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Islamic Education in the Eco-Digital Era: Integrating Digital Transformation and Green Branding for Sustainable Learning Ecosystems

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Abstract: This study investigates how Islamic educational institutions institutionalize digital transformation, green branding, and Islamic environmental ethics to cultivate sustainable learning ecosystems in the eco-digital era. Employing an intrinsic qualitative case study design, data were collected through classroom observations, document analysis, and in-depth semi-structured interviews with school leaders, teachers, environmental program coordinators, and students. Data were analyzed using a hybrid thematic analysis integrating deductive and inductive coding procedures. The findings reveal three interrelated institutional mechanisms. First, digital transformation was institutionalized through Learning Management Systems, digital governance, online communication platforms, and digital *da'wah*, fostering ethical digital literacy, institutional accountability, and responsible learning practices. Second, green branding was institutionalized through waste banks, plastic-free campaigns, urban farming, climate literacy, and *āyāt kauniyyah*-based learning, embedding sustainability as ecological *da'wah* within everyday school culture. Third, the Islamic principles of *khalīfah*, *amānah*, and *tawāzun* functioned as normative mechanisms linking technological innovation with environmental stewardship across governance, curriculum, and institutional practices. Collectively, these mechanisms demonstrate that digital transformation, green branding, and Islamic environmental ethics operate as mutually reinforcing dimensions of sustainability-oriented educational cultures. Building on these findings, the study advances the Eco-Digital Islamic Education Model as an empirically grounded conceptual framework explaining how technological innovation, ecological responsibility, and Islamic values interact to foster sustainable learning ecosystems. The model contributes to the emerging discourse on Islamic Education for Sustainable Development while providing practical guidance for institutional transformation and educational policy supporting Quality Education and Climate Action.

Keywords: Eco digital; digital transformation; green branding; sustainable learning ecosystems.

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INTRODUCTION

Climate change, biodiversity loss, environmental degradation, and widening social inequalities have intensified global concerns regarding the role of education in advancing sustainable development (Abera, 2023; Agbedahin, 2019; Avelar dkk., 2019; Syihabuddin dkk., 2023). As environmental challenges become increasingly complex and interconnected, educational institutions are expected not only to transmit knowledge but also to cultivate ecological responsibility, ethical awareness, and transformative competencies that enable learners to engage meaningfully with sustainability issues (Bria dkk., 2025; Maretta dkk., 2026; Misiaszek, 2016; Shutaleva, 2023). This expectation is

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reflected in Sustainable Development Goal 4.7, which emphasizes the role of education in promoting sustainable lifestyles, environmental stewardship, global citizenship, and responsible participation in society (De Poza-Vilches dkk., 2019; Newman & Tonkens, 2025; UNESCO, 2023).

Consequently, educational transformation is no longer limited to curriculum reform but increasingly encompasses institutional culture, organizational identity, and learning ecosystems capable of fostering sustainability-oriented values and behaviors. Parallel to the sustainability agenda, digital transformation has become one of the most influential forces shaping contemporary education (Ahmad Rizal dkk., 2024; Ogunbukola, 2025). The proliferation of Learning Management Systems, artificial intelligence assisted learning environments, digital communication platforms, and other technology-enhanced learning tools has fundamentally altered how knowledge is produced, accessed, and disseminated (Holmes et al, 2022; OECD, 2023). Existing research consistently demonstrates that digital technologies can expand educational access, personalize learning experiences, and facilitate collaborative knowledge construction (Abusharif, 2023; Ngongpah & Oni, 2025; Rahman & Hossain, 2025).

However, an important tension remains within the literature. While digital transformation is frequently celebrated for improving efficiency and accessibility, sustainability scholars argue that technological adoption alone is insufficient to cultivate long-term ecological commitment, ethical responsibility, or environmentally responsible behavior (Enbaia dkk., 2024; 'Ulyan, 2023). In many contexts, technology functions primarily as an instrument for information delivery rather than a catalyst for sustainability-oriented cultural transformation. This tension raises critical questions regarding how digital innovation can move beyond technical modernization and contribute to the formation of meaningful sustainability practices within educational institutions. In response to these challenges, educational institutions have increasingly embraced green branding as a strategy for communicating environmental commitments and strengthening institutional sustainability identities (Leal Filho et al., 2019; Lozano et al., 2015).

