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Integrating Islamic Values into Sustainability-Oriented Environmental Education: A Qualitative Case Study of Sekolah Alam Pacitan

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ABSTRACT

Sustainability-oriented environmental education is increasingly important in primary education, yet limited empirical attention has been given to how Islamic values are integrated into environmental learning in nature-based schools. This study explores how Sekolah Alam Pacitan reconstructs environmental education through Islamic values, experiential learning, and digital innovation. This research employed a qualitative case study design. Data were collected through observation, semi-structured interviews with school leaders, Islamic education teachers, students, and parents, and analysis of school documents. The data were analyzed using interactive qualitative procedures involving data reduction, data display, and conclusion drawing. Credibility was strengthened through triangulation, member checking, prolonged engagement, and researcher reflexivity. The findings show that Islamic values serve as an ethical and spiritual foundation for environmental education. Concepts such as *khalifah* (stewardship), *amanah* (responsibility), and *syukur* (gratitude) are embedded in daily religious routines, outdoor learning, gardening, composting, waste management, and community-based activities such as *Sinau ing Ndeso* (Sindeso). These practices foster students' ecological awareness, independence, social responsibility, and appreciation of local environmental wisdom. The school also promotes sustainability through the SIDIGS digital application, which supports paperless administration, learning management, attendance, assessment, and parent–school communication. The study suggests that integrating Islamic eco-theological values with experiential and digital learning can strengthen sustainability-oriented environmental education in primary schools. However, measurable indicators of long-term behavioral change and environmental impact are needed to support broader claims of effectiveness and replicability.

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1. INTRODUCTION

Global environmental crises—including climate change, pollution, deforestation, and biodiversity loss—are interconnected challenges that threaten ecosystems and human well-being worldwide (Han & Guo, 2016; Sadulaeva, 2023). In Indonesia, rapid economic growth and increasing energy consumption have intensified environmental degradation, particularly in urban areas where air pollution, deforestation, and marine ecosystem damage have become pressing concerns (Oktavilia et al., 2019; Santosa et al., 2008). Deforestation and marine degradation further contribute to the decline in environmental quality (Nengsih et al., 2023; Oktavilia et al., 2018). Addressing these challenges requires not only effective governance and policy intervention but also transformative educational initiatives that cultivate long-term environmental responsibility (Oktavilia et al., 2021).

Within the Islamic worldview, environmental protection is not merely a social obligation but a religious imperative. The Qur'an consistently warns against environmental destruction and emphasizes human responsibility as khalifah (stewards) entrusted with maintaining balance and preventing harm (*mafsadah*) (Zuhdi et al., 2024; Zulaika et al., 2025). Islamic teachings provide ethical and spiritual foundations for environmental sustainability by promoting responsibility (amanah), gratitude (*syukur*), and preservation of creation (Alhinai & Ringer, 2025; Bsoul et al., 2022; Ulum et al., 2025). Islamic teachings also emphasize the importance of environmental protection and the prohibition of actions that cause environmental damage. Islamic law strictly prohibits any actions that can damage or destroy the environment. This is repeatedly emphasized in the Qur'an, highlighting the importance of maintaining environmental sustainability (Mohamad & Ismail, 2023; Rohman & Ibrahim, 2022). Islamic teachings provide a comprehensive guide for Muslims to manage and protect the environment (Najib et al., 2020).

Humans are considered stewards *(caliphs)* of the Earth, entrusted with managing its resources responsibly to avoid damage *(mafsadah)* that threatens human life (Alwi & Haris, 2026; Munib et al., 2022). The principle of trustworthiness is central, where humans are expected to manage natural resources in a way that ensures sustainability and prevents harm. Islamic tradition connects environmental efforts with ethical and practical conduct, encouraging the activation of religious and scientific institutions in preserving the environment (Bsoul et al., 2022).

Education plays a strategic role in translating these values into practice. Early environmental education fosters ecological awareness, pro-environmental attitudes, and responsible behavior that can shape lifelong commitments to sustainability (Nieto-Ramos et al., 2025; Sihvonen et al., 2024). Experiential and contextual learning approaches, particularly within school environments, significantly enhance students' ecological consciousness (Granato et al., 2025; Mahapatra & Vijayalatha, 2024). However, environmental education in many Indonesian schools remains largely textbook-centered and classroom-bound, limiting students' direct engagement with ecological realities.

