

The digital transformation of the Qur'an: Green technology, materiality, and new religious culture in Indonesia

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Abstract

This study examines the transition of the Qur'anic text delivery from printed manuscripts to digital applications and explores the implications of this shift on its perceived sacredness. The research argues that the digital format is not merely abstract data but has its own materiality, which reinforces religious conviction in the modern era. The transformation into a digital format raises questions about whether the digital Qur'an can retain its sacredness comparable to printed texts while also aligning with principles of green technology. By reducing the need for paper, ink, and the energy required to print and distribute physical mushafs, the digital Qur'an contributes to environmental preservation and resource conservation. This study employs an ethnographic research design, involving respondents from diverse backgrounds who use digital Qur'an applications in major cities across Indonesia. The design allows for direct observation of and engagement with users' experiences and perspectives. The findings reveal that interactive features such as audio recitation, digital exegesis, and aesthetic visual elements enhance users' spiritual experiences. As technology continues to integrate sacred texts into daily life, the digital Qur'an not only preserves its sacred value but also promotes environmental sustainability, offering a sustainable alternative that enriches the spiritual practices of Muslims in Indonesia.

Keywords

Green technology, Digital Qur'an, Materiality, Religious culture

Introduction

The development of digital technology has brought significant changes in various aspects of human life, including the way society accesses, understands, and practices religious teachings [1]. One of the impacts of this development is the transformation of religious texts from manuscript and print forms into digital formats through applications and electronic devices [2]. One of the most important religious texts for Muslims, which is widely spread across the world, is the sacred text of the Qur'an. With the digitalization

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of the Qur'an, it opens up broader access to the sacred text and also introduces a new dimension that changes the relationship between Muslims and the text [3]. In the context of Indonesia, where Islam plays a central role in social life, the digitalization of the Qur'an plays a strategic role in bridging the spiritual needs of the community with modern technology [4].

One important aspect that arises from this digitalization is the application of green technology principles in the dissemination of the sacred text [5]. Green technology refers to the use of environmentally friendly technology that contributes to ecological sustainability [6]. In the case of the digitalization of the Qur'an, this technology allows for a reduction in the use of material resources such as paper, ink, and energy that are typically required to produce and distribute printed *mushafs*. By replacing physical *mushafs* with digital applications, Muslims can access the Qur'an without relying on the printing process, which has significant environmental impacts, such as deforestation and pollution from ink waste.

In Indonesia, the digitalization of the Qur'an not only facilitates access to the sacred text for urban communities with electronic devices but also creates opportunities to raise ecological awareness among Muslims. Digital Qur'an applications enable users to read, listen to recitations, and study tafsir without leaving a significant ecological footprint. This aligns with Islamic values that emphasize the importance of maintaining the balance of nature and being responsible for the environment. From this perspective, the digitalization of the Qur'an can be seen as an innovative step that combines modern technology with spiritual values to create harmony between humans and the environment.

However, the digitalization of the Qur'an also raises profound theological and philosophical questions. Can the digital format preserve the authority and sanctity of the Qur'an in the same way as the printed text? How do Muslims perceive the materiality of the sacred text in this digital age? These questions are important because digitalization is not only about technology but also a cultural transformation that involves new ways for religious people to interact with their sacred texts. In the context of Indonesia, where religion and culture are often intertwined, the digitalization of the Qur'an can shape a new religious culture that is more relevant to modern challenges while also supporting environmental sustainability.

Although studies on the digitalization of the Qur'an have become a widely discussed topic, research that highlights the relationship between the materiality of the Qur'an and ecological awareness in the context of Indonesia remains limited. This study positions itself in the gap of this research by integrating the perspective of green technology as an analytical framework, which is rarely applied in discussions of the digital Qur'an. Using an ethnographic approach, this study offers a unique perspective on how digital Qur'an applications affect religious experiences and support environmental sustainability. Therefore, this article focuses on the use of digital Qur'an applications in Indonesia, involving respondents from various professional backgrounds

in several major cities. This case study aims to understand how users utilize interactive features and visual elements to deepen their religious experiences.