Green branding refers to the deliberate construction of an environmentally responsible institutional image through policies, programs, communication strategies, and visible sustainability practices (Dangelico, 2016; Firdausiah & Fuady, 2026; Kusbah & Khozin, 2025; Srivastava dkk., 2020). Within educational contexts, green branding extends beyond marketing and encompasses efforts to embed sustainability values into organizational culture, stakeholder engagement, and institutional behavior (Arise & Muzuva, 2024; Lambrechts dkk., 2013; Muralidhar dkk., 2025). Through websites, social media platforms, sustainability campaigns, and public narratives, schools increasingly seek to position themselves as environmentally responsible organizations. Nevertheless, a second tension emerges within this body of literature. Green branding strengthens sustainability awareness and reputation, but unsupported claims may encourage organizational greenwashing practices (Delmas & Burbano, 2011; Lyon & Montgomery, 2015; Netto et al., 2020).

This concern is particularly relevant in educational settings, where institutional credibility depends not only on public representation but also on the consistency between values, practices, and educational outcomes. For Islamic educational institutions, the sustainability agenda is not merely a contemporary policy concern but is deeply rooted in a long-standing theological and ethical tradition. Islamic environmental ethics are grounded in the principles of khalīfah (*stewardship*), amānah (*trusteeship*), and mīzān or

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tawāzun (*balance*), which collectively position human beings as morally responsible custodians of creation (Abdullah, 2014; Foltz, 2003; Khalid, 2019). These concepts establish a comprehensive ethical framework linking environmental responsibility with spirituality, worship, and accountability before God (DeWitt, 2025). Islamic environmental ethics frame sustainability as religious responsibility, social obligation, and stewardship beyond secular compliance.

Through this perspective, Islamic education possesses distinctive potential to cultivate sustainability-oriented learning environments that integrate ecological awareness, moral responsibility, and spiritual development. Consequently, Islamic educational institutions offer a particularly valuable context for examining how sustainability values can be institutionalized through both technological innovation and faith-based educational practices. Recent scholarship has generated important insights into several relevant domains. Studies on digital transformation have highlighted the capacity of educational technologies to support learning accessibility, engagement, and personalization (Abusharif, 2023; Fazey et al., 2020; Holmes & Tuomi, 2022). Research on sustainability education and green schools has emphasized the importance of environmental literacy, institutional culture, and sustainability-oriented practices in shaping ecological awareness (Aldawsari et al., 2025; Leal Filho et al., 2019; Wals & Benavot, 2017).

Meanwhile, studies on Islamic environmental ethics have demonstrated the role of religious values in fostering environmental responsibility and sustainable behavior (Choli & Fikri Rachman, 2023; Resky, 2025; Taufikin, 2025). Despite these advances, these strands of scholarship have largely evolved in parallel rather than in dialogue with one another. As a result, limited understanding exists regarding how digital transformation, green branding, and Islamic environmental ethics may interact as mutually reinforcing dimensions of sustainability-oriented educational ecosystems. This fragmentation constitutes a significant theoretical and practical gap. Existing studies tend to investigate digital innovation, sustainability initiatives, green school programs, or Islamic ecological values as separate domains of inquiry, leaving unresolved the question of how these dimensions converge within the everyday practices of Islamic educational institutions.

More importantly, the literature has yet to provide a coherent conceptual explanation of how technological innovation, institutional environmental identity, and Islamic pedagogical values interact in shaping sustainability-oriented educational cultures. Consequently, current scholarship remains insufficient for explaining how Islamic educational institutions simultaneously respond to the dual imperatives of digital transformation and sustainable development. The urgency of addressing this gap is particularly evident in Indonesia, where Islamic educational institutions constitute one of the most influential educational and socio-cultural forces in society. Through extensive networks of *pesantren, madrasah*, Islamic schools, and higher education institutions, these organizations play a significant role in shaping educational practices, community values, and public responses to contemporary challenges (Anshori & Sahara, 2020; Junaedi, 2020).

As digital transformation and sustainability agendas continue to reshape educational priorities, Indonesia provides a particularly relevant context for examining how Islamic educational institutions integrate technological innovation, environmental responsibility, and faith-based values within sustainable learning ecosystems. At the same time, Indonesian educational institutions are increasingly encouraged to adopt digital technologies while supporting national commitments to sustainable development and

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environmental education. Many Islamic schools have begun incorporating digital learning platforms, sustainability programs, environmental campaigns, and green institutional narratives (Anshori & Sahara, 2020; Pandia et al., 2023; UNESCO, 2023). However, empirical understanding of how these initiatives are integrated, experienced, and institutionalized within everyday educational practices remains limited.