Through education, environmental awareness can be effectively instilled in learners from a young age (Sihvonen et al., 2024). By integrating environmental education into early childhood curricula, children can develop a sense of responsibility and stewardship towards the environment, which can influence their behaviors and attitudes throughout their lives (Nieto-Ramos et al., 2025). By fostering knowledge, values, and skills related to the environment, education serves as a strategic means to promote sustainability and stewardship from a young age. This foundational approach not only benefits individual children but also contributes to the broader goal of creating a more sustainable and resilient society.

Sustainability-oriented environmental education is grounded in the broader framework of Education for Sustainable Development (ESD), which integrates environmental integrity, social equity, and economic viability within educational processes (UNESCO, 2017). Beyond enhancing environmental knowledge, ESD aims to cultivate values, critical thinking, and responsible action toward sustainability (Tilbury, 2011). Sustainability education requires a transformative shift from transmissive instruction toward holistic and systems-based learning. Within elementary education, this

approach supports the development of ecological literacy and long-term pro-environmental behavior (Rachman, 2025; Widiastuty & Anwar, 2025).

In this study, the sustainability framework is enriched by Islamic eco-theology as a normative and ethical foundation for environmental stewardship. Islamic environmental ethics are rooted in the concept of humans as khalifah (*stewards*) entrusted with maintaining balance (*mizan*) and preventing corruption (*fasad*) on Earth (Geaves, 2005). Principles such as *amanah* (trust), moderation (*wasatiyyah*), and gratitude (*syukur*) provide moral guidance for sustainable living (Lestiana & Alwi, 2025; Nasr, 1996; Ouis, 2002). Through this perspective, environmental care is understood not only as a social responsibility but also as a spiritual and theological obligation.

These ethical foundations are operationalized through experiential learning theory, which posits that knowledge is constructed through cycles of experience, reflection, conceptualization, and experimentation (Kolb, 1984). Experiential learning emphasizes active engagement and contextual interaction as essential for meaningful understanding. In environmental education, hands-on activities such as gardening, composting, and community-based learning foster deeper ecological awareness and behavioral change (Ardoin et al., 2020). By synthesizing sustainability education, Islamic eco-theology, and experiential learning theory, this study conceptualizes sustainability-oriented environmental education as a holistic model integrating ethical values, ecological knowledge, and transformative practice within elementary education.

The school environment plays a crucial role in shaping sustainable behavior and should implement targeted interventions and policies to support it (Rahmania, 2024). Experiential learning activities within the context of environmental conservation significantly enhance students' ecological awareness by fostering meaningful and contextual understanding through active engagement with environmental values (Masiliauskienė et al., 2025). However, the majority of curricula in Indonesia tend to address environmental awareness through written materials presented in textbooks and confined to classroom-based instruction (Gavilan Tatin et al., 2024; Parker & Prabawa-Sear, 2019; Prayogo et al., 2024). This conventional approach limits students' opportunities to interact directly with environmental realities, thereby reducing the effectiveness of efforts to cultivate genuine ecological consciousness.

The concept of Sekolah Alam (nature-based schools) represents an alternative educational model that utilizes nature both as a learning medium and as a physical learning environment (Robianti et al., 2024). This approach actively engages students with the natural world, fostering ecological values through direct and meaningful experiences (Nazir & Pedretti, 2016). By integrating contextual and experiential learning rooted in environmental settings, Sekolah Alam cultivates environmental awareness and character from an early age (Safri et al., 2024). As such, it serves as a compelling role model for formal education systems seeking to embed ecological consciousness into their curricula (Fachri et al., 2024). Rather than relying solely on theoretical instruction, this model promotes an applied and transformative pedagogy aimed at shaping environmentally responsible future generations.