Method

This study uses a qualitative approach that focuses on a deep understanding of the phenomena occurring among the respondents. The aim of this method is to understand the experiences, feelings, and perspectives of the subjects involved in the research. In this study, the focus is on examining how religion is understood through digital physical objects and its influence on the transformation of religious practices among users of the digital Qur'an application. The qualitative approach is considered appropriate because it allows the researcher to explore deeper subjective experiences and social complexities that are often difficult to measure quantitatively [7]. Therefore, this research is theoretical and aims to provide a clear and detailed depiction of the religious experiences of users of the digital Qur'an application.

An ethnographic approach was chosen as the primary method for this research. Ethnography allows the researcher to directly observe and interact with subjects in their natural environments, providing richer insights into how changes in religious orientation occur. Hammersley and Atkinson explain that in ethnographic research, the researcher needs to see and listen directly to what the subjects say, as well as ask questions to better understand their actions and perceptions [8]. In the context of this study, this approach is used to observe how the use of the digital Qur'an application affects religious and spiritual patterns among Muslims.

This research was conducted in several major cities in Indonesia, involving respondents from various backgrounds, including housewives, traders, teachers, students, professionals, lecturers, and others. The respondents are individuals who use the digital Qur'an application, providing a more comprehensive picture of religious practices through digital media. The main data sources come from interviews and direct observation, while additional data were gathered from journals, books, and related articles. Furthermore, the validity of the data is ensured through source triangulation, where data from various sources are compared and verified against one another. This triangulation involves interviews with respondents from different professions, resulting in a more holistic and accurate representation of the phenomenon being studied.

Results

The findings of this study on the user experience of digital Qur'an applications are summarized in the Table 1. This table categorizes user groups, their experiences with the applications, and the key features that enhance their interaction. These insights, gathered through ethnographic surveys in various cities in Indonesia, illustrate how these applications cater to diverse user needs and foster a meaningful engagement with the Qur'an.

Table 1. User experience of digital Qur'an applications

User Group	Experience with the App	Key Features Highlighted
Housewife in Solo	Found the app easy to use despite not being familiar with technology	Simple and intuitive homepage design.
Madrasah Teacher in Yogyakarta	Emphasized the importance of easy navigation uses the app to find verses for teaching	Quick search feature and simple navigation menu.
Jakarta Informant	Felt more focused with minimalist calligraphy and soft-colored backgrounds	Minimalist visual design and calming aesthetics
Young Professional in Solo	Relies on the app for quick access to the Qur'an during busy work life	Flexibility and portability of accessing the Qur'an anywhere
Pesantren Student in East Java	Benefited from color-coded tajwid features for memorization and spiritual experience	Color-coded tajwid for enhanced focus and understanding
Trader in Semarang	Uses the app to balance religious activities with a busy trading schedule	Ease of integration with daily routines and activities

The main findings from this survey indicate that the design of digital Qur'an applications can create a user experience that is comfortable and easily accessible to a wide range of people, even those who are not familiar with digital technology. One example is the experience of a housewife in Solo, who, despite not being familiar with technology, found the application easy to use. In an interview, she stated, "I am not someone who is used to technology, but this app is very easy to use. I can quickly find the surah or verse I am looking for." This shows that the simple and intuitive homepage design greatly helps users from various technological backgrounds, enabling them to access the digital Qur'an without obstacles.

Additionally, a Madrasah teacher in Yogyakarta emphasized the importance of easy navigation in the application. She often uses this app as a reference in teaching her students about Qur'anic verses. She said, "I just type a word related to the theme I am teaching, and the app immediately shows the verse." The quick search feature and simple menu allow users to easily navigate the app, exploring surahs and verses in the Qur'an without confusion. Field data also indicate that visual elements in the digital Qur'an application are crucial in shaping the user's spiritual experience. For example, an informant in Jakarta reported that she felt more focused while reading the Qur'an on an app with minimalist calligraphy decorations and soft-colored backgrounds, providing an experience similar to opening a physical mushaf. Meanwhile, a student at a pesantren in East Java stated that features like color-coded tajwid helped them focus more while memorizing, enhancing their understanding and spiritual experience. In Solo, for instance, I observed and met with a young professional working in the Sharia finance sector, who shared that he heavily relies on the Qur'an app on his phone. Another observation, in the city of Semarang, involved a trader actively participating in local religious activities, who also experienced the benefits of the digital Qur'an application.

Overall, the field survey shows that digital media in the form of the Qur'an app has directed and transformed the way society interacts with the Qur'an. Users from various

backgrounds stated that this app facilitates access and enriches their spiritual experience, which is relevant to their needs in the increasingly mobile and busy daily life. This transformation reflects how digital technology has become an integral part of religious practices in Indonesia, in line with global trends that allow religion to continue adapting to the changing times.