Questions persist regarding whether digital transformation genuinely supports sustainability-oriented learning, how green branding is embedded within institutional culture, and how Islamic environmental values shape the implementation of these initiatives. Addressing these questions is increasingly important for both educational policy and institutional development. To the best of current scholarly knowledge, no previous study has systematically examined the intersection of digital transformation, green branding, and Islamic environmental ethics as an integrated framework for cultivating sustainable learning ecosystems within Islamic educational institutions. The principal novelty of this research therefore lies in the development of an Eco-Digital Islamic Education Model that explains how these three dimensions interact in shaping sustainability-oriented educational cultures.

By positioning green branding not merely as an institutional image strategy but also as a form of ecological da'wah embedded within digitally mediated educational practices, this study introduces a new conceptual lens through which sustainability, technology, and Islamic educational values can be understood as interconnected rather than separate domains. Accordingly, this study investigates how digital transformation is institutionalized within the educational practices of Islamic educational institutions, how green branding is embedded within organizational culture and sustainability initiatives, and how Islamic environmental ethics shape the interaction between technological innovation and environmental responsibility. Specifically, this study seeks to answer three questions: how is digital transformation institutionalized within Islamic educational practices; how is green branding embedded within the organizational culture and sustainability initiatives of Islamic educational institutions; and how do digital transformation, green branding, and Islamic environmental ethics interact in cultivating sustainable learning ecosystems.?

Through an intrinsic qualitative case study approach, this study examines the interconnected relationships among digital transformation, green institutional culture, and Islamic environmental ethics. It proposes an Eco-Digital Islamic Education Model that integrates technological innovation, environmental responsibility, and Islamic values to support sustainable educational transformation. The model contributes to the growing discourse on Islamic Education for Sustainable Development by offering a contextually grounded framework that connects digital advancement with ecological stewardship. Furthermore, it extends contemporary discussions on sustainability and digital transformation in education by emphasizing ethical and culturally relevant approaches. The study provides a conceptual foundation for educational policy and institutional transformation aligned with Quality Education, environmental sustainability, and Climate Action within Islamic educational institutions (Leal Filho et al., 2019; UNESCO, 2017, 2021).

METHOD

This study employed an intrinsic qualitative case study design Stake (2010); Yin (2018), to investigate how Islamic educational institutions institutionalize digital transformation, green branding, and Islamic environmental ethics in cultivating sustainable learning ecosystems within the eco-digital era. Guided by an interpretivist paradigm, the

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study sought an in-depth understanding of a bounded educational phenomenon within its natural institutional context, viewing institutional realities as socially constructed through participants' experiences and organizational practices. Consistent with naturalistic inquiry Lincoln and Guba (1985), the researcher served as the primary research instrument. The study was conducted in three public and private Islamic junior and senior secondary schools in the Special Region of Yogyakarta, Indonesia, with institutional identities anonymized to ensure confidentiality.

The research sites were purposively selected as information-rich cases Patton (2015), because they had consistently implemented digital learning, sustainability initiatives, and Islamic environmental values within educational practice. Thirty-three participants were recruited, comprising three school principals, three vice principals for curriculum affairs, eight teachers, sixteen students, and three environmental program coordinators, representing complementary perspectives across leadership, curriculum, pedagogy, student experiences, and environmental management (Creswell & Poth, 2018). Data were collected over one month through in-depth semi-structured interviews, classroom observations, and document analysis (Flick, 2018). Interviews with all participants lasted approximately three to four hours and explored experiences of digital transformation, green branding, Islamic environmental ethics, and sustainability-oriented educational practices.

Three rounds of classroom observations examined instructional practices, digitally mediated learning, environmental programs, institutional governance, and stakeholder interactions. Documentary evidence included institutional policy documents, environmental program reports, digital learning materials, school websites, social media content, and interview records. The integration of these data sources enabled methodological triangulation and strengthened the credibility of the findings. Data were analyzed using a hybrid thematic analysis integrating deductive and inductive coding following Braun & Clarke, (2021), six-phase framework. Deductive coding was guided by the study's conceptual domains of digital transformation, green branding, and Islamic environmental ethics, whereas inductive coding identified patterns emerging from the empirical data. Through iterative comparison of interviews, classroom observations, and documents, categories were refined into three overarching themes: digital transformation as a value-oriented educational ecosystem, green branding as ecological da'wah and institutional identity, and the institutionalization of Islamic environmental ethics.

