Tafkir: Interdisciplinary Journal of Islamic Education
Vol 6, No. 4, December 2025, DOI: https://doi.org/10.31538/tijie.v6i4.2238
E-ISSN 2527-8177 pp. 1009-1025

Integrating Fiqh al-Bi'ah into Project-Based Learning to Enhance Environmental Character in Islamic Higher Education

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Keywords:
Project-Based Learning; Fiqh *al-Bi'ah*; Environmental Character; Islamic Education; Experiential Learning.

Abstract

Environmental degradation and climate crises continue to escalate globally, while Islamic higher education has yet to effectively integrate religious environmental ethics into its pedagogy. This study addresses the lack of integration of Islamic environmental values into higher education curricula, particularly within Muhammadiyah institutions. The aim of this research is to examine whether a project-based learning (PjBL) model centered on fiqh al-bi'ah (Islamic environmental jurisprudence) effectively enhances the environmental character of university students. Employing a qualitative Classroom Action Research approach, 40 sixth-semester students participated in community-based environmental projects over one semester, and their progress was assessed through pre- and post-intervention evaluations across cognitive, affective, and psychomotor domains. Findings indicated significant improvements: cognitive understanding of fiqh al-bi'ah increased from 61.2% to 89%, affective attitudes toward environmental stewardship improved from 58.7% to 87.5%, and psychomotor skills rose from 43.5% to 74%. Furthermore, students demonstrated enhanced awareness, empathy, and commitment to Islamic environmental ethics. Overall, this study contributes to eco-Islamic pedagogy by demonstrating the efficacy of integrating religious principles into practical environmental education. It also suggests avenues for future research on long-term behavior changes and broader implementation in diverse educational settings.

Kata kunci:
Pembelajaran Berbasis Proyek; Fikih Bi'ah; Karakter Peduli Lingkungan; Pendidikan Islam; Pembelajaran Berbasis Pengalaman.

Abstrak

Degradasi lingkungan dan krisis iklim terus meningkat secara global, sementara pendidikan tinggi Islam belum sepenuhnya berhasil mengintegrasikan etika lingkungan berbasis nilai-nilai keagamaan dalam pedagoginya. Penelitian ini mengkaji kekurangan tersebut, khususnya di perguruan tinggi Muhammadiyah, dengan tujuan mengevaluasi efektivitas model Project-Based Learning (PjBL) berbasis fiqh al-bi'ah (fikih lingkungan) dalam membentuk karakter lingkungan mahasiswa. Menggunakan pendekatan Classroom Action Research kualitatif, sebanyak 40 mahasiswa semester enam mengikuti proyek lingkungan berbasis komunitas selama satu semester. Evaluasi dilakukan sebelum dan sesudah intervensi pada aspek kognitif, afektif, dan psikomotorik. Hasil menunjukkan peningkatan signifikan: pemahaman kognitif naik dari 61,2% menjadi 89%, sikap afektif dari 58,7% ke 87,5%, dan keterampilan psikomotorik dari 43,5% menjadi 74%. Mahasiswa juga menunjukkan peningkatan kesadaran, empati, dan komitmen terhadap etika lingkungan Islam. Studi ini membuktikan bahwa integrasi nilai-nilai agama ke dalam pendidikan lingkungan praktis efektif membentuk karakter ekoliterasi mahasiswa, serta memberikan kontribusi terhadap pengembangan pedagogi eco-Islamic. Temuan ini merekomendasikan penelitian lanjutan terkait perubahan perilaku jangka panjang dan penerapan lebih luas di berbagai konteks pendidikan.

Article history:
Received: 02-07-2025
Revised 13-09-2025
Accepted 10-10-2025

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INTRODUCTION

Environmental degradation, climate crisis, and biodiversity loss have reached critical levels, calling for urgent, multidimensional responses. In Muslim-majority countries like Indonesia, integrating Islamic environmental ethics into education is increasingly important. The United Nations Environment Programme (UNEP) warns that nearly one million species could become extinct in the coming decades, while the World Wildlife Fund (WWF) reports a 60% decline in wildlife populations since 1970 (Nyika & Mwema, 2021). These alarming trends demand a transformative cultural and behavioral shift—one that can be nurtured through holistic education grounded in both science and religious values.

