

Managing Eco-Theological Integration in Polytechnic Islamic Religious Education: Pedagogical Practices and Institutionalization Gaps

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ABSTRACT. This study examines how Islamic eco-theological values are articulated, enacted, experienced, and institutionally supported within Islamic Religious Education (PAI) learning in Indonesian polytechnics. Using an exploratory, qualitative, multisite design, the study was conducted at three state polytechnics through semi-structured interviews with nine PAI lecturers and 15 students who had completed PAI courses, non-participant observations of classroom and off-class learning activities, and analysis of semester learning plans, instructional materials, and assessment instruments. Data were analyzed thematically through a hybrid deductive–inductive approach, followed by within-site and cross-site comparison. The findings show that concepts such as khalifah, amanah, mizan, and the prohibition of fasad provided a shared normative foundation across the three institutions, but their pedagogical enactment varied. Conceptual transmission corresponded mainly with affective and reflective responses, habit-oriented learning with observable everyday practices, and contextual-experiential learning with more dialogical and participatory engagement. These patterns do not establish a causal sequence. Across all sites, ecological integration remained weakly embedded in learning outcomes, instructional guidance, assessment, and institutional policy, leaving implementation dependent on individual lecturers. The study positions Eco-Theo-Pedagogy as an analytical framework linking theological meaning, pedagogical practice, student engagement, vocational relevance, and institutional support. It identifies preliminary requirements for future development, including curricular articulation, contextual and experiential learning, vocational relevance, ecological action, assessment alignment, and lecturer and institutional support.

Keywords: *Eco-Theo-Pedagogy, Islamic Education, Ecological Awareness, Vocational Education, Sustainability Ethics*



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INTRODUCTION

Environmental sustainability has become a major educational concern as societies face increasing pressures on ecosystems, natural resources, and planetary systems (Richardson et al., 2023; Wals & Benavot, 2017). Research indicates that environmental education can strengthen knowledge, values, skills, participation, and conservation-oriented action (Ardoin et al., 2020). Within this broader educational response, vocational education plays an important role by connecting learning with work, citizenship, and wider social and environmental transformation

(McGrath & Powell, 2016). The expansion of environmental industries and sustainability-oriented workplace practices has also created new competency demands that vocational institutions need to address (Pavlova, 2019). These developments are particularly relevant to polytechnics because their graduates enter industrial and professional settings where energy use, waste management, environmental safety, and resource efficiency constitute practical responsibilities.

In Indonesia, religious education occupies a formally mandated position within higher education. National higher education law requires religious education to be included in undergraduate and diploma curricula (UU No. 12 Tahun 2012 tentang Pendidikan Tinggi, 2012), while recent scholarship similarly recognizes Islamic Religious Education (Pendidikan Agama Islam, PAI) as a compulsory curricular subject for Muslim students in Indonesian higher education (Herlina et al., 2025). Because polytechnics provide diploma and applied undergraduate education, this mandate positions PAI as a formal component of Indonesian polytechnic curricula. Within this institutional context, PAI provides a relevant setting for examining the ethical and religious dimensions of ecological responsibility by connecting spiritual formation, ecological concerns, and character-oriented moral action (Chanifah et al., 2021; Umar et al., 2025; Wakhidah & Erman, 2022). Islamic environmental scholarship identifies stewardship, entrusted responsibility, balance, and the prohibition of destruction as principles governing the human–nature relationship (Bsoul et al., 2022; Nazar et al., 2023). Concepts such as khalifah, amanah, mizan, and the prohibition of fasad therefore provide a normative vocabulary for ecological responsibility.

Previous studies describe ecological curricula and activities, including waste management, conservation, and extracurricular programs (Albar et al., 2024; Nazar et al., 2024; Syukri et al., 2024). Research in Islamic higher education discusses tauhid-based green learning and ecological ethics in PAI textbooks (Masturin et al., 2022; Rahman et al., 2025). However, the unresolved problem is not merely the limited number of polytechnic studies. Existing scholarship has not explained how Islamic ecological values are represented and enacted in PAI, experienced by students, shaped by institutional conditions, and connected with vocational contexts.

In this exploratory baseline study, Eco-Theo-Pedagogy is used as an analytical concept rather than as a validated model. Islamic ecotheology and environmental ethics education provide lenses for interpreting moral responsibility toward nature. A sustainability-pedagogy perspective directs attention to ethical reflection, contextual environmental issues, and everyday decisions (Aldrin, 2024; Altmeyer, 2021). Experiential learning distinguishes conceptual instruction from direct engagement, reflection, and action (Morris, 2020; Murrell & Claxton, 1987), while vocational green-skills education examines links with industrial contexts (Fauziah et al., 2024).

Accordingly, the inquiry examines how lecturers and students articulate Islamic eco-theological values; how ecological concerns are represented in instructional documents and enacted through classroom and off-class learning practices; how students understand, experience, and respond to ecological issues within PAI learning; and what curricular, pedagogical, and institutional conditions support or constrain ecological integration across Politeknik Negeri Medan (Polmed), Politeknik Negeri Bandung (Polban), and Politeknik Negeri Banjarmasin (Poliban). These domains guide the thematic and cross-site analysis used to map ecological integration in PAI learning.