The reciprocal relationships among these themes were synthesized to develop the Eco-Digital Islamic Education Model, explaining how technological innovation, ecological responsibility, and Islamic values interact to cultivate sustainable learning ecosystems. Methodological rigor followed Lincoln and Guba's (1985) trustworthiness framework, encompassing credibility, transferability, dependability, and confirmability. Trustworthiness was strengthened through triangulation, member checking, rich contextual descriptions, an audit trail, reflexive memoing, and peer debriefing. Ethical integrity was maintained through voluntary informed consent, anonymization of institutional and participant identities, and exclusive use of research data for academic purposes. These procedures ensured that the findings were credible, contextually relevant, transparent, and ethically grounded, while supporting the model's conceptual development and potential applicability within Islamic educational settings.

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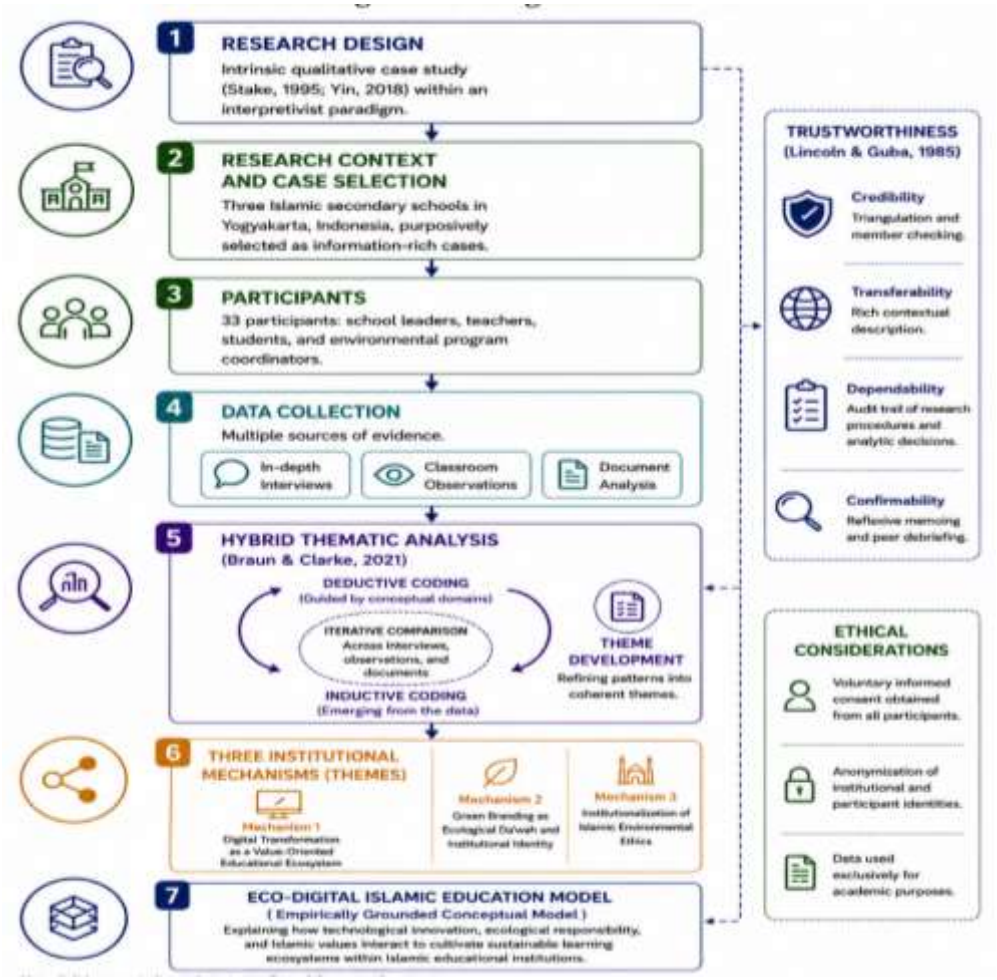


Figure 1. Research Design and Thematic Analytical Framework for Constructing the Eco-Digital Islamic Education Model

RESULT AND DISCUSSION

Digital Transformation as a Value-Oriented Educational Practice

The thematic analysis revealed that digital transformation within Islamic educational institutions extends beyond technological modernization and functions as a value-oriented educational practice embedded within religious and pedagogical commitments. Across the institutions examined, digital technologies were systematically integrated into learning, administration, communication, and institutional management. Rather than being perceived as merely technical tools, digital technologies were understood as educational resources that support discipline, responsibility, accountability, and ethical learning practices. The findings indicate that Learning Management Systems, digital assessment platforms, instructional media, and online communication systems have become integral components of everyday educational activities. These technologies facilitated more efficient learning management, strengthened communication between teachers and students, and enhanced institutional transparency through digital governance mechanisms.

