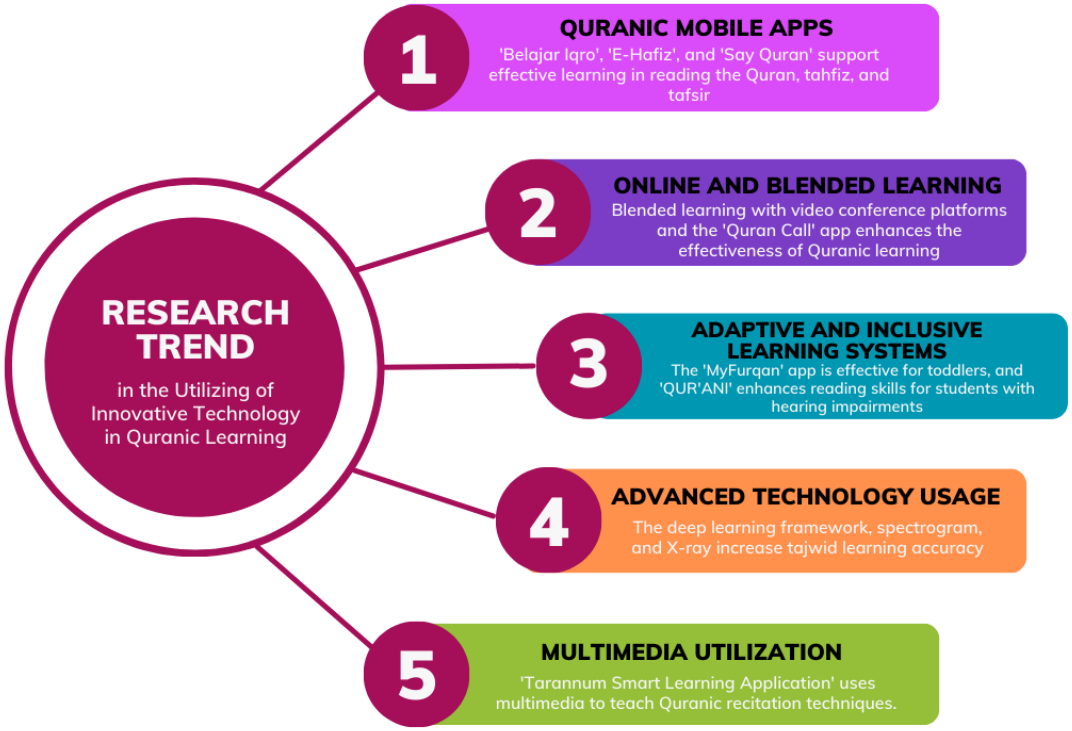

Figure 6. Research Trends in the Utilization of Technology in Qur'anic Learning

These trends are derived directly from the mapping of findings in Figures 4 and 5. For example, the dominance of articles on Qur'anic learning applications in Figure 5 is reflected in the first trend, Qur'anic Mobile Apps. The sharp increase in publications in 2021 and 2023 in Figure 4 corresponds to the growth of Online and Blended Learning approaches, which were strongly driven by the COVID-19 pandemic. Likewise, the presence of studies on inclusive Qur'anic apps for toddlers (Zainuldin et al., 2017a) and students with disabilities (Hanafi et al., 2019) Underpins the third trend, Adaptive and Inclusive Learning Systems. This explicit connection shows that the identified trends are firmly grounded in the systematic mapping of the reviewed studies.

Firstly, there is a strong focus on utilizing mobile applications designed to learn to recite the Qur'an, memorize the Qur'an, and tafsir. Brata et al. (2022) explored an alternative approach to assessing the pronunciation of Makhraj through the "Belajar Iqro" app that utilizes acoustic features such as pitch, volume, and rhythm. Their findings showed that this app was effective in learning Hijaiyah. In the context of Qur'anic memorization, Aziz et al. (2019) illustrate that applications such as E-Hafiz, RFID technology, and gamification present alternatives that facilitate more efficient and enjoyable Qur'anic memorization schedule management than conventional methods. Alqahtani and Fayyoumi's (2015) research developed a Say Quran mobile application designed to facilitate self-learning of the Quran through voice recognition technology that allows users to learn anytime and anywhere. However, the challenge for this trend is ensuring long-term engagement of learners and preventing over-reliance on technology without adequate teacher supervision.