Various studies confirm that incorporating environmental content in higher education enhances students' ecological awareness and responsibility (Tadesse, 2024; Sharma et al., 2024). However, environmental education within Islamic higher institutions, especially in Indonesia, remains fragmented and overly theoretical. The Al-Islam and Kemuhammadiyahan (AIK) curriculum often fails to bridge Islamic teachings with real-world environmental challenges. Although pesantren-based models that integrate Islamic values with conservation practices (Putri et al., 2023) show promise, there is a clear gap in the implementation of experiential, faith-integrated learning strategies at the university level.

This study aims to design and implement a project-based learning (PjBL) model grounded in fiqh al-bi'ah (Islamic environmental jurisprudence) within the AIK curriculum at Universitas Muhammadiyah Makassar. The objective is to enhance students' environmental character—cognitively, affectively, and behaviorally—by engaging them in community-based environmental projects that are explicitly rooted in Islamic ethical principles.

The central hypothesis of this study is that integrating fiqh al-bi'ah into a PjBL framework will significantly improve students' cognitive understanding of Islamic environmental ethics, strengthen their affective commitment to environmental stewardship, and develop their practical (psychomotor) engagement in sustainable actions.

Building on earlier works that emphasize the potential of fiqh al-bi'ah in shaping ecological ethics (Bsoul et al., 2022; Zulkifli et al., 2023; Amir et al., 2023), this study contributes to the emerging discourse on eco-Islamic pedagogy by offering a replicable educational model that combines Islamic theology, character education, and real-world environmental action.

RESEARCH METHODS

This study used a qualitative design combining Classroom Action Research (CAR) and model development to create, implement, and assess a project-based learning (PjBL) model centered on fiqh al-bi'ah within the AIK courses. CAR is highly regarded in higher education for its ability to promote character development through an iterative

process of planning, action, observation, and reflection, allowing educators to adjust teaching methods based on real classroom evidence (Rokhman et al., 2022).

The study was conducted at Universitas Muhammadiyah Makassar during the 2024/2025 academic year, with 40 sixth-semester Management students enrolled in an AIK course. They were divided into four groups, each tasked with designing and implementing an environmental education project based on fiqh al-bi'ah principles. The projects were carried out in collaboration with local Muhammadiyah schools, ensuring real-world relevance and contextual learning.

Data were collected through participatory observations, in-depth interviews with students and instructors, and pre- and post-intervention questionnaires to track changes in students' knowledge, attitudes, and behaviors. Additionally, qualitative documents such as field notes, student portfolios, and project reports were analyzed (Sugiyono, 2022). Thematic analysis was used to identify patterns in students' experiences, while descriptive quantitative analysis captured changes in cognitive, affective, and psychomotor domains. Data triangulation, member checking, and peer debriefing ensured the validity and trustworthiness of the findings.

The integration of CAR with PjBL aligns with best practices that encourage collaborative action research and student co-creation of the learning experience (Rokhman et al., 2022). This combined approach fosters character development by aligning academic goals with ethical and social values. Educational models like the Living Values project and local wisdom-based character education emphasize embedding moral and cultural values into curricula for holistic student development (Nurhidayati et al., 2024).

The AIK learning module consisted of three key components: an introduction to fiqh al-bi'ah, core content involving Qur'anic and Hadith studies along with scientific perspectives on contemporary environmental issues, and a practical project phase. The module concluded with reflection and assessment activities, where students compiled portfolios, gave presentations, and were evaluated using rubrics measuring cognitive, affective, and psychomotor skills (Fathayati et al., 2021).

Assessment was essential, with rubrics assessing performance in all three learning domains, promoting metacognitive reflection and internalization of character values through self-assessment (Fathayati et al., 2021). This comprehensive framework allowed the development of a faith-based PjBL model that enhanced academic understanding while fostering strong environmental ethics rooted in Islamic teachings.

RESULTS AND DISCUSSION

Results

The Condition of AIK Learning Before Model Intervention

A preliminary assessment of the AIK course at Universitas Muhammadiyah Makassar revealed significant shortcomings in fostering environmental awareness among students. Prior to the intervention, AIK was taught primarily through traditional lectures characterized by one-way communication and minimal student engagement.

This passive learning environment provided few opportunities for students to critically engage with the material or connect it to current environmental issues. Unsurprisingly, only 11 out of 40 students (27.5%) even recognized the term fiqh al-bi'ah, and the majority could not explain how Islamic teachings relate to pressing environmental challenges such as climate change, pollution, and biodiversity loss.

