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Research Article

From School Experience to Ecological Action: Perceived Environmental Education and Internalized Islamic Ecological Values as Complementary Predictors of Pro-Environmental Behavior among Primary School Students

Ulum Kurniawati[1*], Ainur Rifqi[2], Muhamad Sholeh[1], Nuphanudin[2], Andi Kristanto[3], and Amrozi Khamidi[1]

[1]Education Management, Faculty of Education, Universitas Negeri Surabaya, Surabaya, Indonesia
[2] Special Education, Faculty of Education, Universitas Negeri Surabaya, Surabaya, Indonesia
[3] Educational Technology, Faculty of Education, Universitas Negeri Surabaya, Surabaya, Indonesia

Abstract

This study aims to develop and evaluate a three-construct framework examining the complementary contributions of perceived environmental education and internalized Islamic ecological values to pro-environmental behavior among primary school students. An explanatory cross-sectional survey was designed to involve 220 students in Grades IV–VI, proportionately selected from 487 eligible students across three integrated Islamic primary schools in East Java, Indonesia. A synthetic dataset representing the planned sample was used to demonstrate confirmatory factor analysis, correlation analysis, and multiple regression. The illustrative measurement model demonstrated acceptable fit (CFI = .962; RMSEA = .043), with satisfactory construct reliability and discriminant validity. Synthetic regression results indicated positive independent associations between perceived environmental education (β = .337, p < .001) and internalized Islamic ecological values (β = .432, p < .001) with pro-environmental behavior, jointly explaining 43.7% of the simulated variance (R^2 = .437). These patterns illustrate the theoretical complementarity between institutional environmental learning opportunities and moral-spiritual value internalization. Consistent with environmental education theory and affective learning principles, the framework suggests that ecological behavior may depend on both supportive educational experiences and personally meaningful ethical commitments. However, because the analyses rely entirely on synthetic data, the findings cannot establish empirical relationships or causal effects. Future research should validate the proposed model using participant-derived data, direct behavioral observations, and longitudinal designs to strengthen its empirical applicability.

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CORRESPONDING AUTHOR

* **Ulum Kurniawati**, Education Management, Faculty of Education, Universitas Negeri Surabaya, Surabaya, Indonesia.
Email: 25010845085@mhs.unesa.ac.id

Introduction

Environmental education is increasingly expected to prepare children not merely to understand ecological problems but also to participate responsibly in addressing them. Primary schools introduce waste management, biodiversity, water and energy conservation, and the relationship between everyday practices and ecological systems. Large-scale syntheses show that environmental education can support knowledge and attitudes, but behavioral responses are more variable and require careful measurement (van de Wetering et al., 2022; Świątkowski et al., 2024). Children may understand conservation concepts without acting consistently in classrooms or at home. Recent

reviews therefore emphasize distinguishing environmental knowledge, opportunities to act, and directly observed or self-reported behavior (Liu & Green, 2024; Falchi & Zurru, 2024).

The gap between environmental understanding and everyday action is best understood as a combination of individual motivation and contextual opportunity rather than a direct knowledge-to-behavior sequence. Recent reviews identify values, environmental self-identity, family interaction, social models, and practical access to environmentally responsible activities as relevant factors (Liu & Green, 2024; Jia & Liang, 2025; Rahmania, 2024). Intervention effects can vary across knowledge, intention, and actual behavior, so these outcomes should not be treated as interchangeable (van de Wetering et al., 2022; Świątkowski et al., 2024). This distinction guides the present framework's separation of school provision, value internalization, and students' reported ecological action.

Environmental education may help narrow this gap when schools offer lived opportunities to practice ecological responsibility rather than only provide environmental information. Whole-institution research emphasizes coherence among curriculum, school routines, staff role modeling, facilities, learner participation, and organizational culture (Holst, 2023; Holst et al., 2024). Reviews of environmental teaching practices in elementary education also indicate the importance of locally meaningful, experiential learning opportunities (Falchi & Zurru, 2024; Suhartono et al., 2025; Zhang et al., 2025). Parents and teachers may act as role models, although such influences are dependent on communication and participation rather than simple exposure (Jia & Yu, 2021; Liang et al., 2022). In this study, perceived environmental education therefore denotes what schools provide, demonstrate, and enable, not the behaviors that learners ultimately report.

The Indonesian primary-school context makes this distinction relevant because environmental initiatives are implemented through curricular activities, Adiwiyata-related routines, waste facilities, teacher modeling, and student participation. A study of Adiwiyata primary-school students examines students' perspectives on environmental care behavior, while research on school environmental psychology points to the interaction between institutional conditions and psychosocial factors (Febriyanti & Rahmandani, 2024; Rahmania, 2024). Local educational work also identifies both instructional opportunities and constraints in implementing environmental learning (Azima & Yumna, 2022; Baan, 2023). A school's environmental provision should therefore be measured separately from student conduct, because supplying activities or facilities does not necessarily mean that students have adopted consistent ecological routines. Broader research on pro-environmental behavior among Indonesian schoolchildren provides complementary perspectives on educational habits and student well-being (Al Bahij et al., 2025).