Secondly, the COVID-19 pandemic prompted a surge in online learning and blended learning methods (Mujib & Marhamah, 2020; Romadhon et al., 2019; Tiarawati et al., 2023; Zumaro, 2023), with the utilization of video conferencing platforms such as Zoom, Google Meet, Quran Call, and social media such as Telegram, WhatsApp, and TikTok, demonstrating that online Qur'ānic learning can be equivalent to face-to-face learning in terms of effectiveness. Research conducted by Aripudin, (2023) Highlights the significant transition to online Qur'anic learning during the COVID-19 pandemic through the Quran Call App. This online Qur'anic learning platform features the best Qur'anic teachers in Indonesia, equipped with learning materials that can be accessed anytime after logging into the application. In a different context, Mujib dan Marhamah (2020) Explored using blended cooperative e-learning methods in Qur'anic learning in schools. The results showed that integrating online and face-to-face learning can improve the overall effectiveness of Qur'anic learning. Looking forward, blended learning may remain a dominant model even post-pandemic, though challenges remain in digital access, learning equity, and the readiness of teachers to integrate technology sustainably.

Third, adaptive and inclusive Quran learning systems are developed for non-Arabic speakers, toddlers, and people with disabilities. Alsharbi et al., (2021) and Mubin and Novoa (2021) Successfully developed a reinforcement learning system for non-Arabic children, which improves learning outcomes through personalized feedback. Zainuldin et al., (2017) Proved the effectiveness of MyFurqan software in improving the recognition of hijaiyah letters and motivation to learn the Quran in toddlers. In addition, Hanafi et al. (2019) Research showed that the QUR'ANI application can improve students with hearing loss's ability to read the Qur'an. This trend highlights the importance of accessibility, though scaling such systems requires significant resources, localized adaptation, and teacher support to ensure inclusivity.

Fourth, advanced technologies such as deep learning, speech recognition, and reinforcement learning have been applied to improve the accuracy and effectiveness of Qur'an learning. Nigar et al., (2023) Developed a deep learning-based framework that uses LSTM-RNN and MFCC speech extraction features to improve the accuracy of online Qur'an learning, achieving an accuracy rate of up to 97.7% and the ability to detect Tajweed errors precisely. Meanwhile, Yasin et al., (2018) Explored the use of technologies such as spectrograms and X-rays in teaching Tajweed, enabling in-depth analysis of vowel pronunciation and the position of the organs of articulation (*makhraj huruf*) and developing a better understanding of Tajweed rules. Nevertheless, the implementation of such cutting-edge technologies faces challenges related to cost, infrastructure, and teacher training, which may limit their adoption in less developed regions.

Fifth, multimedia in Quran learning shows the importance of visual and audio elements in enhancing the learning process. Research by Awang et al., (2022) Produced the Tarannum Smart Learning Application, which uses multimedia technology to teach tarannum, a vocal technique for reciting the Qur'an. The application, which offers seven types of tarannum through an easy-to-use interface and video content from leading reciters, demonstrated its effectiveness in enriching tarannum learning. Future research could explore how multimedia can be combined with gamification and virtual reality to enrich Qur'anic learning experiences further.

Overall, research trends in using technology for Qur'anic learning show innovative and adaptive measures influencing how the Qur'an is learned and taught. From the development of mobile applications, online learning, and blended learning to the use of advanced technology and multimedia, this research highlights that technology can deepen understanding, increase accessibility, and enhance learner and teacher engagement in Islamic education. At the same time, these opportunities must be balanced with awareness of possible negative impacts, including the digital divide, data privacy issues, and the risk of reduced human interaction in learning. Thus, technology should be seen as a complement to, not a replacement for, teachers, who continue to play a central role in transmitting values, ethics, and spiritual guidance.