Many students admitted they were unsure how environmental values fit within Islamic teachings. As one student, Amra Aeni, shared: "I always considered caring for the environment to be just a civic duty, not something deeply rooted in Islamic values. I only realized that the Qur'an and Hadith place significant emphasis on environmental ethics." Her comment illustrates a general unawareness of Islam's theological basis for environmental stewardship—in other words, students tended to view environmental care as a secular concern rather than a religious duty.

Another student, Agrisya Yuliana, echoed this sentiment: "I often saw environmental issues as topics for science or social studies. I noticed more environmental action from activists than from religious teachers." Her perspective underscores a disconnect between religious education and modern environmental advocacy—students seldom encounter ecological topics in the context of their religious studies.

A similar gap in understanding was pointed out by Miftah Farid, who confessed: "I thought that as long as we prayed and fasted, we were fulfilling our religious obligations. I didn't realize that protecting nature is also our responsibility as Muslims." His statement reflects a narrow interpretation of religious duties—one that overlooks broader ethical obligations such as caring for the environment.

Survey data further highlighted this gap. When asked if caring for the environment is an essential part of Islamic ethics, only 11 out of 40 students (27.5%) strongly agreed. Nearly half (47.5%) responded neutrally, and the remaining 25% either disagreed or were uncertain. These responses reveal a widespread hesitancy and lack of deep understanding among students regarding the religious importance of environmental stewardship.

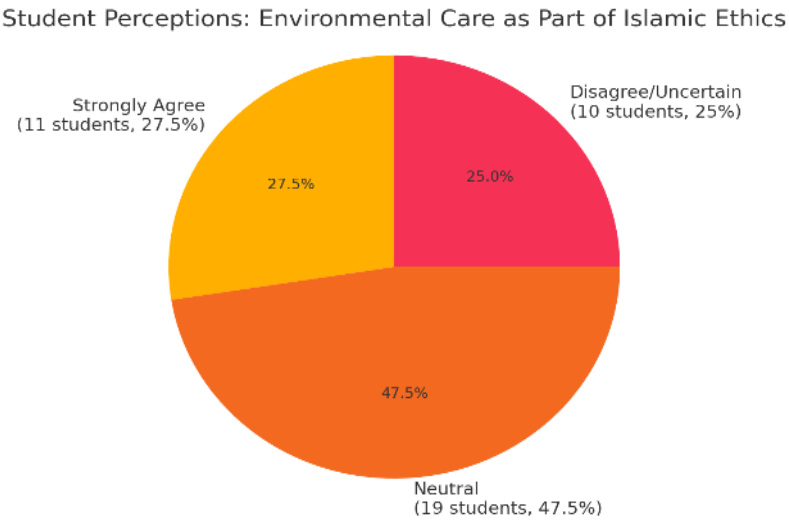

***Figure 1**: Student Perceptions of Environmental Care as Part of Islamic Ethics*

Interestingly, initial awareness levels varied among different groups of students. Group 1 showed the highest awareness (14 out of 40 students, or 35%), possibly because some of its members had participated in extracurricular environmental activities before. In contrast, fewer than 8 students in either Group 2 or Group 4 (less than 20% in each group) had any prior knowledge of fiqh al-bi'ah. Group 3 demonstrated only moderate awareness, and even those students struggled to clearly articulate Islamic environmental principles.

These disparities are visually summarized in a preliminary diagram of the findings. The diagram underscores the fragmented nature of students' understanding and the differing degrees of readiness across the student groups to engage with environmental topics.