This study therefore aims to map the current integration of ecological values in PAI learning across three state polytechnics. It does not claim to construct or validate a final Eco-Theo-Pedagogy model. Instead, it identifies recurring patterns, institutional differences, implementation gaps, and preliminary requirements for curriculum articulation, contextual and experiential learning, ecological projects, assessment, lecturer development, and institutional support. The resulting baseline provides an empirically grounded account of the conditions required to strengthen ecological integration in PAI learning across vocational institutions.

METHOD

This study employed an exploratory qualitative multisite design to examine the integration of ecological values and Islamic theological principles into PAI learning across polytechnic institutions (Jenkins et al., 2018). The study was conducted from May to October 2025 at three state polytechnics: Polmed, Polban, and Poliban. These institutions were purposively selected to represent variations in institutional contexts and PAI learning practices within vocational education. The unit of analysis included instructional planning, pedagogical practices, students' learning experiences, and institutional support for ecological integration.

Participants consisted of nine PAI lecturers and fifteen student interviewees selected purposively. Three lecturers and five student interviewees were recruited from each institution. Lecturers were selected based on their active involvement in planning and teaching PAI. Student interviewees were required to have completed the PAI course so that they could adequately reflect on their learning experiences (Robinson, 2014). The students observed during classroom and off-class learning activities were different from the student interviewees and were enrolled in PAI classes during the observation period.

Table 1. Interview Participant Profiles

No	Initials	Institution	Participant Role	Location
1	LM1	Politeknik Negeri Medan	Lecturer	Medan
2	LM2	Politeknik Negeri Medan	Lecturer	Medan
3	LM3	Politeknik Negeri Medan	Lecturer	Medan
4	SM1	Politeknik Negeri Medan	Student	Medan
5	SM2	Politeknik Negeri Medan	Student	Medan
6	SM3	Politeknik Negeri Medan	Student	Medan
7	SM4	Politeknik Negeri Medan	Student	Medan
8	SM5	Politeknik Negeri Medan	Student	Medan
9	LB1	Politeknik Negeri Bandung	Lecturer	Bandung
10	LB2	Politeknik Negeri Bandung	Lecturer	Bandung
11	LB3	Politeknik Negeri Bandung	Lecturer	Bandung
12	SB1	Politeknik Negeri Bandung	Student	Bandung
13	SB2	Politeknik Negeri Bandung	Student	Bandung
14	SB3	Politeknik Negeri Bandung	Student	Bandung
15	SB4	Politeknik Negeri Bandung	Student	Bandung
16	SB5	Politeknik Negeri Bandung	Student	Bandung
17	LJ1	Politeknik Negeri Banjarmasin	Lecturer	Banjarmasin
18	LJ2	Politeknik Negeri Banjarmasin	Lecturer	Banjarmasin
19	LJ3	Politeknik Negeri Banjarmasin	Lecturer	Banjarmasin
20	SJ1	Politeknik Negeri Banjarmasin	Student	Banjarmasin
21	SJ2	Politeknik Negeri Banjarmasin	Student	Banjarmasin
22	SJ3	Politeknik Negeri Banjarmasin	Student	Banjarmasin
23	SJ4	Politeknik Negeri Banjarmasin	Student	Banjarmasin
24	SJ5	Politeknik Negeri Banjarmasin	Student	Banjarmasin

Note. All lecturer participants were actively teaching PAI during the study period, and all student participants had completed the PAI course.

Data were collected through semi-structured interviews, non-participant observations, and document analysis. Interviews examined participants' understanding of Islamic ecological values, pedagogical practices, learning experiences, and institutional conditions. Observations focused on teaching strategies, classroom interactions, environmental issues, student engagement, and ecological activities inside and outside the classroom. Documents included semester learning plans, instructional materials, and assessment instruments. Institutional permission was obtained before data collection. Participants were informed about the study, participated voluntarily, and were anonymized through institutional and individual codes for confidentiality.

Data collection and analysis involved six researchers. Researcher assignments overlapped across sites, as some researchers contributed to research activities at two institutions. Two researchers conducted data collection at each site using common interview, observation, and document-review protocols. Data were organized and coded manually using Microsoft Excel and analyzed thematically through a hybrid deductive–inductive approach. Initial analytical domains were derived from the research focus, while more specific codes were developed from the empirical data (Fereday & Muir-Cochrane, 2006).

For each site's dataset, three researchers collaboratively conducted repeated reading, initial coding, code categorization, and theme development. Differences in interpretation were discussed until consensus was reached (Cascio et al., 2019; Nowell et al., 2017). Analysis proceeded from within-site analysis to cross-site comparison to identify similarities, differences, recurring patterns, and divergent findings across the three institutions. Trustworthiness was strengthened through source and method triangulation, cross-site review, peer debriefing, and documentation of analytical decisions as an audit trail (Nowell et al., 2017).

RESULT

Shared Eco-Theological Foundations with Different Institutional Articulations

Across the three sites, lecturers and students recognized environmental stewardship as part of Islamic responsibility. This shared foundation was expressed through recurring concepts such as khalifah, amanah, mizan, and the prohibition of fasad. The cross-site analysis summarized these variations into three recurring forms of articulation: moral obligation, everyday religious practice, and conceptual-juridical reasoning. The commonality lay in accepting ecological responsibility as a religious duty, whereas the differences appeared in the language, emphasis, and intellectual framework through which that duty was interpreted and communicated within PAI learning in each institutional context.