Islamic Religious Education learning in elementary school of Sekolah Alam Pacitan offers an integrative approach that combines Islamic values with ecological awareness. In this context, Islamic teachings are not only delivered textually but also contextualized through real-life activities involving direct interaction with nature. Sekolah Alam Pacitan is one of the nature-based schools that integrates environment-based learning into Islamic Religious Education, both within the context of formal classroom instruction and through contextualized outdoor education activities.

Several previous studies relevant to fostering ecological awareness among students in schools include research on environmentally friendly education at Sekolah Alam Lampung (Sagala et al., 2019), as well as a study on cultivating environmental awareness through the 3R (Reduce, Reuse, Recycle) program (Mamat et al., 2024). In addition, Sukma's research highlights that science education is one of the most feasible subjects to be integrated with environmental education in the primary school context (Sukma et al., 2020). Rohman's study discusses the importance of integrating eco-theology into the

Islamic Religious and Character Education (IRCE) curriculum and recommends the inclusion of Islamic eco-theology in the IRCE curriculum in Indonesia (Rohman et al., 2024).

However, these studies tend to focus either on general environmental programs, subject-based integration, or normative discussions of eco-theology within curriculum frameworks. Limited research has empirically examined how Islamic values are operationalized holistically within sustainability-oriented environmental education in a nature-based elementary school setting. This study differs by providing an in-depth qualitative case analysis of how Islamic eco-theological principles are translated into experiential environmental practices, school culture, and digital innovation within Sekolah Alam Pacitan. The objectives of this research include: (1) exploring environmental education with Islamic values in the elementary school of Sekolah Alam Pacitan, (2) examining environmental activities conducted by the school to enhance students' environmental awareness, and (3) identifying digital innovations developed by the elementary school of Sekolah Alam Pacitan to promote environmental sustainability.

2. METHODS

This study employed a qualitative research approach using a descriptive-analytical case study design to explore how Sekolah Alam Pacitan integrates Islamic values into environmental education to promote sustainability. A qualitative approach was considered appropriate as it allows for an in-depth understanding of educational practices, values, and participants' experiences within their natural context (Creswell, 2013). Qualitative data collection emphasizes understanding participants' experiences, meanings, and social contexts through flexible and context-sensitive methods (Creswell & Poth, 2018). A single case study design was considered appropriate because it allows for an in-depth and contextualized exploration of the integration of Islamic values into sustainability-oriented environmental education within a specific institutional setting, enabling a comprehensive understanding of complex educational practices.

Data collection was conducted about three months specific period during regular school activities to capture authentic educational practices. Data were collected using three main techniques: semi-structured interviews, participant observation, and documentation analysis (Sugiyono, 2015). Semi-structured interviews were conducted with school leaders (principle), teachers of Islamic Education, and parents of students, and also 2 students' grade five and six to explore their perspectives, experiences, and interpretations regarding the implementation of Islamic-based environmental education. This interview format allows for guided yet flexible inquiry, enabling the researcher to probe emerging themes while maintaining consistency across participants (Kallio et al., 2016). Interviews were audio-recorded with participants' consent and transcribed verbatim to ensure accuracy of interpretation.

Participant observation was carried out to examine environmental practices and learning activities within their natural setting. Observation enables researchers to capture real-time interactions, behaviors, and contextual dynamics that may not be fully articulated in interviews (Merriam & Tisdell, 2016). Participant observations were conducted in school activities such as Islamic religious education subjects, waste management practices, outdoor learning sessions, religious activities emphasizing environmental ethics, and the use of digital systems supporting paperless administration. Observation checklists and field notes were used to systematically record behaviors, interactions, and learning processes related to environmental education. Documentation analysis involved reviewing relevant materials, including school curricula, lesson plans, teaching modules, environmental program reports, digital learning systems (SIDIGS), and school policy documents. These documents provided contextual information and supported the triangulation of data sources.

Data analysis followed Miles and Huberman's interactive model, consisting of data reduction, data display, and conclusion drawing and verification (Miles et al., 2014). Initially, interview transcripts, observation notes, and documents were coded to identify related to Islamic values, environmental

practices, sustainability concepts, and educational innovations. The codes were then grouped manually into broader categories and themes that reflected patterns of integration between religious values and environmental education. Data displays in the form of thematic matrices and narrative summaries were used to organize and interpret the findings. Finally, conclusions were drawn and continuously verified through comparison across data sources.