Importantly, digital systems were not only viewed as instruments for efficiency but also as manifestations of Islamic values such as amānah (*trustworthiness*), iḥsān (*professional excellence*), and responsibility in educational practice. Another significant finding concerns the emergence of digital ethics as an important dimension of Islamic

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educational transformation. Digital literacy was consistently associated with moral responsibility, respectful communication, academic honesty, and self-regulated learning (Amirudin dkk., 2025; Theobald, 2021). Digital transformation simultaneously develops technological competence and ethical awareness. Institutions increasingly employ websites, social media, digital campaigns, and educational content for digital da'wah, extending Islamic and sustainability messages beyond school boundaries. Overall, digital transformation represents a value-oriented ecosystem integrating technology, ethics, learning, sustainability, and religious meaning.

Table 1. Major Themes of Digital Transformation in Islamic Educational Institutions

Dimension	Manifestation	Educational Function
Digital Learning Infrastructure	LMS, digital classrooms, online resources	Learning accessibility and flexibility
Digital Governance	Academic administration, reporting systems, communication platforms	Institutional efficiency and transparency
Digital Ethics	Discipline, responsibility, academic honesty	Character development and ethical literacy
Digital Da'wah	Social media, websites, digital religious content	Dissemination of Islamic and sustainability values

Collectively, these findings suggest that the educational significance of digital transformation lies not merely in the adoption of digital technologies but in their institutionalization through mechanisms that integrate technological innovation with Islamic values in everyday educational practice. This interpretation extends current scholarship emphasizing the contribution of digital technologies to learning accessibility, instructional effectiveness, and institutional efficiency (Holmes et al., 2022; OECD, 2023). Instead, the findings indicate that digital technologies acquired broader educational significance when institutionalized within Islamic ethical principles (Afif et al., 2025). Consequently, digital platforms, Learning Management Systems, and online communication technologies functioned not only as instructional tools but also as institutional mechanisms for enacting *amānah* (trustworthiness), *iḥsān* (professional excellence), responsibility, and ethical digital literacy.

The findings further extend scholarship on digital religion, which has primarily examined digital media as platforms for religious communication and online faith communities (Aisyah et al., 2025; Campbell, 2013). In contrast, this study demonstrates that digital technologies simultaneously supported educational innovation, ecological awareness, institutional governance, and the dissemination of Islamic sustainability values through digital da'wah. Consequently, digital transformation should be understood as an integrated educational ecosystem in which technological innovation, religious values, and sustainability commitments mutually reinforce one another. Conceptually, this institutional mechanism represents the first foundational component of the Eco-Digital Islamic Education Model, illustrating how digital transformation functions as the ethical and organizational infrastructure through which technological innovation, Islamic values, and sustainability commitments become institutionalized within educational practice.

Green Branding as Ecological Da'wah and Institutional Identity

The findings demonstrate that green branding occupies a central role in shaping the organizational identity of Islamic educational institutions. Rather than functioning solely as a communication strategy, green branding serves as a mechanism for embedding

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sustainability values within institutional culture and educational practice. Sustainability was consistently presented as an integral component of the schools' vision, mission, and character education programs. Environmental initiatives such as waste banks, plastic-free campaigns, urban farming projects, environmental literacy programs, and sustainability-focused extracurricular activities formed the core of institutional sustainability efforts. These programs encouraged active participation among students and teachers while simultaneously cultivating ecological awareness and environmentally responsible behavior. Green branding therefore extended beyond visual representation and became embedded in everyday institutional practices.

The analysis revealed that environmental values were integrated into the curriculum through the study of *āyāt kauniyyah*, ecological reflection, climate literacy, and sustainability-oriented learning activities. This integration encouraged students to understand environmental responsibility not merely as a civic obligation but also as a religious commitment. Consequently, green branding functioned as a form of ecological da'wah, framing environmental stewardship as part of Islamic moral responsibility. The findings further indicate that Islamic educational institutions increasingly construct environmentally responsible identities by integrating sustainability, spirituality, and educational excellence. This approach strengthens institutional character while promoting ecological awareness, ethical behavior, and sustainable practices across learning environments and institutional communities.