A second pathway concerns moral meaning and the internalization of ecological responsibility. Environmental action may become more stable when learners see conservation as personally important rather than merely as an instruction to follow. Contemporary studies connect biospheric values, environmental identity, moral norms, and connection to nature with pro-environmental behavior, while cautioning against treating these associations as proof of causality (Jia & Liang, 2025; Marchetti et al., 2025; Chen et al., 2025). Islamic educational settings offer culturally meaningful concepts of stewardship (*khalifah*), trust (*amanah*), balance (*mizan*), excellence (*ihsan*), and avoidance of excess (*israf*) or environmental harm (*fasad*). Recent Islamic-education scholarship discusses how such principles may be integrated with curriculum, teaching, and school culture (Rohman et al., 2024; Qudsiyah et al., 2025; Taufikin, 2025). The educational question is whether ecological values are enacted and internalized, not simply recognized as religious

vocabulary. Studies of faith-based environmental governance also highlight ethical and spiritual commitments without implying a uniquely causal pathway (Abumoghli, 2024).

The present study integrates these two pathways while maintaining their conceptual boundaries. Recent reviews show that children's pro-environmental behavior is influenced by external educational experiences and internal psychological factors, yet much of the literature remains cross-sectional, self-reported, and fragmented across separate explanatory domains (Liu & Green, 2024; Świątkowski et al., 2024). Measurement problems also arise when environmental education instruments include behavioral items that subsequently reappear within the dependent variable. This study therefore distinguishes what schools provide, what students internalize, and what students report doing. Three hypotheses are proposed: perceived environmental education positively predicts pro-environmental behavior after controlling for Islamic value internalization; internalized Islamic ecological values positively predict pro-environmental behavior after controlling for perceived environmental education; and both predictors jointly explain significant variance in students' pro-environmental behavior. Empirical reviews and educational intervention syntheses provide the principal contemporary foundation for this distinction (Liu & Green, 2024; Świątkowski et al., 2024; Zhang et al., 2025).

Theoretical Framework and Hypothesis Development

Environmental education can influence ecological action through learning, participation, modeled practice, and opportunities to apply sustainability knowledge. Evidence on whole-institution approaches stresses that isolated classroom messages may be less coherent than learning environments in which curriculum, facilities, teacher behavior, school policies, and daily routines reinforce one another (Holst, 2023; Holst et al., 2024). Elementary-school research similarly points to teacher preparedness, practical context, and active participation as conditions for implementation (Baan, 2023; Falchi & Zurru, 2024; Hung & Pan, 2025). The school can therefore be conceptualized as an environmental learning ecology in which institutional practices make environmentally responsible actions possible and credible. This is an explanatory framework to be tested rather than an empirically established causal mechanism for the present sample.

Five dimensions represent this environmental learning experience. Learning exposure captures whether students encounter environmental ideas and problems, while practice opportunities refer to occasions for applying responsible behavior directly. Role modeling and reinforcement represent environmental examples and encouragement provided by teachers and other school adults, whereas supportive facilities reflect whether responsible actions are materially feasible. Participation opportunities concern students' involvement in environmental activities and collective responsibility. These dimensions intentionally measure school provision rather than student behavior, allowing environmental education and pro-environmental behavior to remain analytically distinct. Elementary sustainability curriculum research similarly distinguishes learning opportunities and institutional provision from students' individual responses (Hung & Pan, 2025; Holst et al., 2024). Practical environmental-literacy instruction has also been examined in school-focused Indonesian studies (Karmana, 2023; Miterianifa & Mawarni, 2024).

Values provide a complementary pathway because ecologically responsible actions may require resisting convenience, limiting consumption, or acting without immediate external rewards. Research relates biospheric values, environmental identity, personal norms, nature connectedness, and moral identity to reported pro-environmental behavior (Jia & Liang, 2025; Marchetti et al., 2025;

Chen et al., 2025). Educational and moral-philosophical analyses likewise argue that factual environmental knowledge requires an ethical dimension if it is to support responsible choices (Begum et al., 2022; Abumoghli, 2024). These sources support the conceptual importance of values while leaving the proposed independent contribution of Islamic ecological value internalization to be tested using participant-derived data.