To ensure the credibility and trustworthiness of the findings, several strategies were employed. Data triangulation was achieved by comparing information obtained from interviews, observations, and documents, as well as across different participant groups. Prolonged engagement in the field allowed the researcher to build rapport with participants and gain a deeper understanding of the school context. Member checking was conducted by sharing preliminary findings with key informants to confirm accuracy and interpretation. Additionally, detailed descriptions of the research process were provided to enhance the dependability and transferability of the study.

Ethical approval for this study was obtained from the relevant institutional review board, and informed consent was secured from all participants, including parental consent for student participants, prior to data collection to ensure confidentiality, voluntary participation, and adherence to ethical research standards. To minimize researcher bias, reflexivity was maintained throughout the study by critically reflecting on the researcher's assumptions and positionality, keeping analytic memos during data collection and analysis, and continuously comparing interpretations across data sources to ensure balanced and objective findings.

3. FINDINGS AND DISCUSSION

3.1 Findings

The findings presented about summarize the results of observations and interviews conducted with teachers, students, and parents at Sekolah Alam Pacitan. The data reveal that environmental education at the school is implemented through an integrative approach that combines nature-based learning, Islamic values, experiential activities, and digital innovation. The results indicate that environmental awareness is cultivated not only through classroom instruction but also through routine religious practices, outdoor learning activities, community-based programs, and the use of digital technology that supports sustainable school management. These practices collectively contribute to the development of students' ecological awareness, moral responsibility, leadership skills, and independent character. The key evidence presented in the table reflects participants' perspectives and experiences, while the pedagogical implications highlight the potential contributions of these practices to holistic and environmentally responsible education, such as in table below:

Table 1. Summary of Key finding

Research Theme	Key Findings	Key Evidence	Pedagogical Implication
Integration of Environmental Education and Islamic Values	• Environmental awareness is integrated with Islamic teachings emphasizing humans as *khalifah* (stewards of the Earth) • Religious routines such as *mura'jaah* and Dhuha prayer strengthen students' spirituality and environmental responsibility.	"Before learning begins, students routinely perform Dhuha prayer and review their Qur'an memorization to remind them that humans must take care of Allah's creation." (Teacher)	Integrating environmental education with religious values helps students develop ecological awareness grounded in moral and spiritual responsibility.
Nature-Based Learning Approach	The school uses the natural environment as the main learning resource through outdoor and experiential learning activities.	"Most learning activities are conducted using the surrounding environment so students can directly observe and interact with nature." (Principal)	Nature-based learning enhances students' experiential understanding of environmental issues and promotes meaningful learning.
Four Pillars of Holistic Education	Student development is based on four pillars: knowledge, character, leadership, and entrepreneurship.	"Our learning system focuses not only on academic knowledge but also on character, leadership, and entrepreneurship." (Principal)	Holistic education encourages balanced development of cognitive, affective, and practical competencies in students.
Environmental-Based Extracurricular Activities	Environmental awareness is strengthened through activities such as planting, composting, and environmental care practices.	"Students are involved in planting plants and processing leaves into compost so they understand the importance of maintaining the environment." (Teacher)	Hands-on environmental activities help students develop ecological responsibility through direct practice.
"Sindeso" Program (Village Immersion)	The "Sindeso" program allows students to live in villages and learn local wisdom, independence, and environmental practices.	"During "Sindeso", we stayed in villagers' homes and learned many things about village life and independence." (Student)	Community-based learning strengthens students' social awareness, independence, and appreciation for local ecological wisdom.
Contextual Learning through Field Visits	Field visits such as outings to traditional markets and city tours connect academic lessons with real-life experiences.	"By visiting the traditional market, students learn about buying and selling while practicing honesty and responsibility." (Parent)	Contextual learning bridges theoretical knowledge with real-world applications and strengthens social-emotional learning.
Digital Innovation in Education	The SIDIGS application supports digital school management and learning processes.	"Through SIDIGS, teachers, students, and parents can access attendance, assignments, and announcements easily." (Principle)	Digital platforms enhance educational management efficiency and improve communication among school stakeholders.
Paperless School Initiative	Digitalization reduces paper use and supports environmental sustainability.	"The use of SIDIGS helps reduce paper usage because assignments and evaluations are conducted digitally." (Teacher)	Paperless learning systems contribute to environmental sustainability and efficient educational administration.
Parental Involvement through Technology	Parents can monitor student activities, attendance, finances, and character development through the application.	"I can monitor children's attendance, savings, and character cards through the SIDIGS application." (Parent)	Technology strengthens school–parent collaboration and supports transparent monitoring of students' learning progress.