Table 2. Green Branding as Ecological Da'wah and Institutional Identity

Dimension	Manifestation	Institutional Function
Green Identity	Islamic Green School narratives	Institutional differentiation
Eco-Campaigns	Sustainability campaigns, environmental communication	Public awareness and engagement
Green Curriculum	*Āyāt kauniyyah*, climate literacy, environmental learning	Ecological consciousness
Environmental Programs	Waste banks, urban farming, plastic-free initiatives	Ecological habit formation
Ecological Da'wah	Sustainability framed through Islamic teachings	Spiritual and moral transformation

Collectively, these findings suggest that green branding within Islamic educational institutions extends beyond institutional communication and functions as a pedagogical mechanism through which sustainability values, Islamic ethics, and organizational identity become mutually reinforcing. Rather than enhancing institutional reputation alone, green branding was institutionalized through environmental programs, curriculum integration, and ecological da'wah, embedding sustainability within everyday educational practice (Muin et al., 2025; Mundofi & Habibi, 2026). This mechanism positioned environmental responsibility as both a religious commitment and an educational responsibility. These findings extend current scholarship, which has primarily conceptualized green branding as a strategy for communicating environmental commitment and strengthening organizational legitimacy (Dangelico, 2016; Priyana et al., 2025).

While these dimensions were evident across the participating institutions, the present study demonstrates that green branding assumes broader educational significance when integrated with Islamic environmental values. Waste reduction initiatives, urban farming, climate literacy, and sustainability campaigns functioned not only as environmental interventions but also as pedagogical mechanisms for cultivating ecological awareness, moral responsibility, and Islamic environmental ethics. Accordingly,

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the findings differ from concerns regarding symbolic environmentalism and organizational greenwashing (Delmas & Burbano, 2011; Mustofa et al., 2025), as sustainability commitments were consistently embedded within institutional policies, curriculum implementation, and everyday educational practices. This integration strengthened institutional credibility, environmental responsibility, and alignment between sustainability narratives and actual practices.

Conceptually, these findings extend contemporary green branding theory by introducing ecological *da'wah* as an institutional mechanism that transforms sustainability communication into a pedagogical and spiritual process. Ecological *da'wah* strengthens ecological awareness, moral responsibility, and institutional identity by integrating environmental messages with Islamic values and educational practices. Within the Eco-Digital Islamic Education Model, ecological *da'wah* represents the second foundational component, explaining how religious values, curriculum implementation, and organizational culture institutionalize sustainability-oriented learning ecosystems. This perspective demonstrates that environmental communication in Islamic education extends beyond promotional activities, becoming a transformative process that connects sustainability, spirituality, learning, and institutional identity while fostering environmentally responsible behavior among educational communities.

Institutionalizing Islamic Environmental Ethics

The findings reveal that Islamic environmental ethics function as the normative foundation underlying both digital transformation and sustainability initiatives. Across the institutions examined, the principles of *khalīfah* (stewardship), *amānah* (trusteeship), and *tawāzun* (balance) were consistently embedded within institutional narratives, educational policies, and sustainability practices. The principle of *khalīfah* was reflected in programs designed to cultivate environmental stewardship and ecological responsibility among students. Environmental protection was framed as a religious obligation linked to humanity's role as custodian of creation. Meanwhile, *amānah* informed both technological and organizational practices, emphasizing responsible technology use, institutional accountability, and ethical governance.

Tawāzun served as a guiding principle for balancing technological advancement with environmental sustainability, ensuring that educational modernization remained aligned with ecological responsibility. The integration of Islamic values fostered eco-spirituality, in which technology, sustainability, and religious commitment mutually reinforced one another. Islamic environmental ethics therefore functioned not merely as abstract theological concepts but as practical principles embedded within educational culture and institutional governance. Through curriculum implementation, environmental programs, digital learning, and everyday activities, these values encouraged students and educators to develop responsible relationships with nature. Consequently, Islamic educational institutions demonstrated how technological innovation and spiritual values can collectively support sustainable learning environments, strengthen ethical awareness, and promote long-term ecological responsibility within educational communities.