At Polmed, ecological responsibility was articulated primarily as a direct moral obligation. Lecturers emphasized that humans are entrusted with managing, protecting, and preserving nature, while students linked environmental care to obedience to divine commands. LM1 stated, "*Nature must not be separated from humans; humans have the role of managing, protecting, and preserving the universe.*" Students reinforced this position by associating environmental destruction with betrayal of divine trust and with fasad. This pattern reflected a practical-moral interpretation in which khalifah and amanah functioned as immediate ethical imperatives governing human conduct toward the environment.

At Polban, ecological responsibility was articulated through everyday religious practice, particularly cleanliness and personal discipline. Lecturers associated environmental care with the belief that cleanliness reflects faith and devotion. LB1 stated, "*Cleanliness is part of faith; a clean environment reflects obedience to God.*" Students expressed a similar understanding, although they acknowledged that environmental issues were not always discussed explicitly in PAI classes. The Polban pattern therefore indicated that ecological values were internalized mainly through familiar religious habits rather than formal ecological discourse. Environmental care was communicated as an extension of daily piety, personal responsibility, and the maintenance of physical and spiritual purity.

At Poliban, ecological responsibility was articulated through a more conceptual-juridical framework. Lecturers situated environmental protection within the developing discourse of maqāṣid al-sharī'ah, including the proposition that environmental preservation should be recognized as an additional objective of Islamic law. LJ3 stated, "*The development of maqāṣid al-sittah shows that environmental protection is now considered part of Islamic legal objectives.*" This framing positioned ecological responsibility within a broader legal-ethical system rather than solely as individual morality or daily religious conduct. These variations indicate that the principal difference across the institutions did not lie in the presence or absence of ecological theology, but in how that

theology was interpreted, justified, and communicated within PAI learning across distinct educational and institutional contexts.

Pedagogical Enactment: From Conceptual Transmission to Contextual Experience

The cross-site analysis identified three recurring forms of pedagogical enactment: conceptual transmission, habit-oriented application, and contextual-experiential learning. These forms differed in the extent to which Islamic ecological values were translated from theological explanation into observable learning activities. At Polmed, ecological content remained largely classroom-based and was conveyed through lectures, discussions, photographs, and videos. At Polban, lecturers connected religious values with everyday practices such as waste sorting, reducing plastic use, using reusable bottles, and maintaining campus cleanliness. At Poliban, local environmental problems and selected field activities were used as entry points for contextual learning.

At Polmed, interview, observation, and documentary evidence converged on a pattern of conceptual transmission. LM2 explained that learning was “*limited to showing photos or videos about nature,*” because no specific time was allocated for direct environmental interaction. Classroom observations similarly showed lecture- and discussion-based instruction without practical activities or field visits. Document analysis indicated that ecological concerns were not presented as independent topics and appeared only as limited extensions of material on the human role as khalifah. No off-class activities directly connecting PAI learning with environmental action were identified during the observation period. Ecological integration therefore remained primarily discursive and cognitive.

At Polban, ecological values were enacted through habit-oriented learning. LB2 reported linking course material with waste sorting, composting, reduced plastic consumption, and reusable bottles. This account was supported by classroom observations showing lecturers encouraging reflection on personal habits and by documents in which ecological concerns appeared implicitly within topics such as humanity and leadership rather than as separate curriculum content. Outside the classroom, students completed structured campus clean-up assignments and observed water use, waste disposal, and the use of public spaces. These activities translated broad religious values into routine and observable practices, although they were not yet formally articulated as distinct ecological learning outcomes.



Figure 1. Polban Students Participating in a Campus Clean-Up Activity Related to PAI Learning

At Poliban, pedagogy was more contextual and selectively experiential. Lecturers used Banjarmasin’s waste emergency and flooding as discussion triggers, connecting Islamic teachings with environmental conditions familiar to students. Classroom observations recorded theological

dialogue around these local problems, while off-class activities included tree planting, waste audits, mosque clean-ups, and environmental observations. Documentary evidence suggested that ecological themes were present only partially and were not consistently embedded across instructional structures. Thus, the principal pedagogical difference across the institutions concerned the degree to which theological concepts were translated into contextually meaningful and observable learning experiences: from conceptual explanation, through everyday habituation, to limited contextual and field-based engagement.

Student Ecological Engagement: Affective, Habitual, and Contextual Responses

Cross-site analysis summarized students' ecological engagement into three recurring forms: affective-reflective responses, habitual behavioral engagement, and contextual-participatory involvement. These forms corresponded with the learning opportunities available at each site, although the data do not establish a causal sequence. Across the institutions, students generally recognized environmental care as part of Islamic responsibility, yet the expression of that recognition varied. Where ecological learning remained predominantly conceptual, students' responses were mainly emotional and personal. Where learning was connected with everyday practices or local environmental problems, engagement became more observable through discussion, routine action, and participation in ecological activities.

At Polmed, students' engagement was primarily affective and reflective. Classroom observations showed that students listened attentively, took notes, and acknowledged explanations linking khalifah with environmental responsibility, but little questioning or interactive discussion occurred. Interview data reflected a similar pattern. SM3 stated, *"I often feel sad and concerned when I see environmental damage, but I am not confident enough to directly reprimand others."* SM1 also reported becoming more careful in disposing of waste, even though environmental issues were not discussed extensively. These responses indicate ecological sensitivity and personal caution, while collective or action-oriented engagement remained limited during the observed learning activities.