3.1.1 Environmental Education Integrated with Islamic Values in Sekolah Alam Pacitan

The findings indicate that environmental education at Sekolah Alam Pacitan is implemented through a nature-based learning approach that integrates Islamic values with daily learning practices. Observations revealed that the natural environment is frequently used as a primary learning resource, allowing students to interact directly with plants, soil, and surrounding ecosystems. Teachers explained that this approach aims to foster not only academic understanding but also students' environmental

awareness and moral responsibility. Principle also described how the learning process is intentionally connected with character formation:

> *"Learning here is not only about academic knowledge. We also emphasize character, leadership, and independence so students can understand their responsibility toward nature." (Principle)*

Students' character development is framed through four main learning orientations: knowledge, character, leadership, and entrepreneurship. These dimensions are reflected in both classroom and outdoor learning activities, such as gardening, planting crops, and managing organic waste. Observational data showed that students regularly participate in practical environmental activities, including waste sorting and compost production using organic materials collected around the school.

With the vision, "To become a leading educational institution that implements integrated learning grounded in nature, local potential, and a strong culture of environmental stewardship", Sekolah Alam Pacitan is committed to educating students to develop a strong sense of environmental responsibility. To realize this vision, the school has established the following missions, namely (1) dedicated to providing education that nurtures individuals who are knowledgeable, morally upright, and of noble character, (2) aims to develop high-quality education that is accessible to the wider community, (3) preparing a generation of future leaders with strong personal character, (4) It is also committed to building a collaborative learning community, and (5) implementing effective and efficient learning processes by utilizing the natural environment as a central medium of instruction.

The integration of Islamic values is also evident in routine religious activities conducted before formal lessons begin. Students start their day with Qur'an memorization review (*mura'jaah*) followed by the dhuha prayer. According to the Islamic Education (PAI) teacher, these practices are intended to strengthen students' awareness that caring for the environment is part of their religious responsibility.

> *"We remind students that humans are created as khalifah on Earth. Taking care of the environment is part of worship and gratitude to Allah." (Teacher)*

Figure 1. Getting used to Dhuha prayer before learning

In addition to religious routines, environmental awareness is reinforced through everyday practices such as proper waste disposal, separating organic and inorganic waste, and reusing materials for creative projects. Teachers frequently connect these practices with Islamic teachings about stewardship and responsibility for the natural world. A student also reflected on how these activities influence their perspective on the environment:

> *"Here we learn that nature is Allah's creation, so we should not damage it. When we plant trees or make compost, it feels like we are taking care of what Allah has given us." (Student)*

The integration of environmental awareness and religious values is implemented holistically at Sekolah Alam Pacitan through various contextual and experience-based learning activities. Each activity, both inside and outside the classroom, is designed to foster students' love for nature while

strengthening their spirituality. Environmental awareness is cultivated through practices such as disposing of waste properly, sorting trash, and reusing materials for art projects. The role of the Islamic Education (PAI) teacher is to enrich and deepen students' understanding of Islamic teachings, particularly the notion that humans are entrusted as stewards (*khalifah*) on Earth (Alwi et al., 2024).

3.1.2 Environmental Activity in School to Enhance Environmental Awareness in Students

Environmental awareness among students is fostered through various outdoor and community-based learning activities. These activities extend learning beyond the classroom and allow students to interact directly with environmental and social contexts. Previous studies suggest that environmental education embedded in real-life contexts can strengthen students' sense of responsibility toward ecological issues (Obasi & Osah, 2022). The findings of this study support this view, showing that experiential environmental activities contribute to students' understanding of sustainability practices.