Implementation of Technology Utilisation in Various Aspects of Qur'anic Learning

The implementation of technology in Qur'anic learning can be directly linked to the research trends outlined in Figure 6. For example, the finding in Figure 5 that mobile applications dominate the main topics (Qur'an Reading App, Online Qur'an Learning, and Tahfidz Learning) underpins much of the implementation described below. Similarly, the increase in publications during 2021 and 2023 (Figure 4) highlights how the COVID-19 pandemic accelerated the adoption of online and blended learning approaches.

Regarding reading the Qur'an, Brata (2022) developed the application 'Belajar Iqro', which utilizes m-learning technology to evaluate the pronunciation of Hijaiyah. Users read and pronounce a series of Hijaiyah Letters, which are then recorded by the application. The results of the application assessment are compared with the manual assessment by Ustadz, showing the effectiveness and accuracy of the application in strengthening reading skills. This example shows how Trend 1 (Qur'anic Mobile Apps) translates research innovation into practical learning tools. However, their effectiveness remains contingent upon accessibility and sustained learner engagement.

In learning to read the Qur'an online, the QuranCall platform provides learning through weekly video calls with the best Qur'an teachers from Indonesia. QuranCall also provides learning materials, including the Qur'an and its translation in PDF format, which can be accessed at any time after logging into the app (Aripudin, 2023). Online Qur'anic learning is also conducted with a Blended Learning approach through social media such as WhatsApp, Telegram, and TikTok to create a collaborative, interactive, and practical learning atmosphere (Ghozali et al., 2022a; Mujib & Marhamah, 2020a; Romadhon et al., 2019)This reflects Trend 2 (Online and Blended Learning), which shows clear growth post-2020. Sustaining this approach will require addressing issues such as student digital fatigue, teacher readiness, and infrastructure limitations.

Using technology to read the Quran also shows aspects of adaptivity and inclusiveness. Hanafi et al., (2019) Developed the QUR'ANI application for deaf students. The app is taught by the method of demonstration by the teacher, hands-on practice by the student, and instant feedback to correct mistakes. QUR'ANI provides balanced visual and audio information, improving literacy and Qur'an reading skills for students with hearing disabilities. On the other hand, Zainuldin et al., (2017) Tested the effectiveness of MyFurqan, a Qur'an learning software developed for toddlers. These examples connect directly to Trend 3 (Adaptive and Inclusive Learning Systems), showing how inclusivity in technology-supported Qur'anic learning is becoming a research and practice priority. Nevertheless, scaling such inclusive systems to larger populations requires careful design, funding, and teacher training.

Technology also plays an essential role in memorizing the Qur'an. As described by Aziz et al., (2019) The E-Hafiz app uses Tajweed rules and RFID technology to facilitate identification and monitoring of memorization progress. The system simplifies communication and memorization schedule management and includes gamification elements, making the memorization process more engaging and interactive. The technology allows users of different ability levels to improve memorization independently, while teachers can track and monitor memorization activities more efficiently, improving learning effectiveness. This reflects how Qur'anic Mobile Apps not only support reading but also tahfidz. The challenge, however, lies in ensuring that gamification enhances, rather than distracts from, the spiritual dimension of Qur'anic memorization.

In the field of tafsir, mobile applications also bring essential innovations. Alqahtani and Fayyoumi (2015) developed the 'Say Quran' application, which uses speech recognition technology to recognize and interpret Qur'anic verses orally. The user speaks Qur'anic verses into the device's microphone, which is then processed by the speech recognition engine (ASR) into text. The analyzed results are used to search for verses in the Qur'an that are similar to the spoken words. Information about the verse, including the Surah name and verse number, is displayed to the user, who can also select the desired interpretation language and context. This innovation illustrates the

potential of advanced technology supporting Qur'anic interpretation, though it raises concerns about accuracy and the theological sensitivity of automated tafsir tools.