At Polban, engagement was more visible in habitual behavior and participation in everyday ecological practices. Students discussed personal efforts to reduce plastic use and maintain campus cleanliness after lecturers linked these actions with Islamic teachings on cleanliness. Observations outside the classroom recorded students organizing waste collection, separating organic and non-organic waste, and reminding peers to maintain cleanliness. SB3 stated that environmental damage motivated participation in clean-up activities, while SB4 explained that applied activities helped demonstrate how Islamic teachings could be practiced in daily life. The Polban pattern therefore combined personal concern with repeated and socially observable behavior.

At Poliban, students displayed more contextual and participatory engagement. When lecturers introduced Banjarmasin's waste and flooding problems, students asked questions, shared neighborhood experiences, and related local conditions to Qur'anic teachings on preventing fasad. Students also participated in mosque clean-ups, tree planting, and environmental observation activities. SJ4 and SJ5 explained that direct participation made ecological learning feel real and meaningful. These findings show that students' ecological engagement differed less in the presence of concern than in how that concern was expressed. Conceptual exposure was associated mainly with reflection, everyday application with habitual action, and contextual experience with more dialogical and participatory involvement. Across all sites, however, sustained engagement remained uneven and depended on the opportunities provided within PAI learning.

Curricular and Institutionalization Gaps

Despite the differences in pedagogical practice, cross-site analysis revealed a shared institutionalization gap across the three polytechnics. Ecological values were recognized by lecturers and students and appeared in selected classroom discussions and activities, but they had not been systematically embedded in learning outcomes, instructional guidance, assessment procedures, or institutional policies. Consequently, ecological integration remained uneven and

largely dependent on individual lecturers' interpretations and initiatives. The central limitation was therefore not the absence of Islamic ecological values, but the lack of curricular and managerial mechanisms capable of sustaining their implementation across courses, lecturers, and academic programs.

At Polmed, the gap was most visible in the limited curricular representation of ecological issues. Document analysis showed that ecological concerns were not presented as distinct topics or learning outcomes and appeared mainly as minor extensions of material concerning the human role as *khalifah*. Classroom observations indicated that these themes were addressed briefly through lectures and discussions, without corresponding practical activities or assessment tasks. Lecturers also referred to limited instructional time as a constraint on field-based or experiential learning. During the observation period, no routine off-class activity was identified that formally connected PAI learning with environmental practice. Ecological integration at Polmed therefore remained primarily conceptual and weakly supported by curricular structures.

At Polban, ecological themes were likewise not formally established as independent components of the PAI curriculum. However, document analysis indicated implicit integration through topics concerning humanity, leadership, and religious responsibility. Lecturers extended these themes into assignments and everyday practices involving cleanliness, waste sorting, plastic reduction, and campus clean-up activities. This pattern demonstrates that practical enactment could develop even without explicit curricular formulation. Nevertheless, because ecological competencies and assessment indicators were not clearly specified, implementation depended on lecturers' willingness to interpret general PAI content ecologically. The continuity of these practices could therefore not be ensured across classes or teaching periods.

At Poliban, ecological integration was comparatively more visible through local environmental issues, classroom dialogue, and selected field activities. Nevertheless, documentary evidence showed that ecological content remained partial and inconsistent across instructional structures. Activities such as waste audits, tree planting, mosque clean-ups, and environmental observations were not yet supported by standardized modules, common assessment procedures, or formal institutional policies. Across the three sites, the findings thus indicate a gap between emerging pedagogical practices and their curricular institutionalization. Ecological learning was present in varying forms, but it had not yet become a stable, formally coordinated, and assessable component of PAI learning.

Cross-Theme and Cross-Site Synthesis

Across the three institutions, Islamic eco-theological values provided a shared normative foundation, yet their educational expression varied according to how lecturers translated those values into learning activities. Conceptual transmission was associated mainly with affective and reflective responses, while habit-oriented and contextual-experiential approaches were associated with more visible behavioral, dialogical, and participatory engagement. The cross-site pattern therefore indicates that differences in student engagement were less related to the presence of ecological concern than to the form, intensity, and contextual relevance of pedagogical exposure available within PAI learning across the three institutional settings. The relationships among the four themes and the institutional variations across the three sites are summarized in Table 2.

Table 2. Cross-Site Synthesis of Ecological Integration in PAI Learning

Analytical Dimension	Polban	Polmed	Poliban	Cross-Site Interpretation
Eco-theological articulation	Cleanliness and everyday religious practice	Moral responsibility through <i>khalifah</i> ,	Conceptual-juridical reasoning through	Shared theological foundation with different institutional articulations

		<i>amanah</i> , and <i>fasad</i>	<i>maqāṣid al-</i> <i>shari‘ah</i>	
Pedagogical enactment	Habit-oriented application and daily ecological practices	Conceptual transmission through lectures, discussions, and visual media	Contextual learning through local issues and selected field activities	Different degrees of translating theology into learning experiences
Student ecological engagement	Habitual and observable behavior	Affective and reflective responses	Dialogical and participatory engagement	Engagement varied with the form of pedagogical exposure
Curricular representation	Implicitly integrated	Minimal and incidental	Partial and uneven	Ecological content was not systematically embedded
Institutionalization	Emerging practices but lecturer-dependent	Limited support and practice	Contextual initiatives without standardized support	Integration remained dependent on individual lecturers

At the same time, these pedagogical differences remained constrained by a common curricular and institutionalization gap. Ecological themes were only partially represented in learning plans, rarely connected to explicit competencies or assessment indicators, and generally unsupported by shared modules, coordinated guidance, or institutional policies. As a result, implementation depended heavily on individual lecturers and varied across sites and teaching contexts. The central finding is therefore not the absence of Islamic ecological values, but the uneven translation of those values into sustained, assessable, and institutionally supported pedagogical practice across vocational higher education contexts. Practices therefore remained fragmented despite widespread recognition of ecological responsibility among lecturers and students.