Table 3. Institutionalization of Islamic Environmental Ethics

Islamic Principle	Educational Interpretation	Practical Manifestation
Khalīfah	Ecological stewardship	Environmental programs and sustainability initiatives
Amānah	Ethical responsibility	Digital governance and responsible technology use
Tawāzun	Sustainable balance	Integration of technology and environmental responsibility

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Taken together, these findings demonstrate that digital transformation, green branding, and Islamic environmental ethics function not as separate institutional initiatives but as interdependent mechanisms driving sustainability-oriented educational transformation. Digital transformation provides the technological infrastructure for learning and governance, green branding institutionalizes ecological identity through educational practice, and Islamic environmental ethics provide the moral and spiritual foundation guiding technological innovation and environmental responsibility. Together, these dimensions establish an integrated educational ecosystem in which technology, sustainability, and Islamic values mutually reinforce one another. (Misiaszek, 2023; Mustofa et al., 2025). These findings extend scholarship on Islamic environmental ethics, which has primarily conceptualized *khalīfah*, *amānah*, and *tawāzun* as normative foundations for ecological stewardship and moral accountability (Foltz, 2003; Khalid, 2019; Sheikh, 2024).

The present study demonstrates that these principles operate beyond individual belief by functioning as institutional values shaping governance, curriculum development, sustainability initiatives, and digital educational practices. In doing so, the findings broaden prevailing sustainability frameworks by showing that ecological responsibility is institutionalized through the integration of religious commitment, organizational culture, and educational practice, rather than through environmental literacy and behavioural change alone (Fazey et al., 2020; Taufikin, 2025). Islamic environmental ethics provide the normative foundation of the Eco-Digital Islamic Education Model, integrating technology and sustainability through Islamic moral values. Together with digital transformation and ecological *da'wah*, they connect technology, spirituality, and environmental stewardship to foster sustainable learning ecosystems.

Emergence of the Eco-Digital Islamic Education Model

The most significant finding of this study is the emergence of an Eco-Digital Islamic Education Model that explains how digital transformation, green branding, and Islamic environmental ethics interact to cultivate sustainable learning ecosystems. The thematic analysis indicates that these three dimensions do not operate independently; rather, they function as interconnected and mutually reinforcing components of institutional transformation. Within the Eco-Digital Islamic Education Model, digital transformation functions as the institutional mechanism through which learning innovation, digital literacy, institutional efficiency, and digital da'wah are advanced. Green branding functions as a vehicle for ecological identity formation, environmental communication, and sustainability-oriented institutional culture. Islamic environmental ethics provide the moral and spiritual foundation that guides both technological innovation and environmental responsibility.

Together, these dimensions create an integrated educational ecosystem combining technology, sustainability, and spirituality. Their interaction generates outcomes including ethical digital literacy, ecological awareness, spiritual responsibility, institutional sustainability, and sustainability-oriented educational cultures. Technology becomes not merely a learning instrument but also a medium for promoting ethical, religious, and environmental values. Consequently, Islamic educational institutions move beyond conventional religious schooling by developing innovative approaches that connect faith, digital competence, and ecological responsibility. The Eco-Digital Islamic Education Model therefore positions Islamic education as a transformative system capable of responding to contemporary challenges of digital transformation and sustainable development while

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strengthening institutional identity, ethical formation, environmental awareness, and responsible educational practices across the wider learning community.

Table 4. Components of the Eco-Digital Islamic Education Model

Component	Core Function	Educational Outcome
Digital Transformation	Facilitates learning innovation, digital governance, ethical digital practices, and digital *da'wah*	Ethical digital literacy and institutional effectiveness
Green Branding	Strengthens ecological identity, sustainability communication, and environmental engagement	Ecological awareness and sustainability-oriented institutional culture
Islamic Environmental Ethics	Provides the moral and spiritual foundation through *khalīfah*, *amānah*, and *tawāzun*	Spiritual responsibility and ethical environmental stewardship
Institutional Integration	Integrates digital transformation, green branding, and Islamic environmental ethics into a unified institutional framework	Sustainable learning ecosystem

Building upon the empirical synthesis presented above, the reciprocal relationships among digital transformation, green branding, and Islamic environmental ethics were integrated into the Eco-Digital Islamic Education Model (Figure 2). The model illustrates how these dimensions interact through institutional mechanisms that connect technological innovation, environmental sustainability, and Islamic values. Digital transformation provides technological infrastructure and opportunities for ethical learning, while green branding communicates and reinforces institutional sustainability commitments. Islamic environmental ethics provide the normative foundation guiding these processes toward responsible stewardship. Their interaction creates sustainable learning ecosystems that integrate digital competence, ecological awareness, spiritual responsibility, and institutional identity.