One of the activities observed during the study was the "Sindeso" program (Sinau Ing Ndeso, meaning learning in the village), in which students stay in a local village for several days and participate in community life. According to the school principal, the activity is intended to provide students with real-life learning experiences beyond the classroom.

> *"Through Sindeso, students learn directly from the community. They see how people manage their environment and daily life, so the learning becomes more meaningful." (Principal)*

Figure 2. Sindeso 2025 activities in Ngadirojo, Pacitan

Students also described the activity as an opportunity to develop independence and practical skills while interacting with the local community.

> *"When we stayed in the village, we had to adapt to a different environment and help with daily activities. It taught us to be more independent and understand how people live close to nature." (Student)*

These findings are consistent with research by Ibrahim et al. (2022), which highlights that community immersion experiences can enhance students' problem-solving abilities and adaptability. However, the present study extends previous research by showing that such experiences also contribute to students' environmental awareness when learning activities are explicitly linked with ecological values (Ibrahim et al., 2022).

In addition to community-based learning, environmental practices are also integrated into daily school activities. Observations revealed that students participate in planting vegetables and flowers within the school environment. Organic waste such as fallen leaves and plant residues is collected and processed into compost. Teachers involve students in each stage of the composting process to help them understand the ecological cycle and the benefits of waste management. Teacher explained the importance of involving students directly in these activities:

"Students are not only told about environmental care; they practice it. For example, when they make compost from leaves, they can see how waste can become something useful." (Teacher)

These hands-on activities align with the argument of Ximenes et al. (2018), who emphasize that environmental education introduced from an early age can foster responsible environmental behavior. The findings of this study support this perspective by demonstrating that practical environmental activities can help translate abstract ecological concepts into concrete learning experiences (Ximenes et al., 2018).

Another form of experiential learning observed in this study is contextual field visits, such as trips to traditional markets and city tours. During visits to traditional markets, students observe buying and selling processes and interact directly with vendors. Teachers use these activities to introduce economic concepts while also emphasizing values such as honesty, responsibility, and respect for others. Teacher described the purpose of this activity as follows:

"When students visit the traditional market, they learn about real economic activities. At the same time, they practice communication, respect for sellers, and appreciation for people's work." (Teacher)

While previous studies primarily highlight the cognitive benefits of contextual learning, the findings of this research suggest that such activities also contribute to the development of social and environmental awareness by connecting classroom knowledge with everyday experiences.

Religious values are also integrated into outdoor learning activities. The Islamic Education teacher explained that environmental activities are often framed within the Islamic concept of human responsibility toward nature.

"We remind students that everything in nature is created by Allah, and humans are entrusted as khalifah to protect it. So when they care for plants or clean the environment, it is part of their responsibility." (Teacher)

This finding extends previous literature on environmental education by demonstrating how ecological awareness can be reinforced through religious perspectives. While many environmental education studies focus on scientific or civic approaches, the integration of spiritual values in this context provides an additional moral framework that encourages students to care for the environment. The Islamic Education teacher emphasizes to students that every outdoor activity is a form of learning and an expression of gratitude for the creations of Allah SWT. Furthermore, the teacher consistently reminds students that all elements of nature have been created by Allah for the benefit of humankind, and that humans are entrusted with the responsibility to act as khalifah (stewards) on Earth—to protect and preserve the environment, not to exploit or damage it.