DISCUSSION

Across the three polytechnics, ecological responsibility was widely recognized through *khalifah*, *amanah*, *mizan*, and the prohibition of *fasad*, yet this shared theological foundation was expressed through uneven pedagogical practices. Articulations ranged from moral obligation and daily religious discipline to conceptual-juridical reasoning, with corresponding differences in student engagement. Conceptual teaching was associated mainly with affective-reflective responses, whereas habit-oriented and contextual-experiential learning corresponded with more visible behavioral, dialogical, and participatory engagement.

From Shared Eco-Theological Foundations to Uneven Pedagogical Enactment

Across the three polytechnics, lecturers and students consistently recognized ecological responsibility as part of Islamic teaching. Across the dataset, participants' explanations drew on concepts such as *khalifah*, *amanah*, *mizan*, and the prohibition of *fasad* as foundations for understanding the human relationship with nature. However, these shared concepts were articulated differently across institutional contexts. In one setting, ecological responsibility was expressed mainly as a direct moral obligation; in another, it was connected with everyday religious discipline, particularly cleanliness and responsible habits; elsewhere, it was framed through

conceptual-juridical reasoning associated with *maqāṣid al-sharīʿah*. These variations show that theological agreement did not automatically generate pedagogical consistency.

From the perspective of Islamic ecotheology, the recurring use of *khalifah*, *amanah*, *mizan*, and *fasad* indicates the availability of a shared normative vocabulary for environmental responsibility. Islamic environmental ethics further clarifies that these concepts regulate human conduct toward nature by emphasizing stewardship, entrusted responsibility, balance, and the avoidance of destruction (Bsoul et al., 2022; Nazar et al., 2023). Nevertheless, normative recognition alone did not determine how ecological values were taught. Islamic ecotheology supplied a shared moral and conceptual foundation, but pedagogical enactment depended on how lecturers selected examples, framed environmental problems, organized activities, and created opportunities for students to reflect and act.

This distinction becomes clearer through a sustainability-pedagogy perspective. Sustainability pedagogy directs attention to the connection between ethical reflection, contextual environmental problems, everyday decisions, and participation in practical action (Altmeyer, 2021; Ardoin et al., 2020). In the present study, ecological values became more educationally visible when lecturers related theological principles to waste management, plastic reduction, campus cleanliness, flooding, or other environmental conditions familiar to students. By contrast, where ecological content remained limited to brief conceptual explanation, its pedagogical presence was less explicit. Sustainability pedagogy therefore helps explain why moral values acquire greater educational significance when they are connected with real decisions, meaningful contexts, and opportunities for participation.

The cross-site comparison also indicates that the key variation was not the existence of Islamic ecological principles, but the degree of pedagogical mediation through which those principles were translated into learning. Conceptual explanation emphasized understanding and moral recognition, whereas habit-oriented and contextual approaches made ecological responsibility more visible through routines, local cases, and selected activities. This does not imply that one approach was inherently superior or that a specific teaching strategy directly produced a particular outcome. Rather, the findings show that theological values required instructional mediation before they could become observable learning experiences. Different forms of mediation corresponded with different ways in which ecological responsibility appeared within classroom and off-class practices.

Conceptually, these findings shift the analytical emphasis from the presence of Islamic ecological values to the pedagogical processes through which those values are represented, contextualized, experienced, and enacted. This distinction is important because several influential discussions of Islamic environmental education emphasize normative principles without sufficiently explaining how those principles operate within actual instructional settings (Aldrin, 2024; Bsoul et al., 2022; Nazar et al., 2023). The present study shows that a shared theological foundation may coexist with markedly different pedagogical forms. Eco-Theo-Pedagogy should therefore be understood at this stage as an analytical lens for examining the translation of theological values into learning, rather than as a finalized instructional model.

Pedagogical Exposure and Forms of Student Ecological Engagement

The cross-theme analysis identified a correspondence between forms of pedagogical exposure and the ways students expressed ecological engagement. Conceptual transmission was associated mainly with affective and reflective responses, including concern about environmental degradation, recognition of personal responsibility, and greater caution in everyday conduct. Habit-oriented application was observed alongside more visible and repeated behaviors, such as maintaining cleanliness, reducing plastic use, sorting waste, and reminding peers about responsible practices. Contextual-experiential learning corresponded with more dialogical and participatory engagement, particularly when students discussed local environmental problems, shared personal

experiences, or participated in selected ecological activities. These patterns indicate different expressions of engagement rather than a fixed hierarchy of pedagogical effectiveness.