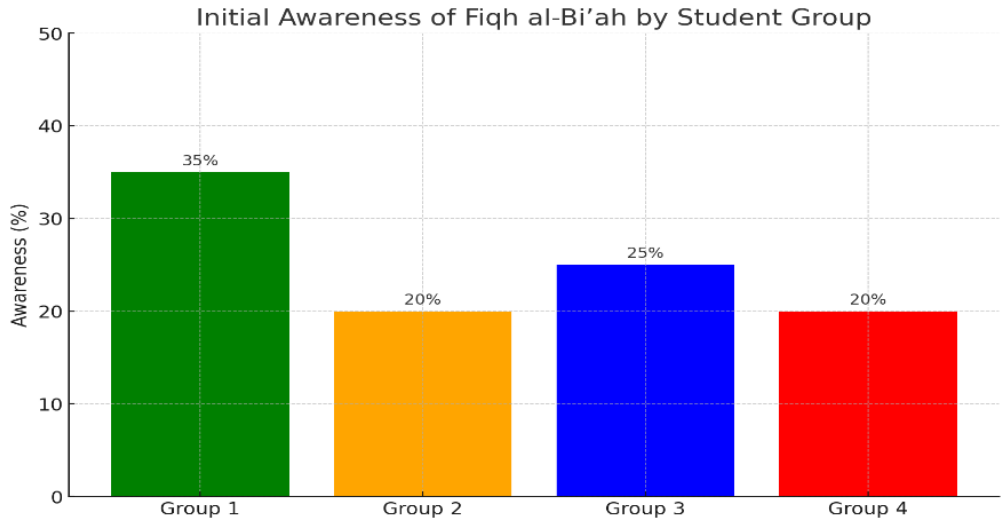

***Figure 2**: Initial Awareness of Fiqh al-Bi'ah by Student Group*

The traditional lecture-based AIK approach clearly failed to put religious values into context, resulting in only a superficial understanding of environmental ethics among students. Lacking contextual, hands-on, and reflective learning opportunities, students did not internalize environmental stewardship as part of their spiritual identity. These findings reinforce the need for a transformative educational model that links Islamic teachings with practical environmental action—one that truly embodies Islam's vision of *rahmatan lil 'alamin* and empowers students to act as responsible stewards of the Earth.

Development and Implementation of the Project-Based Learning Model

The AIK project-based learning model was specifically developed to integrate the concept of fiqh al-bi'ah into the course through a PjBL approach. The goal of this model was to foster students' environmental awareness, instill Islamic environmental values, and build practical skills for stewardship.

Stages of Model Development

The model was developed in three major stages, each designed to align the pedagogy with Islamic ecological values and to build a well-rounded environmental character in students:

In the first stage, instructor held a series of classroom sessions to introduce Islamic teachings on environmental stewardship. During the initial three meetings, lecturers highlighted Quranic verses such as Al-Baqarah 30, Al-Nahl 10-11, Yasin 33-35, Al-Mu'minun 21, Yasin 71-73, Al-Zumar 21, Al-A'raf 56, Al-Rum 41, Al-An'am 141, and they shared relevant Hadith like, "No Muslim plants a tree or sows a crop, then a human, an animal, or a bird eats from it, but it will be counted as a charity (sadaqah) for him," (Hadith narrated by Bukhari and Muslim), and "Whoever shows kindness (compassion) to living beings on earth, Allah will show mercy to him,"(Hadith narrated by Thabrani). After these presentations, two class sessions were dedicated to collaborative discussions in which students—guided by their lecturers—began designing their own environmental project activities. This approach helped students directly connect religious concepts to practical action plans.

In the second stage, the instructors developed learning modules that merged scriptural references with local environmental issues. Alongside studying Qur'anic and Hadith materials, students examined local case studies (for example, the urban waste crisis in Makassar and the problem of deforestation in South Sulawesi). This contextual learning encouraged students to critically reflect on how Islamic ethical principles could be applied to address real environmental challenges, thereby deepening their engagement.

The third stage focused on preparing for assessment. Instructor created detailed rubrics to evaluate student development in the cognitive, affective, and psychomotor domains. These rubrics included indicators such as the students' ability to link scriptural teachings with environmental practices, their empathy and commitment to ecological values, and their demonstration of leadership, teamwork, and innovation during the projects. The rubrics were reviewed and validated in consultation with AIK curriculum experts and environmental educators to ensure they were reliable and culturally relevant. The key steps of this development process are summarized in Table 1.

Table 1. *Stages of Project-Based Learning Model Development for AIK*

Stage	Description
Concept Formulation	The instructor conducted classroom meetings to convey Islamic perspectives on caring for the environment. They emphasized selected Quranic verses and Hadith, and then guided discussions in which students started to design environmental projects, allowing them to translate religious principles into concrete action plans.
Module Development	The core instructional materials are prepared, incorporating relevant Qur'anic verses, *Hadith*, and local environmental case studies.
Rubric Design	Assessment rubrics are developed and validated by experts to ensure they cover the cognitive, affective, and psychomotor learning domains.