Islamic ecological ethics offers a culturally relevant way to articulate this moral dimension. Recent educational studies describe stewardship, responsibility, balance, moderation, and avoidance of harm as concepts that can be incorporated into religious instruction, school routines, and curriculum design (Syukri et al., 2024; Rohman et al., 2024; Qudsiyah et al., 2025). Case-based work on eco-theology in Islamic education illustrates ways ecological responsibility can be connected to lived religious pedagogy, but does not establish that verbal endorsement automatically predicts behavior (Taufikin, 2025; Rohmah & Mahira, 2025). Curriculum research also identifies missed opportunities to integrate environmental themes across religiously oriented subjects (Taufiqurrochman, 2025). Accordingly, the present construct concerns the depth with which Islamic ecological meanings are personally valued rather than religious identification alone.

The affective-domain progression of receiving, responding, valuing, organization, and characterization is used as an organizing framework for the planned measure of internalization. These stages distinguish noticing an ecological obligation from increasingly consistent endorsement, prioritization, and enactment. The original taxonomy is a foundational conceptual antecedent, while the present 2021–2025 reference set draws on more recent work connecting moral educational commitments with environmental practices (Begum et al., 2022; Rohman et al., 2024; Qudsiyah et al., 2025). A student may recognize that wasting water conflicts with ecological responsibility without yet organizing daily decisions around water conservation. The empirical validity of the proposed stage-based measurement structure remains to be evaluated in the field study.

The model therefore proposes complementarity, not mediation. Perceived Environmental Education provides knowledge, environmental opportunities, practical repertoire, reinforcement, and institutional conditions, while Internalized Islamic Values contribute moral direction and self-regulation. Environmental education primarily addresses "what can be done and how," whereas internalization strengthens "why this action matters and why I should continue." The two constructs may correlate because students encounter both within the same institutional setting, yet neither is conceptually reducible to the other. This theoretical distinction leads to the simultaneous two-predictor model tested in the study. This two-pathway interpretation remains a hypothesis for the planned field study, not a conclusion from the synthetic dataset (Jia & Liang, 2025; Rahmania, 2024).

Method

The planned empirical study uses an explanatory cross-sectional survey design to examine associations among perceived environmental education, internalized Islamic ecological values, and pro-environmental behavior. The intended sampling frame comprises 487 eligible students in Grades IV-VI across three integrated Islamic primary schools in East Java, Indonesia, with 220 participants to be selected proportionately across schools and grade levels. The design is observational and therefore supports predictive-association language rather than causal conclusions. Importantly, this manuscript-development version does not analyze participant-derived observations. A synthetic dataset was generated solely to demonstrate the planned measurement and regression workflow and to identify reporting requirements before field estimation. Environmental-education evidence

also cautions that results depend on study design and the population being sampled (van de Wetering et al., 2022; Liu & Green, 2024).

The synthetic sample structure approximates balanced representation across sex, grade, and participating schools. It contains 112 girls (50.9%) and 108 boys (49.1%), with 71 cases in Grade IV, 74 in Grade V, and 75 in Grade VI. School representation comprises 78 cases from School A, 73 from School B, and 69 from School C, with a specified mean age of 10.65 years (SD = 0.92). These figures are illustrative and must not be interpreted as descriptive statistics from actual respondents.

Table 1. Illustrative Synthetic Sample Structure

Characteristic	n	%
Total	220	100.0
Girls	112	50.9
Boys	108	49.1
Grade IV	71	32.3
Grade V	74	33.6
Grade VI	75	34.1
School A	78	35.5
School B	73	33.2
School C	69	31.4

Note. The table presents the synthetic sample structure used only to demonstrate the planned analysis; mean age = 10.65 years, SD = 0.92.

Perceived Environmental Education was operationalized through five dimensions: learning exposure, practice opportunities, role modeling and reinforcement, supportive facilities, and participation opportunities. Item content was restricted to students' perceptions of what the school provided, enabled, demonstrated, or encouraged. This design prevents the predictor from directly measuring the environmental behavior later analyzed as the criterion. Higher scores indicate stronger perceived environmental educational provision, using a five-point response structure. The selection of institutional indicators is informed by whole-school sustainability measurement, not by evidence that the synthetic responses represent actual students (Holst et al., 2024; Hung & Pan, 2025).

Internalized Islamic Ecological Values comprises receiving, responding, valuing, organization, and characterization, consistent with the affective-domain framework. Ecologically relevant item content reflects *khalifah*, *amanah*, *mizan*, *ihsan*, avoidance of *israf*, and prevention of *fasad*. Pro-Environmental Behavior is represented through waste management, resource conservation, environmental cleanliness, environmental preservation, participation, and consistency across school and home contexts. Behavioral items are restricted to activities reasonably controllable by primary-school students. Higher scores indicate stronger educational experience, deeper internalization, or more frequent ecological behavior, depending on the construct. Contemporary Islamic environmental education offers the substantive ethical context for these constructs (Rohman et al., 2024; Qudsiyah et al., 2025).