The findings resonate with experiential learning, which conceptualizes learning through the relationship among concrete experience, reflective observation, abstract conceptualization, and active experimentation (Morris, 2020; Murrell & Claxton, 1987). In the present study, direct engagement and reflection were associated with more visible ecological meanings than conceptual explanation alone. Conceptual instruction was observed alongside students' recognition of theological principles and articulation of concern, but offered limited opportunities to connect those principles with observable practice. Habit-oriented activities corresponded with application in familiar routines, while contextual and field-based experiences were associated with students relating religious values to environmental conditions they could observe and discuss. The analytical distinction is therefore between knowing an ecological value, reflecting on its moral significance, connecting it with lived experience, and expressing it through action. The study does not demonstrate the complete operation of an experiential learning cycle, but the framework helps interpret the variations found across the three sites.

A sustainability-pedagogy perspective further explains the importance of context in ecological learning. Such a perspective emphasizes ethical reflection and everyday ecological decision-making (Altmeyer, 2021), while environmental education research highlights the importance of locally relevant problems and opportunities for participation and practical action (Ardoin et al., 2020). In this study, waste accumulation, flooding, campus cleanliness, plastic consumption, and students' routine habits functioned as pedagogical entry points through which abstract theological concepts acquired contextual relevance. Discussions of local problems situated ecological responsibility within conditions that were familiar and immediately observable to lecturers and students. Similarly, everyday practices such as using reusable bottles or separating waste provided concrete settings for examining how religious responsibility might be expressed through ordinary decisions rather than remaining solely a matter of conceptual understanding.

Figure 1 illustrates the collective campus clean-up activity discussed above. When interpreted together with the interview and observation data, the activity represents an attempt to connect religious values of cleanliness and responsibility with ecological practice. However, because the activity was not linked to explicit learning outcomes, competencies, or assessment indicators, it remained a lecturer-led initiative rather than an institutionalized element of PAI. These patterns should not be read causally or as evidence of lasting behavioral change. They indicate only context-bound correspondences between pedagogical exposure and observed affective, habitual, dialogical, and participatory engagement. More visible forms of ecological engagement were observed in PAI settings that included opportunities for explanation, reflection, contextualization, and participation in local practice.

Institutionalization Gaps as a Management Problem in PAI Learning

Table 2 shows that the three institutions differed in pedagogical translation but shared weak curricular institutionalization and dependence on individual lecturers. Ecological responsibility appeared through varied theological explanations, contextual discussions, daily practices, and activities, yet these remained tied to lecturers' personal interpretations rather than stable arrangements across courses or academic periods. Ecological values were usually implicit within themes such as human responsibility, leadership, cleanliness, and khalifah, and were rarely formulated as explicit learning outcomes. Consequently, links among content, activities, competencies, and assessment remained incomplete, allowing ecological initiatives to emerge while leaving their continuity, coordination, and evaluation uncertain.

From an Islamic educational management perspective, ecological integration had not yet moved from individual initiative to coordinated institutional practice. Planning remained limited because ecological competencies were not explicitly specified within instructional objectives. Organizing was underdeveloped because lecturers did not operate through common modules,

shared guidance, or coordinated implementation procedures. Instructional practice varied according to individual interpretation, while assessment remained disconnected from observable ecological learning indicators. Lecturer capacity development was also not systematically organized, and institutional support had not yet created mechanisms for maintaining continuity. These conditions indicate that ecological integration requires managerial coordination across planning, implementation, assessment, professional development, and institutional policy (Anthony Jnr, 2021; Desmaniar et al., 2022; Hasbi et al., 2025).

The polytechnic context gives this institutionalization gap particular vocational significance. Graduates are expected to enter professional and industrial environments where waste management, energy use, environmental safety, resource efficiency, and ethical responsibility may form part of workplace practice. Green TVET scholarship emphasizes that vocational education should integrate sustainability-oriented competencies, environmental values and attitudes, and green skills into curricula in response to changing occupational, industrial, and environmental demands (Fauziah et al., 2024; McGrath & Powell, 2016; Pavlova, 2019; Wickramasinghe & Wickramasinghe, 2026). However, the vocational relevance of ecological PAI remained underdeveloped because most practices were connected with general environmental responsibility rather than explicitly linked with professional and industrial contexts. This indicates that the potential contribution of PAI to sustainability-oriented professional ethics has not yet been fully articulated within polytechnic learning.

The cross-site synthesis therefore identifies institutionalization as the mechanism required to connect theological recognition, pedagogical practice, student engagement, and continuity across teaching contexts. Institutionalization does not mean replacing lecturers' initiatives with rigid standardization. Rather, it involves establishing shared curricular directions, adaptable instructional guidance, relevant competency indicators, assessment alignment, lecturer development, and organizational support. Such arrangements could provide continuity while allowing each institution to respond to its local ecological conditions and vocational characteristics. Within this study, institutionalization should be understood as an empirically identified requirement for strengthening ecological integration, not as a mechanism whose effectiveness has already been tested.

Preliminary Requirements for Future Eco-Theo-Pedagogy Development

As an exploratory baseline study, the present research does not provide a finalized Eco-Theo-Pedagogy instructional model. Instead, the cross-site findings identify preliminary and empirically grounded requirements that may inform its subsequent design and testing. These requirements arise from the relationship among shared Islamic eco-theological foundations, differentiated pedagogical enactment, varied forms of student ecological engagement, and persistent curricular and institutionalization gaps. Figure 2 should therefore be read as a preliminary analytical framework rather than as a validated instructional sequence. Its function is to organize the empirical implications of the study and to clarify which elements require further development before a formal model can be constructed.