Discussion

The integration of visual elements, features, and audio in digital Qur'an applications contributes to enhancing the spiritual experience of its users. These visual elements, such as thoughtfully designed layouts, the use of Islamic calligraphy, and interactive features like thematic search and visual illustrations, strengthen the user's interaction with the sacred text. Research shows that visual elements not only beautify the appearance of the application but also help users understand the content of the Qur'an more deeply and make it more accessible to users from diverse backgrounds. Thus, these visual elements reinforce the authority of the sacred text in the digital context, creating a spiritual space where users can connect deeply with the Qur'an through digital media. These findings align with recent studies by scholars such as Svensson [9], Futatsuyama [10], and Suit [11] regarding how Muslims interact with the materiality of the Qur'an as a physical object.

Ecologically, the digitalization of the Qur'an offers an innovative solution that reduces the environmental impact of traditional religious practices. Research by Zhao [12], Triantafyllidou [13], and Yin [14] shows that digital technology can enhance green innovation performance through technological improvement, cost reduction, and resource optimization. Digital technology also enables increased accessibility and distribution. In this context, the mass production of printed Qur'ans requires material resources such as paper and ink, as well as energy for distribution and storage. By shifting these needs to digital applications, Muslims not only reduce their ecological footprint but also contribute to global efforts to preserve the environment. The reduction of carbon emissions from distribution and production processes further strengthens the role of Muslims in addressing climate change issues.

Moreover, the digitalization of the Qur'an is not only part of the technological transformation in the delivery of the sacred text but also contributes to environmental preservation. In this context, the digital Qur'an can be seen as a form of green technology that supports environmental sustainability through the reduction of dependence on material resources used in the production and distribution of printed Qur'ans. The production of traditional printed mushafs requires raw materials such as paper and ink, which have significant environmental impacts, ranging from deforestation for paper production to the use of chemicals in ink that can pollute the environment. By switching to a digital format, the need for these resources can be significantly minimized.

Therefore, the digitalization of the Qur'an becomes more than just a technological tool; it becomes a new medium for deepening the relationship between the believers and the sacred text, as discussed in the research developed by Morgan [15] and Meyer on the mediation of religion and media [16]. The digitalization of the Qur'an also opens up space for a broader discussion on how technology can be used to support ecological sustainability and religious culture. Digital Qur'an applications create an innovative model that demonstrates that religion, technology, and ecology do not have to be in conflict. On the contrary, all three can complement each other to create a holistic solution that supports the spiritual life of humanity while protecting the environment.

In the modern era, which is increasingly aware of the importance of sustainability, the digital Qur'an becomes an innovative model that demonstrates how technology can be used to meet spiritual needs without neglecting ecological responsibility. This is particularly important in the global context, where climate change, deforestation, and pollution are increasingly urgent issues. The digital Qur'an, as a symbol of this transformation, serves as a tangible example that religious communities can adapt to technological advancements without losing the essence of the holiness and authority of their texts. Moreover, this model opens up space for discussion about how religious communities can play a larger role in environmental preservation efforts. As a sacred text now available in digital format, the Qur'an provides an example that technological innovation can support sustainability practices while strengthening spiritual values. It shows that religion, technology, and ecology are not conflicting entities; instead, they can complement each other to create a better world.

Conclusion

The digitalization of the Qur'an is a transformative step that not only expands access to the sacred text but also offers a significant contribution to environmental sustainability. By adopting green technology, digitalization can reduce dependence on materials such as paper and ink, which are typically used in the production and distribution of printed mushafs. Visual elements and interactive features in digital Qur'an applications, such as color-coded tajwid, thematic search, and calligraphy decoration, enrich the user's spiritual experience and create a solemn atmosphere that maintains the sacred value of the holy text. Moreover, the digitalization of the Qur'an demonstrates that technology can function as a medium that not only preserves religious essence but also addresses modern ecological and social challenges. In the context of Indonesia, this digitalization serves as an innovative model that shows how religion, technology, and ecology can align to create a positive impact for both the community and the environment. Thus, the digital Qur'an not only serves as a modern spiritual tool but also symbolizes a harmonious adaptation between traditional values and the sustainability demands of the contemporary era.