Structure of the Learning Module

The following table presents the structure of the AIK project-based learning module used in this study:

Table 2. Structure and Components of the AIK Project-Based Learning Module Focused on *Fiqh al-Bi'ah*

Module Component	Description
Introduction	The introduction establishes core AIK values, highlights the urgency of environmental stewardship, and outlines the basic concepts of *fiqh al-bi'ah*.
Conceptual Material	This section provides scriptural references from the Qur'an and *Hadith*, integrates logical reasoning with scientific perspectives, and presents case studies on environmental ethics.
Project Activities	Students engage in designing and implementing community projects, such as organizing workshops and training sessions.
Reflection & Assessment	This phase involves developing portfolios, delivering group presentations, receiving instructor feedback, and conducting self-evaluations.

Based on Table 2 above, the program emphasized core AIK values and the urgent need for environmental conservation in Islam, while introducing the foundational concepts of fiqh al-bi'ah (Islamic environmental jurisprudence). The conceptual material included a close study of Qur'anic verses and Hadith related to environmental ethics, combined with scientific explanations and group discussions addressing contemporary environmental issues. Students were required to design, implement, and document community-based environmental initiatives such as educational workshops, recycling campaigns, or ecoenzyme production projects. Finally, reflection and assessment involved students preparing portfolios and group presentations, instructors observing student engagement, and students conducting self-evaluations all guided by an environmental character evaluation rubric.

Model Implementation

The implementation spanned 16 class meetings over one semester. The first five meetings were dedicated to in-class learning and project planning. The subsequent eight meetings took place in the field, where students worked directly with community partners to carry out their environmental projects. The last three meetings were reserved for students to compile project reports, deliver presentations, reflect on their experiences, and participate in evaluation activities.

A total of 40 students were divided into four project groups, each working at a different Muhammadiyah partner school in the community:

Group 1 (SMP Muhammadiyah 1 Maccini): This group initially encountered resistance from the partner school's students, who viewed environmental care as a secular topic. Through interactive sessions that underscored Muslims' religious responsibility toward the environment, these perceptions gradually shifted in a positive direction.

Group 2 (SMA Muhammadiyah 1 Makassar): The second group struggled at first to motivate the high school students to collect recyclable materials. They addressed this challenge by organizing a creative competition, which dramatically increased participation and enthusiasm for recycling.

Group 3 (SMA Muhammadiyah 6 Makassar): This group used visual storytelling and local case examples to inspire the students. Their approach led to enthusiastic responses and even spurred some of the high school students to initiate their own environmental activities.

Group 4 (SMP Muhammadiyah Limbung): The fourth group introduced an ecoenzyme production project. This initiative drew interest from local community leaders, who indicated they would like to replicate the project in their homes and neighborhoods.

Throughout the project, students kept detailed portfolios documenting their learning journey, the challenges they faced, and their personal reflections. These portfolios—together with the groups' final presentations and instructors' feedback—formed the basis of the final assessment. In the last three meetings, dedicated reflection sessions allowed students to internalize the lessons learned, recognize their own growth, and suggest improvements for future projects.

Table 3
Student Project Titles, Locations, and Activity Types in the AIK Project-Based Learning Implementation

Group	Project Title	Location	Activity Type
Group 1	Environmental Counseling and Education	SMP Muhammadiyah 1 Maccini	Awareness sessions on Islamic environmental ethics
Group 2	Recycled Materials Workshop	SMA Muhammadiyah 1 Makassar	Creative recycling projects and environmental awareness campaigns
Group 3	Islamic-Based Ecological Literacy Workshop	SMA Muhammadiyah 6 Makassar	Visual storytelling sessions and eco-spiritual discussions
Group 4	Ecoenzyme Production Training	SMP Muhammadiyah Limbung, Gowa	Practical training sessions in sustainable waste management

The Effectiveness of the Fiqh al-Bi'ah-Based Project Model in Shaping Students' Environmental Character

We evaluated the effectiveness of the fiqh al-bi'ah-based PjBL model by examining student progress across the affective, cognitive, and psychomotor domains. This evaluation incorporated pre- and post-tests, classroom observations, and student reflections to provide a comprehensive picture of each student's development.

Affective Domain (Attitude)

The affective domain (students' attitudes and values) showed the most dramatic improvement. The average affective pre-test score was 11.75 out of 20 points (58.7%), but this rose to 17.5 (87.5%) after the intervention. Nearly all students (92.5%) demonstrated a strong awareness of the importance of cleanliness and environmental sustainability, and 90% expressed a deep appreciation for nature as a divine creation that must be protected. These outcomes indicate a significant positive shift in students' attitudes and motivations, reflecting a deeper internalization of Islamic environmental ethics.