The use of advanced technology in Tajweed learning has changed the way the complex rules of Tajweed are taught and understood. Technologies such as spectrograms and X-ray displays are used for in-depth analysis of formant values and positions of the organs of articulation during pronunciation, helping to understand Tajweed rules more accurately (Yasin et al., 2018). Mobile applications such as Multimedia Application (TaLA) and E-Qur'an provide flexible and interactive learning platforms where learners can actively participate and receive immediate feedback. These applications support interactive exercises and facilitate understanding of Tajweed concepts through visual and auditory materials that clarify pronunciation and rules (Nigar et al., 2023). Looking ahead, integrating such technologies widely will depend on balancing affordability, accessibility, and teacher capacity to adopt these tools.

Advances in learning technology show the importance of integrating traditional methods and digital innovations to create a more holistic and practical learning experience. Blended learning models (Ghozali et al., 2022; Mujib & Marhamah, 2020; Romadhon et al., 2019; Zumaro, 2023), which combine online and face-to-face elements, as well as the use of social media and mobile applications (Alqahtani & Fayyoumi, 2015; Aziz et al., 2019; Brata et al., 2022; Puspitasari et al., 2020), show that digital tools can support and strengthen existing teaching methods. Applications such as QUR'ANI (Hanafi et al., 2019) and MyFurqan (Zainuldin et al., 2017) Demonstrate that technology can be customized to support specific needs and emphasize the importance of user-centered design in educational technology. These developments confirm that technological advances in Qur'anic education are not just a trend but an essential part of the evolution of education that prepares learners to interact with an increasingly digital world. Qur'anic education through technology has become imperative to adapt to the needs of future generations, ensuring traditional values can be maintained and extended in a modern context. However, challenges such as unequal access to digital infrastructure, data privacy issues, and the risk of overreliance on technology need to be carefully addressed so that these innovations truly complement, rather than replace, the essential role of teachers in transmitting values and ethics.

The Impact Of Technology Utilization On Qur'anic Learning

Applying m-learning technology in Qur'anic learning offers significant advances in teaching and evaluation methods. Apps such as "Belajar Iqro" not only introduce a new way of assessing the pronunciation of Hijaiyah Letters but also offer convenience and flexibility in learning. The technology allows learners to receive accurate, immediate feedback to correct mistakes in real-time (Brata et al., 2022). Meanwhile, m-learning applications such as those reviewed by Isa et al., (2024) and those described by Aziz et al., (2019) Increase student engagement through multimedia and gamification, transforming learning to memorize the Qur'an into a more interactive and fun activity. The impact can be seen in an increase in motivation and student retention of material. In tafsir learning with the "Say Quran" mobile application (Alqahtani & Fayyoumi, 2015) Students responded positively and improved their learning experience and learning outcomes.

Online and blended learning advances have opened new opportunities for more inclusive and accessible Qur'anic education. Platforms such as QuranCall, described by Aripudin (2023) and the use of TikTok in the dissemination of Qur'anic teachings (Ghozali et al., 2022) Demonstrate that technology can extend the reach of Qur'anic da'wah and education. These platforms facilitate access to high-quality resources and direct interaction with teachers without geographical restrictions. Blended learning, practiced by Mujib and Marhamah, (2020), and Tiarawati et al.,(2023) Using online platforms can increase students' learning motivation, engagement in the learning process, and active and collaborative involvement, thus developing communication, teamwork, and problem-solving skills. This approach also helps students understand and apply the Quran daily, deepening their understanding of its teachings.

The development of apps designed for specific groups, such as QUR'ANI for students with hearing impairments (Hanafi et al., 2019) and MyFurqan for toddlers (Zainuldin et al., 2017)It highlights that technology can be customized to meet the needs of diverse learners. Both apps reinforce basic Qur'an reading and memorization skills and increase engagement and motivation through innovative approaches. Using visuals, audio, and high interactivity helps introduce religious concepts early and provides learning support for learners with special needs.

Advanced technologies such as spectrograms, X-ray displays, and speech recognition (Yasin et al., 2018), and the use of deep learning frameworks (Nigar et al., 2023) It has revolutionized the way Tajweed is taught and learned. Research shows that these technology-based applications deepen the understanding of Tajweed rules and improve pronunciation accuracy. This technology provides detailed feedback and allows learners to visualize the correct pronunciation, substantially improving learners' Qur'an reading skills.