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References

- [1] Rahmadani, P. Digital Evaluation Of Islamic Education. In Proceeding International Conference on Tradition and Religious Studies, vol. 3, no. 1, pp. 656-666, 2024, <http://proceedings.radenfatah.ac.id/index.php/lc-TiaRS/>
- [2] Tsuria, Ruth, and Heidi A. Campbell. "Introduction to the study of digital religion." In Digital religion, pp. 1-21. Routledge, 2021, ISBN: 9780429295683
- [3] Hefni, W. Perkembangan Mushaf Al-Qur'an Digital di Indonesia: Teknologi, Fungsi, dan Dampak Sosial Budaya. Jurnal Studi Agama dan Masyarakat, vol.5, no. 2, pp. 92-106, 2020, doi: <https://doi.org/10.17576/JKMJC-2023-3901-06>
- [4] Nabilah, Khairun, Hisny Fajrussalam, Anisa Mutiara Ilahi, Dhea Resti Fauziah, and Shela Amelia. "Pengaruh Aplikasi Al-Quran Digital terhadap Motivasi Beribadah Mahasiswa Purwakarta." Al Qodiri: Jurnal Pendidikan, Sosial dan Keagamaan, vol. 21, no. 1, 2023, pp. 30-48 , doi: <https://doi.org/10.53515/qodiri.2023.21.1.30-48>
- [5] Nirsal, N., Apriyanto, A., Judijanto, L., Maysanjaya, I. M. D., Dermawan, K. T., Weking, A. N., ... & Putra, P. M. Modern Database Management: Tren, Teknologi, dan Penerapan. Sonpedia Publishing Indonesia, 2024. ISBN: 9786235143064
- [6] Ikram, M., Ferasso, M., Sroufe, R., & Zhang, Q. Assessing green technology indicators for cleaner production and sustainable investments in a developing country context. Journal of Cleaner Production, vol. 322, no. 129090. 2021, pp. 1-20 doi: <https://doi.org/10.1016/j.jclepro.2021.129090>
- [7] Silverman, David. "What counts as qualitative research? Some cautionary comments." Qualitative sociology review, vol. 9, no. 2, 2013, pp. 48-55, doi: <https://doi.org/10.18778/1733-8077.09.2.05>
- [8] Martyn Hammersley, and Paul Atkinson. Ethnography: Principles in practice. Routledge, 2019.
- [9] Svensson, Jonas. "Relating, revering, and removing: Muslim views on the use, power, and disposal of divine words." In The Death of Sacred Texts, pp. 31-53. Routledge, 2016.
- [10] Futatsuyama, Tatsuro. " Thinking Islam Through Things: From the Viewpoint of Materiality of the Qur'ān." Kyoto Bulletin of Islamic Area Studies," vol.13, 2020, pp. 69-80, doi: 10.14989/250324
- [11] Suit, Natalia K. Qur'anic matters: material mediations and religious practice in Egypt. Bloomsbury Publishing, 2020.
- [12] Zhao, Xing, and Yuanyuan Qian. "Does digital technology promote green innovation performance?." Journal of the Knowledge Economy 15, no. 2, 2024, pp. 7568-7587, doi: <https://doi.org/10.1007/s13132-023-01410-w>
- [13] Triantafyllidou, E., Zabaniotou, A. Digital Technology and Social Innovation Promoting a Green Citizenship: Development of the "Go Sustainable Living" Digital Application. Circ.Econ.Sust. 2, pp. 141–164, 2022, doi: <https://doi.org/10.1007/s43615-021-00111-3>
- [14] Yin, Shi, Nan Zhang, Kifayat Ullah, and Shuo Gao. "Enhancing digital innovation for the sustainable transformation of manufacturing industry: a pressure-state-response system framework to perceptions of digital green innovation and its performance for green and intelligent manufacturing." Systems 10, no. 3, 2022, pp. 72, doi: <https://doi.org/10.3390/systems10030072>
- [15] Meyer, Birgit, David Morgan, Crispin Paine, and S. Brent Plate. "The origin and mission of material religion." Religion, vol. 40, no. 3, pp. 207-211, 2010, doi: <https://doi.org/10.1016/j.religion.2010.01.010>
- [16] Meyer, Birgit. Religion as Mediation. Entangled Religions, vol. 11, no. 3, 2020, doi: <https://doi.org/10.46586/er.11.2020.8444>.