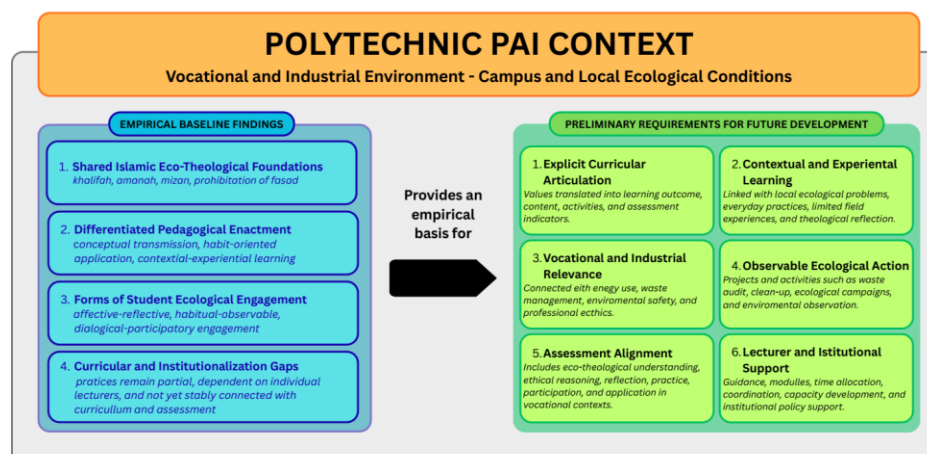


Figure 2. *Preliminary Analytical Framework for Future Eco-Theo-Pedagogy Development*

The first requirement is explicit curricular articulation. Islamic ecological values need to be translated into stated learning outcomes, relevant content, planned learning activities, and observable assessment indicators. The findings show that ecological themes were already present in implicit or partial forms, but their curricular position remained unstable. A second requirement is contextual and experiential learning. Local ecological problems, everyday environmental practices, limited field-based experiences, and theological reflection should be systematically connected so that students can relate abstract values to situations they encounter (Almughyiri, 2025). These two requirements address the gap between normative recognition and structured pedagogical implementation.

The third requirement concerns vocational and industrial relevance. In polytechnic settings, ecological learning should be connected with energy use, waste management, environmental safety, resource efficiency, and professional ethics. This does not mean turning PAI into a technical subject. Rather, it means clarifying the ethical and religious dimensions of ecological responsibilities that students may encounter in professional practice. The fourth requirement is observable ecological action. Activities such as waste audits, campus clean-ups, plastic-reduction initiatives, environmental observation, or ecological campaigns can provide opportunities for students to express theological values through participation. However, such activities need clear pedagogical purposes so that they do not remain isolated events.

The fifth requirement is assessment alignment. Ecological learning should be evaluated through indicators that reflect eco-theological understanding, ethical reasoning, reflection, participation, practical behavior, and application in vocational contexts. These proposed dimensions require alignment among intended learning outcomes, authentic and contextualized assessment tasks, explicit assessment criteria, and observable evidence of student performance (Cano García & Lluch Molins, 2022; Kioupi & Voulvoulis, 2022; Redman et al., 2021). Assessment should nevertheless remain proportionate to the exploratory and value-oriented character of PAI. The sixth requirement is lecturer and institutional support. Shared guidance, adaptable modules, sufficient time allocation, coordination among lecturers, professional development, and institutional policy are needed to reduce dependence on individual initiative. Sustainable implementation requires organizational arrangements that support continuity while allowing contextual adaptation (Anthony Jnr, 2021; Barokah et al., 2025; Desmaniar et al., 2022; Fauzi et al., 2025; Musa et al., 2024; Tihabsah et al., 2024).

The six requirements presented in Figure 2 operate primarily at the curricular, pedagogical, and institutional levels. Table 3 complements this framework by translating their learner-oriented implications into provisional domains of student ecological learning. The relationship is not strictly one-to-one: some development requirements support several learning domains, while lecturer and institutional support functions as an enabling condition across all domains.

Table 3. Provisional Student Ecological Learning Domains for Future Eco-Theo-Pedagogy Development

Provisional Domain	Focus	Possible Evidence of Learning
Eco-theological understanding	Understanding <i>khalifah</i> , <i>amanah</i> , <i>mizan</i> , and <i>fasad</i>	Conceptual explanation
Ethical-reflective reasoning	Evaluating ecological issues from ethical and religious perspectives	Reflection or case analysis
Contextual ecological awareness	Connecting Islamic values with local environmental problems	Discussion of environmental issues
Habitual ecological practice	Applying ecological habits in everyday life	Observation or practice journal
Collaborative ecological action	Participating in ecological actions or projects	Project performance and participation

Vocational ecological responsibility	Connecting ecological ethics with professional and industrial contexts	Vocational case analysis
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Note. *These domains are preliminary analytical propositions derived from the cross-site findings. They do not constitute a validated competency framework or assessment system.*

Taken together, Figure 2 and Table 3 present complementary dimensions for future Eco-Theo-Pedagogy development. Figure 2 identifies curricular, pedagogical, and institutional requirements, while Table 3 specifies provisional domains of student ecological learning. Neither represents validated model components, fixed instructional stages, or a completed competency framework. Both remain analytical and developmental.