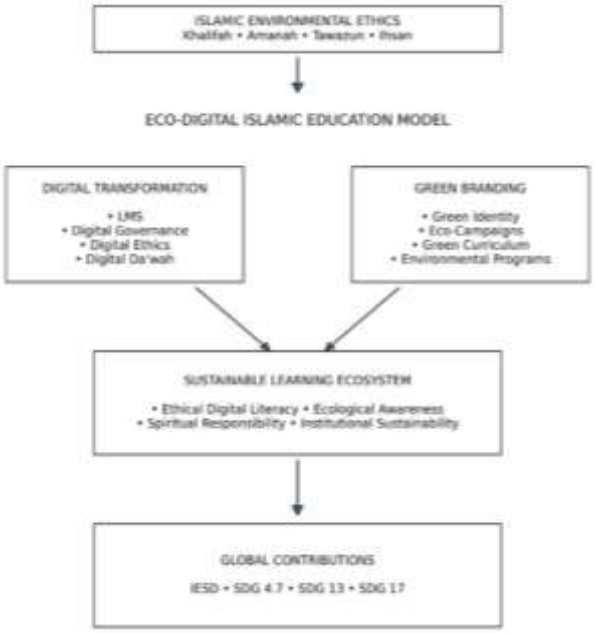


Figure 2. Eco-Digital Islamic Education Model

Collectively, the empirical findings indicate that sustainable transformation within Islamic educational institutions is achieved through the institutional integration of digital

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transformation, green branding, and Islamic environmental ethics rather than through isolated technological or environmental initiatives. Figure 2 illustrates how these three empirically derived mechanisms interact reciprocally to cultivate sustainable learning ecosystems. Digital transformation establishes the technological infrastructure for learning innovation, governance, and digital *da'wah*; green branding institutionalizes ecological identity and sustainability-oriented educational culture; while Islamic environmental ethics provide the moral and spiritual foundation guiding both technological innovation and environmental responsibility. Their reciprocal interaction demonstrates that sustainability-oriented educational transformation emerges through the convergence of technology, ecological responsibility, and faith-based values within institutional practice.

These findings extend existing scholarship, which has generally examined digital transformation, sustainability education, green schools, and Islamic environmental ethics as separate domains of inquiry (Akhmedova, 2024; Ali & Agushi, 2024). Whereas previous frameworks have predominantly emphasized technological effectiveness, environmental literacy, or religious values independently, the present study demonstrates that their educational significance arises from institutional interaction rather than isolated implementation. Unlike conventional digital education models or Education for Sustainable Development frameworks that primarily emphasize technological outcomes or environmental behaviour (Artmann, 2023; UNESCO, 2023). The Eco-Digital Islamic Education Model integrates technology, ecology, and Islamic ethics through *khalīfah*, *amānah*, and *tawāzun* to advance sustainable Islamic education.

Conceptually, the Eco-Digital Islamic Education Model represents the principal theoretical contribution of this study by explaining how technological innovation, ecological responsibility, and Islamic values interact to cultivate sustainable learning ecosystems. The model strengthens Islamic Education for Sustainable Development while offering practical guidance for institutional transformation through sustainability literacy, ethical digital competencies, and faith-based environmental responsibility. It contributes to Sustainable Development Goals 4.7 by promoting sustainability-oriented learning and responsible citizenship, supports Sustainable Development Goals 13 through ecological awareness and climate-responsive practices, and aligns with Sustainable Development Goals 17 by encouraging collaborative partnerships among educational institutions, communities, religious organizations, and sustainability networks.

CONCLUSION

This study demonstrates that integrating digital transformation, green branding, and Islamic environmental ethics can foster sustainable learning ecosystems within Islamic educational institutions. Digital transformation functions beyond technological modernization by promoting ethical digital literacy and meaningful learning, while green branding operates as an ecological *da'wah* strategy that embeds sustainability values within educational culture and institutional practices. The primary contribution is the Eco-Digital Islamic Education Model, which explains how technological innovation, environmental stewardship, and Islamic values interact to shape sustainability-oriented educational cultures. Grounded in *khalīfah*, *amānah*, and *tawāzun*, the model integrates technology, spirituality, and sustainability within a coherent framework. Practically, it advances Islamic Education for Sustainable Development and supports Sustainable Development Goals 4.7, Sustainable Development Goals 13, and Sustainable Development

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Goals 17 by promoting sustainability literacy, ethical digital competencies, ecological awareness, and collaboration, positioning Islamic education as a strategic contributor to sustainable development and contemporary educational transformation.

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