Supporting this quantitative data, several student testimonies reveal meaningful personal transformation. Khaerun, one participant stated, "Before this project, I thought environmental issues were only the responsibility of activists. But after studying fiqh al-bi'ah and working directly in the field, I realized that caring for nature is part of worship." Risma, another student, shared, "I feel more responsible after learning that the Qur'an repeatedly emphasizes ecological balance. Now I'm more sensitive and proactive in protecting my home environment." These reflections demonstrate that the model encouraged not just cognitive understanding, but deep emotional and spiritual alignment with environmental values.

Table 4
Comparison of Affective Learning Outcomes Before and After AIK Project-Based Learning

Affective Indicators	Pretest (%)	Posttest (%)
Environmental awareness	60	90
Appreciation of nature as God's creation	55	88
Commitment to environmental preservation	57	87
Internalization of Islamic values in ecological action	59	85
Empathy toward socio-ecological issues	63	88

Cognitive Domain (Knowledge)

The cognitive domain (knowledge and understanding) also showed major gains. The average score on cognitive assessments rose from 12.25 (61.2%) before the intervention to 17.8 (89%) afterward. In fact, 91% of students were able to clearly explain the importance of fiqh al-bi'ah and its relevance to Islamic teachings and environmental conservation. This suggests that the PjBL model successfully bridged the gap between theoretical knowledge and practical understanding, allowing students to recognize environmental ethics as an integral part of their faith and daily lives.

Table 5
Comparison of Cognitive Learning Outcomes Before and After AIK Project-Based Learning

Cognitive Indicators	Pretest (%)	Posttest (%)
Understanding of fiqh al-bi'ah	61	89
Knowledge of Islamic ecological principles	58	86
Connection between Islamic teachings and environmental issues	62	90
Understanding of eco-spirituality in Islam	59	88
Understanding of relevance to SDGs	66	91

Psychomotor Domain (Skills)

Improvement in the psychomotor domain (practical skills and behaviors) was more modest but still notable. The average score increased from 8.7 out of 20 (43.5%) to 14 (74%) after the project. About 80% of the students reported adopting more environmentally friendly habits, 70% became actively involved in waste management practices, and 60% participated in environmental campaigns via social media. These outcomes suggest that while applying environmental ethics in daily life may require ongoing reinforcement, the PjBL model did succeed in jump-starting the development of key sustainable skills and habits. (Table 6 (Table 6. Comparison of Psychomotor Learning Outcomes Before and After AIK Project-Based Learning) provides a detailed comparison of psychomotor outcomes before and after the intervention.)

Table 6
Comparison of Psychomotor Learning Outcomes Before and After AIK Project-Based Learning

Psychomotor Indicators	Pretest (%)	Posttest (%)
Adoption of eco-friendly lifestyle	40	78
Participation in waste management	45	75
Environmental campaigns via social media	43	72
Engagement in greening activities	47	76
Execution of fiqh al-bi'ah-based projects	43	70

Overall, students achieved the highest post-intervention scores in the cognitive domain, followed closely by the affective domain. This indicates that they not only developed a strong intellectual understanding of Islamic environmental ethics, but also an emotional connection to these principles. Although improvements in the psychomotor domain were more moderate, they still reflect the model's ability to influence behavior. The inclusion of community-based projects was especially important in building practical skills and motivating students to become active participants in environmental stewardship.

Taken together, the marked improvements across all three learning domains underscore the transformative potential of integrating fiqh al-bi'ah into a project-based learning framework. The model not only filled the gaps left by traditional AIK teaching methods, but also offered a replicable and contextually relevant strategy for cultivating environmental character in Islamic higher education. By involving students in reflective, community-focused activities, the approach aligned academic learning with spiritual and ethical development—effectively preparing students to act as informed, responsible environmental stewards in their communities and beyond.

Discussion

The findings from this study highlight the profound impact of incorporating *fiqh al-bi'ah* into project-based learning (PjBL) to enhance students' environmental character. Initially, students had a limited understanding of environmental issues within an Islamic framework, mirroring concerns highlighted in existing literature, which suggests that traditional lecture-based methods often lead to shallow engagement with environmental topics (Fosnacht & Broderick, 2020). These conventional approaches typically produce passive learners and fail to connect theoretical concepts to real-world or ethical contexts. In contrast, the PjBL method created an interactive learning environment that engaged students in hands-on environmental problem-solving while allowing them to internalize Islamic values surrounding stewardship and sustainability (Nurhidayati et al., 2024).