Theoretical and Practical Implications

Theoretically, the findings distinguish between the normative availability of Islamic ecological values and their pedagogical enactment within formal learning. Concepts such as *khalifah*, *amanah*, *mizan*, and the prohibition of *fasad* provided a shared ethical vocabulary across the three institutions, but their presence did not ensure consistent ecological learning. Previous studies similarly indicate that translating Islamic ecological values into sustained learning requires explicit curricular integration, pedagogical mediation by teachers, and support from educational institutions and relevant stakeholders (Abd Rahman et al., 2020; Albar et al., 2024; Ar et al., 2025; Badrudin et al., 2025; Calaguas, 2025; Rohman et al., 2024). The present study extends this scholarship by empirically distinguishing the availability of normative principles from the curricular, pedagogical, and institutional processes through which they become learning experiences. Eco-Theo-Pedagogy can therefore be positioned as an analytical space connecting theological meaning with the educational processes through which ecological responsibility is contextualized, reflected upon, and expressed (Amin et al., 2025; Khuadthong et al., 2025; Maarif et al., 2026).

The study also contributes to sustainability pedagogy and experiential learning by identifying correspondence between forms of pedagogical exposure and forms of student ecological engagement. Conceptual transmission was observed alongside mainly affective and reflective responses, while habit-oriented and contextual-experiential practices corresponded with more visible behavioral, dialogical, and participatory engagement. This finding does not establish a developmental sequence or causal relationship. Instead, it indicates that ecological engagement becomes differently observable according to the opportunities available for explanation, reflection, contextualization, and participation. The findings thus support the analytical value of examining ecological learning as a relationship among ethical understanding, contextually situated experience, reflection, and opportunities for participation and action (Altmeyer, 2021; Ardoin et al., 2020; Asy'Ari et al., 2025; Broto et al., 2026; Morris, 2020).

A further theoretical implication concerns institutionalization. The cross-site findings indicate that pedagogical initiatives can emerge without explicit curricular requirements, but their continuity remains uncertain when they depend primarily on individual lecturers. Research on sustainability curriculum change and sustained teaching innovation in higher education similarly shows that bottom-up initiatives may begin with individual lecturers or local champions, whereas durable institutionalization requires coordinated bottom-up and top-down strategies, leadership support, professional development, collaboration, supportive organizational conditions, and continuing adaptation (Bearman et al., 2024; Radinger-Peer & Pflitsch, 2017; Trechsel et al., 2018; Weiss et al., 2021). Institutionalization therefore represents an analytical link between theological recognition, pedagogical practice, student engagement, and sustained implementation. From an Islamic educational management perspective, this suggests that ecological integration should be examined through the interaction of planning, coordination, implementation, assessment, lecturer development, and institutional support (Anthony Jnr, 2021; Desmaniar et al., 2022). The study

consequently extends discussion beyond individual teaching strategies by locating ecological integration within broader curricular and organizational arrangements.

Practically, polytechnics should begin by making ecological responsibility more explicit within PAI learning outcomes, instructional content, learning activities, and assessment indicators (Ayu et al., 2025; Fajri et al., 2025; Khaerunnisa et al., 2025). Such articulation would provide a common direction without requiring identical implementation across institutions. Lecturers could adapt ecological issues to local and vocational contexts, including waste management, energy use, environmental safety, resource efficiency, and professional ethics. Contextual discussions, reflective assignments, daily ecological practices, and selected field or project activities may then be aligned with clearly stated pedagogical purposes. The provisional learning domains presented in Table 3 offer an initial reference for connecting eco-theological understanding, ethical reasoning, contextual awareness, habitual practice, collaborative action, and vocational responsibility.

Implementation also requires lecturer and institutional support. Shared guidance, adaptable teaching materials, appropriate time allocation, coordination among PAI lecturers, professional development, and institutional policy could reduce dependence on isolated initiatives. Assessment should remain proportionate to the value-oriented character of PAI while providing evidence of understanding, reflection, participation, and contextual application. These implications should not be interpreted as a complete implementation framework. They identify practical priorities derived from the baseline findings and require contextual adaptation, expert review, and empirical testing before broader adoption.

CONCLUSION

This study found that Islamic eco-theological values were widely recognized across the three polytechnics, but their pedagogical implementation remained uneven. Conceptual, habit-oriented, and contextual-experiential approaches corresponded with different forms of student engagement. However, ecological integration was still weakly embedded in learning outcomes, instructional guidance, assessment, and institutional policy, making implementation largely dependent on individual lecturers.

The study contributes by positioning Eco-Theo-Pedagogy as an analytical link between Islamic ecological values, pedagogical practice, student engagement, vocational relevance, and institutional support. Rather than presenting a validated model, it identifies preliminary requirements for future development: curricular articulation, contextual and experiential learning, vocational relevance, ecological action, assessment alignment, and lecturer and institutional support.

The study is limited by its qualitative scope, purposive sample, and focus on three polytechnics. It did not measure long-term behavioral change, compare instructional effectiveness, or test the proposed framework. Future research should refine the framework through expert review, develop measurable competencies and assessment indicators, and conduct pilot, comparative, and longitudinal studies across broader vocational education contexts.

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