3.1.3 Digital Innovations of Sekolah Alam Pacitan to Promote Environmental Sustainability

Digital technology in Sekolah Alam Pacitan is used not only to support administrative and instructional processes but also to reduce paper consumption in school activities. Digital technologies significantly improve energy efficiency, reduce waste, and optimize resource utilization, which are essential for sustainability (Alsanie, 2025). Observations and interviews revealed that a smartphone-based application is used to manage attendance, learning materials, assessments, and communication between teachers, students, and parents. Teachers reported that the system allows assignments, evaluations, and announcements to be distributed digitally rather than through printed documents. Principle explained how digital tools have changed everyday classroom practices:

"Previously, many assignments and announcements were printed. Now most of them are shared through the application, so we rarely use paper." (Principle)

Figure 3. Semester Evaluation Activities using the SIDIGS Application

This shift toward digital documentation reflects broader discussions on the role of digitalization in promoting sustainable resource use. Studies have shown that digital systems can reduce paper consumption and contribute to environmental sustainability by minimizing deforestation and waste (Ghosh et al., 2019). The findings of this study support this argument, as digital platforms appear to reduce reliance on printed materials in routine school activities.

The application also allows students to access learning materials and track their academic progress. According to student, the digital platform makes it easier to review assignments and monitor their results:

> *"We can see our assignments and scores directly in the application, so we don't need printed papers anymore." (Student)*

Potential of digital technologies to improve student engagement and learning outcomes, digital tools may also contribute to environmental education indirectly by reducing paper-based learning practices (Niță & Guțu, 2023). However, teachers also noted that digitalization requires adjustments in teaching strategies and technological familiarity among educators.

School leadership also plays a role in encouraging the use of digital tools for learning and school management. The importance of digital leadership not only facilitating technology integration within educational institutions, but also demonstrating how digital leadership can also support environmental sustainability initiatives within school environments (Shen et al., 2025; Syarip & Dadang, 2025) The principal emphasized the importance of adopting technology to support both educational efficiency and environmental sustainability.

> *"We encourage teachers and students to use digital systems because it helps simplify administration and at the same time reduces the use of paper." (Principal)*

This finding aligns with previous studies emphasizing the importance of digital leadership in facilitating technology integration within educational institutions (Brunner et al., 2023). At the same time, the findings extend earlier research by demonstrating how digital leadership can also support environmental sustainability initiatives within school environments.

In addition to supporting academic activities, the digital platform enables parents to monitor students' attendance, learning progress, and financial transactions related to school activities. Parents can also submit absence notifications through the application rather than using printed letters. A parent described the benefit of this system:

> *"Through the application, we can check our child's attendance and activities easily, and if they are absent we can send the permission letter directly." (Parent)*

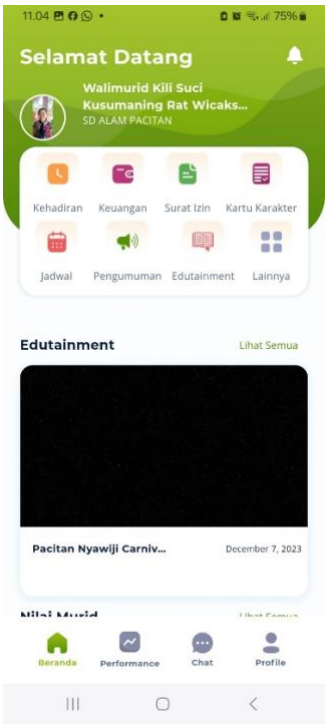

Figure 4. SIDIGS Application for Parent

The findings suggest that digital technology can support environmentally responsible school management by reducing dependence on paper-based documentation while simultaneously improving communication and learning accessibility. However, the long-term sustainability impact of such initiatives requires further evaluation through measurable indicators, such as documented reductions in paper consumption and resource use. Strengthening digital literacy among teachers and ensuring consistent implementation across school activities will be essential for maximizing the environmental and educational benefits of digital innovation in school settings.

3.2 Discussion

Environmental education in the school context is shaped by the integration of nature-based learning, Islamic values, experiential activities, and digital innovation. From a theoretical perspective, this integration contributes to the growing discourse on Islamic eco-theology and sustainability education. Islamic eco-theology emphasizes the ethical relationship between humans and the natural environment, particularly through the concept of *khalifah* (stewardship), which positions humans as responsible guardians of the earth. The findings suggest that embedding environmental practices within religious teachings may strengthen students' moral commitment to environmental stewardship. This aligns with the argument of Seyyed Hossein Nasr that environmental ethics in Islam are rooted in spiritual responsibility and reverence for creation (Nasr, 1996). By linking ecological activities such as composting, planting, and waste management with religious narratives, the program appears to extend conventional environmental education models that often rely primarily on scientific or civic frameworks.