The significant improvements observed in students' cognitive abilities align with other studies that emphasize how PjBL promotes higher-order thinking and a deeper understanding of interdisciplinary concepts through experiential learning (Aminullah & Solihun, 2024). In this study, embedding *fiqh al-bi'ah* into the curriculum enabled students to explore Islamic perspectives on environmental stewardship, reinforcing the connection between their religious values and broader environmental ethics, such as those reflected in the Sustainable Development Goals (Putri, 2024). For instance, student knowledge increased from 61.2% to 89%, providing clear evidence that PjBL can effectively foster a deeper understanding of Islamic ecological principles.

The noticeable gains in the affective domain further support the idea that PjBL nurtures students' emotional engagement and commitment to environmental issues. This finding echoes research that suggests active, participatory learning experiences can heighten empathy and strengthen students' sense of moral responsibility toward ecological challenges (Weber et al., 2025). In this study, students' greater appreciation for nature as a divine creation marked a genuine shift in their values, reflecting an internalization of Islamic environmental ethics. Specifically, affective attitudes improved from 58.7% to 87.5%, highlighting a notable transformation in how students viewed environmental care as a religious obligation.

Although the psychomotor domain showed the smallest relative improvement, the increase in students' ability to apply environmental ethics practically is still significant. The rise from 43.5% to 74% aligns with other studies that suggest practical environmental action requires sustained effort and institutional support (Wibowo et al., 2024). Acquiring hands-on skills typically necessitates continuous reinforcement and adequate infrastructure support, which can be challenging to provide within a single semester (Haswan et al., 2024). These findings suggest that future implementations should consider extending project durations and enhancing institutional resources to provide students with more opportunities to practice and refine their skills.

The collaborative, community-based nature of the projects was key in delivering a comprehensive learning experience. By working with local communities, students were able to relate the projects to real-life issues, fostering a sense of social responsibility and personal agency (Romlah et al., 2024). This approach also mirrors the conservation

practices of the Bajo tribe (Chanifah et al., 2024) and the Pengulu Uten forest guardians (Gayo et al., 2024), who emphasize the importance of community-based environmental stewardship aligned with Islamic environmental principles. The deep respect the Bajo community has for marine environments, and the Gayo tradition of forest stewardship, are clear examples of how *fiqh al-bi'ah* manifests in practice—examples that students could draw inspiration from in their own projects.

This study's integration of Islamic principles through *fiqh al-bi'ah* highlights how faith-based environmental education can foster deeper moral and ethical engagement in learners. Embedding religious values directly into environmental projects encouraged students to view caring for the environment not just as an academic task, but as a spiritual and communal responsibility (Bsoul et al., 2022; Zulkifli et al., 2023). The alignment between faith and practice reinforced students' identities as environmentally responsible Muslims, helping to cultivate essential character traits such as empathy, cooperation, and integrity. The sasi tradition in Maluku (Haq et al., 2025) serves as another example of how local Islamic values can regulate sustainable resource use, with social sanctions in place for violations—paralleling lessons taught in the AIK course projects.

The practical successes of the student-led projects, such as effective waste management campaigns and environmental literacy workshops, further demonstrate the effectiveness of the PjBL model in fostering environmental stewardship (Hadiati et al., 2024; Vilcapoma-Malpartida et al., 2023). Through these projects, students gained invaluable hands-on experience that strengthened their classroom knowledge while simultaneously developing leadership and teamwork skills. Similar results have been observed in Eco-Tahfiz models in Malaysia, where students' immersion in religious education combined with ecological ethics leads to heightened commitment and increased community engagement (Aziz Rekan & Mokhtar, 2025).

The use of comprehensive assessment rubrics that cover cognitive, affective, and psychomotor domains was crucial for capturing the multi-dimensional outcomes of the intervention. Including a self-assessment component also encouraged students to reflect on their learning and become more metacognitive, enabling them to assess their progress and personal growth continuously (Fathayati et al., 2021). This holistic assessment approach aligns with best practices in character education, which emphasize evaluating knowledge, attitudes, and skills together.

The results of this study underscore the advantages of PjBL over traditional lecture-based methods in developing students' environmental character. The active learning and real-world relevance inherent in PjBL inspire students to internalize sustainable practices and develop critical soft skills such as leadership and ethical decision-making. In contrast, traditional methods—focused on rote memorization and individual performance—do not cultivate the collaborative learning environment and community involvement that PjBL fosters (Haswan, 2024).