Table 3. The Impact of Utilizing Technology in Learning al-Qur'an

Aspect	Impact
Mobile Quran Application	Enhances real-time feedback, error correction, and student engagement through multimedia and gamification
Online and Blended Learning	Improves accessibility, inclusivity, learning effectiveness, student engagement, and collaboration
Adaptive and Inclusive Learning Systems	Meet the needs of diverse learners, enhancing the skills and motivation of learners with special needs
Advanced Technology	Improves Tajweed pronunciation accuracy and provides detailed feedback and visualization of correct pronunciation
Multimedia Utilization	Enriches the learning process through visual and audio elements, improving sight-reading skills

As summarised in Table 3, integrating technology in Qur'anic learning has created a more inclusive, interactive, and efficient learning environment, positively impacting learners' motivation, engagement, and learning outcomes. However, while technology offers many advantages, it is essential to remember that human relationships remain at the core of effective learning. Combining cutting-edge technology and direct guidance from Qur'anic teachers will create a holistic and balanced learning experience (Aziz et al., 2019b)Qur'anic teachers still play an essential role in providing values, ethics, and spiritual teachings that technology cannot entirely replace. Thus, the collaboration between technology and teacher guidance is expected to produce a generation of Qur'anic learners who are technically savvy and have a deep understanding and appreciation of Qur'anic teachings. Nevertheless, challenges such as limited digital infrastructure, data privacy concerns, and varying teacher readiness must be addressed to ensure that technology remains a complementary tool rather than a substitute for the essential human dimensions of Qur'anic learning.

Systematically and comprehensively, this study has analyzed various research results on using technology in learning the Qur'an, both in learning to read the Qur'an, Tahfidz, Tafsir, Tajweed, and Tarannum. This research found that technology has great potential to improve Qur'anic learning in terms of accessibility, effectiveness, and quality of education. Previously, there have been several systematic studies on the use of technology in Qur'anic learning, but they have different focuses. The studies of (2024) and Khairuldin et al. only focus on using advanced technology in mobile Quran applications (m-learning) to improve the accuracy of Quran learning. Meanwhile, the research of Abdullah et al. (2021) only focuses on the potential use of technology in tahfidz learning that can improve the effectiveness and quality of learning. Although all three also use the SLR method and discuss the same main topic, the novelty of this research lies in its broader and comprehensive coverage. This study analyses various aspects of Quranic learning and covers various technologies ranging from mobile applications and online platforms to advanced technology and multimedia. It provides a more comprehensive evaluation of the impact of

technology on different aspects of Quranic learning, thus offering a more holistic and thorough insight compared to previous studies.

CONCLUSION

Based on this systematic literature review, several key trends in the use of technology for Qur'anic learning were identified, including the development of mobile applications, the integration of online and blended learning models, adaptive and inclusive systems, advanced technologies, and multimedia utilization. These innovations have enhanced Qur'anic learning by providing real-time feedback, increasing accessibility, supporting learners with diverse needs, and enriching the learning process through interactive and engaging features. Applications such as Belajar Iqro, E-Hafiz, Say Quran, QUR'ANI, and MyFurqan illustrate how technology can complement traditional approaches and expand opportunities for Qur'anic education. While the positive impacts are significant, challenges remain, such as unequal access to digital infrastructure, data privacy concerns, and varying teacher readiness. These issues highlight the importance of positioning technology as a supportive tool rather than a substitute for the critical role of Qur'anic teachers in instilling values, ethics, and spirituality. Moving forward, future research and practice should focus on addressing these challenges, scaling up adaptive and inclusive systems, and ensuring that technological innovations are aligned with pedagogical goals. By combining technological advancement with the irreplaceable guidance of teachers, Qur'anic education can evolve into a more holistic, inclusive, and sustainable model that prepares learners to navigate an increasingly digital world without losing sight of its spiritual essence.

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