The experiential learning strategies observed in this study also resonate with principles of experiential education and place-based learning. As argued by David A. Kolb, knowledge is constructed through concrete experiences and reflective practice (Kolb, 1984). Activities such as community immersion in the "Sindeso" program, gardening, and compost production provide students with opportunities to interact directly with environmental systems. These practices support earlier research suggesting that environmental education becomes more meaningful when students engage with real-life ecological contexts rather than abstract concepts alone. However, the present

study extends this literature by demonstrating how experiential environmental learning can be reinforced through a religious framework that frames environmental care as both a moral and spiritual obligation.

Despite these strengths, several limitations should be considered. First, the sustainability practices implemented in the program appear to rely heavily on teacher facilitation and school initiatives. Without systematic evaluation or long-term assessment, it remains unclear whether students' environmental attitudes and behaviors persist beyond the school environment. Previous studies in sustainability education emphasize the importance of measuring behavioral outcomes rather than relying solely on reported learning experiences (Tilbury, 2011). Future research could therefore incorporate longitudinal evaluation to assess whether such programs lead to sustained pro-environmental behavior among students.

Another important aspect of the program is the use of the SIDIGS digital platform to support administrative and instructional processes. The findings suggest that digitalization has contributed to reducing the use of printed materials for assignments, attendance records, and school communication. This observation supports previous studies indicating that digital systems can reduce paper consumption and contribute to environmentally sustainable school management (Ghosh et al., 2019). However, the current study did not quantify the actual reduction in paper usage or calculate environmental impact indicators such as paper savings or carbon reduction. As a result, the sustainability contribution of SIDIGS remains largely inferred rather than empirically measured.

Furthermore, the effectiveness of digital tools also depends on the digital literacy of teachers, students, and parents. While the platform facilitates communication and monitoring of student activities, challenges may arise if stakeholders have unequal access to digital devices or internet connectivity. Successful technology integration requires continuous training and institutional support (Brunner et al., 2023). Therefore, future development of digital sustainability initiatives should consider capacity building and infrastructure readiness to ensure equitable participation.

Overall, the findings suggest that integrating religious values, experiential environmental activities, and digital innovation offers a promising approach to sustainability education. At the same time, the program would benefit from stronger evaluation mechanisms and measurable sustainability indicators to demonstrate its long-term environmental impact.

This study highlights the potential of integrating Islamic eco-theological values, experiential environmental learning, and digital innovation to strengthen sustainability education in school contexts. By framing environmental stewardship as both an educational and spiritual responsibility, the program provides an alternative approach that complements existing scientific and civic models of environmental education. However, the long-term effectiveness of such initiatives depends on systematic evaluation, measurable sustainability indicators, and continuous development of digital and pedagogical capacities among school stakeholders.

4. CONCLUSION

This study examined the implementation of sustainability-oriented environmental education in a nature-based elementary school through the integration of Islamic values, experiential learning, and digital innovation. The findings show that these elements function as an interconnected educational model in which ecological practices are framed not only as scientific learning but also as moral and spiritual responsibilities. By connecting environmental activities with Islamic concepts such as khalifah or stewardship, the school fosters students' ecological awareness, responsibility, and commitment to environmental care. Theoretically, this study contributes to sustainability education and Islamic eco-theology by demonstrating how religious environmental ethics can be translated into school culture, experiential activities, and digital management practices. Practically, it highlights the importance of gardening, waste management, community-based learning, interdisciplinary curricula, and paper-reducing digital systems in strengthening environmental education.

However, the study is limited by its single-case qualitative design, which makes the findings context-specific and unable to measure long-term behavioral change or quantifiable environmental impacts. Future research should involve comparative studies across different schools, longitudinal designs to examine students' sustained pro-environmental attitudes and behaviors, and quantitative measures of outcomes such as reduced paper use, waste reduction, or improved resource efficiency. Such studies would provide stronger empirical evidence for integrating ethical values, experiential learning, and digital innovation in sustainability education.

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