Furthermore, framing environmental education within the context of *fiqh al-bi'ah* reinforces the idea that Islamic environmental teachings are universal and directly

aligned with contemporary global sustainability initiatives. Islamic principles of stewardship, justice, and interconnectedness strongly echo the objectives of sustainable development, providing a distinctive ethical foundation for environmental education (Lutfauziah, 2023; Putri, 2024). For example, productive waqf forests, grounded in *fiqh al-bi'ah*, offer an effective model for balancing economic development with ecological stewardship, as seen in the study by Umam et al. (2024), which parallels the community projects in this research.

However, the study also identified several challenges that need to be addressed in future iterations. Measuring outcomes in the psychomotor domain remains a complex task and may require more robust assessment tools and greater institutional support (Wibowo et al., 2024). Additionally, ensuring long-term behavioral changes may require ongoing reinforcement and follow-up activities beyond a single semester—such as additional workshops, extended community partnerships, and more integration of environmental education into the broader curriculum (Setianingrum et al., 2024; Maslani et al., 2023).

Scaling up and sustaining community-based environmental projects within Islamic educational institutions will benefit from strengthened collaborations with local communities and the purposeful use of Islamic values to inspire ecological responsibility. Incentivizing student engagement can also help maintain momentum (Aulia et al., 2019). Furthermore, developing campus infrastructure that supports sustainable practices and incorporating environmental education into core curricula are crucial steps toward institutionalizing these initiatives (Nazar et al., 2024; Hadiati et al., 2024). Aligning policies with *maqāṣid al-sharīʿah*, as suggested by Rois et al. (2024), will ensure that ecological conservation remains a priority for governments and educational institutions.

Finally, the study suggests several directions for future research. One potential avenue is to explore interdisciplinary approaches that integrate Islamic teachings with environmental science, as well as conducting longitudinal studies to assess the long-term impact of such educational models on student behavior. There is also a need for culturally tailored strategies to ensure environmental education remains relevant across diverse Muslim communities (Gueye & Mohamed, 2023; Mufid et al., 2024). Investigating the role of policy frameworks and technological innovations in supporting eco-Islamic education could help create more effective, scalable, and sustainable pedagogical models. Insights from successful Islamic environmental projects—such as the blue economy initiatives in halal industry development (Saba et al., 2025)—could serve as valuable inspiration for expanding the reach and relevance of eco-Islamic curricula in higher education.

CONCLUSION

This study revealed a surprising insight: despite students' prior exposure to religious courses, they were largely unaware of the deep connections between Islamic teachings and environmental ethics. Significant improvements across all three domains—cognitive, affective, and psychomotor—only became evident after students engaged in a project-based learning model incorporating the principles of fiqh al-bi'ah. This transformative learning experience demonstrated that students not only enhanced their knowledge but also cultivated stronger moral commitments and practical habits conducive to environmental stewardship. The fact that they had previously viewed environmental ethics as a secular rather than a religious matter underscores the urgent need for integrative, faith-based educational approaches. This intervention also showed that contextualizing Islamic environmental principles through direct community projects can foster a profound internalization of values to a degree that traditional methods cannot achieve.

From a scholarly perspective, this study presents a novel, integrative educational framework that blends Islamic environmental jurisprudence with project-based learning. Instead of simply confirming or challenging previous research, this study introduces a new pedagogical model that integrates the cognitive, affective, and psychomotor domains of character development within an Islamic ethical context. The findings not only support prior work highlighting the importance of experiential, values-based learning but also provide concrete evidence of the effectiveness of this approach in an Islamic higher education setting. This model serves as a replicable example for educators aiming to foster environmental ethics through religious education, offering both conceptual and practical contributions to the growing discourse on eco-Islamic pedagogy.

This study, however, has several limitations. First, it was conducted at a single institution with a relatively small sample of 40 students, all of whom shared similar academic and cultural backgrounds. Second, the intervention lasted only one semester, which limited the ability to observe long-term behavioral changes. Future research should address these issues by including larger, more diverse samples across multiple educational contexts and by extending the duration of the interventions. Additionally, studies should explore variations across gender, academic discipline, and geographic region to gain a more comprehensive understanding of the model's effectiveness. By addressing these limitations, subsequent research can further refine and expand the model, thereby enabling more robust policy recommendations. Ultimately, such efforts will contribute to the development of holistic, faith-based environmental education strategies that are both culturally adaptable and widely scalable.

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