Before field testing, the empirical instrument should undergo expert review for content relevance, readability testing with age-appropriate respondents, and psychometric evaluation. The planned measurement assessment includes standardized factor loadings, Cronbach's alpha, composite reliability, average variance extracted, and HTMT ratios, together with confirmatory factor analysis using chi-square, CFI, TLI, RMSEA, and SRMR. In the present manuscript-development version, the synthetic data were parameterized to illustrate an acceptable measurement structure; these values are reporting exemplars, not evidence of instrument validity in the target population.

Recent measurement-methodology research offers additional perspective on heterotrait–monotrait discriminant-validity evaluation (Roemer, 2021). Subject-specific educational media studies offer indirect examples of visual instructional engagement rather than direct evidence for ecological behavior (Sari et al., 2025; Rasyid et al., 2025).

The planned analysis proceeds through data screening, descriptive analysis, confirmatory measurement evaluation, Pearson correlations, and multiple regression. The primary regression equation is PEB = beta0 + beta1PEE + beta2IIV + epsilon, where PEB represents Pro-Environmental Behavior, PEE Perceived Environmental Education, and IIV Internalized Islamic Ecological Values. Variance inflation factors assess multicollinearity, while confidence intervals and standardized coefficients communicate effect magnitude. Because students are nested within classes and schools, intraclass correlations should be examined and cluster-robust or multilevel procedures considered if meaningful dependence is detected. All numerical estimates reported in this version are synthetic and are intended to be replaced by field estimates before empirical submission. Parent- and school-related ecological factors may be correlated, strengthening the case for examining dependence and measurement separation (Alam & Hamzah, 2025; Jia & Yu, 2021).

Result and Discussion

Result

Screening of the synthetic dataset indicated complete analyzable information for all 220 illustrative cases. Construct-level distributions were specified as approximately symmetric, with absolute skewness values below .70 and absolute kurtosis values below .90. The illustrative class-level intraclass correlation for pro-environmental behavior was .031, suggesting limited clustering in the demonstration dataset. No extreme multivariate response patterns were specified. These diagnostics illustrate the planned screening sequence rather than describe actual students.

The three-factor confirmatory model demonstrated acceptable fit within the synthetic illustration, chi-square (101) = 142.36, p = .004, CFI = .962, TLI = .953, RMSEA = .043, 90% CI [.026, .057], and SRMR = .045. Standardized loadings ranged from .70 to .84 for Perceived Environmental Education, from .74 to .88 for Internalized Islamic Ecological Values, and from .69 to .85 for Pro-Environmental Behavior. Cronbach's alpha ranged from .86 to .90, composite reliability from .88 to .91, and average variance extracted exceeded .50 for all three constructs. These estimates demonstrate the intended reporting standard but do not establish psychometric validity in the target population.

Table 2. Illustrative Measurement-Model Results (Synthetic Data)

Construct	Loading range	Cronbach's α	CR	AVE
Perceived Environmental Education	.70–.84	.86	.88	.59
Internalized Islamic Ecological Values	.74–.88	.90	.91	.67
Pro-Environmental Behavior	.69–.85	.89	.91	.63

Note. CR = composite reliability; AVE = average variance extracted. All values are synthetic reporting exemplars.

Discriminant-validity estimates in the synthetic demonstration indicated related but nonredundant constructs. HTMT was .55 between Perceived Environmental Education and Internalized Islamic Ecological Values, .63 between Perceived Environmental Education and Pro-Environmental Behavior, and .67 between Internalized Islamic Ecological Values and Pro-Environmental Behavior, all below the conservative .85 threshold. A competing one-factor representation produced markedly poorer fit, chi-square (104) = 496.28, CFI = .643, RMSEA = .131,

and SRMR = .108. The illustration therefore shows how the field analysis can test whether school provision, value internalization, and behavioral action remain empirically separable. For real respondent data, the proposed validity and reliability criteria must be assessed from observed item responses rather than adopted from the illustrative values (Roemer, 2021).

Table 3. Illustrative HTMT Matrix (Synthetic Data)

Construct	1	2	3
1. Perceived Environmental Education	—		
2. Internalized Islamic Ecological Values	.55	—	
3. Pro-Environmental Behavior	.63	.67	—

Descriptive values in the synthetic dataset were M = 3.78 (SD = .52) for Perceived Environmental Education, M = 4.06 (SD = .48) for Internalized Islamic Ecological Values, and M = 3.85 (SD = .49) for Pro-Environmental Behavior. The illustrative correlations were r = .47 between the two predictors, r = .54 between Perceived Environmental Education and Pro-Environmental Behavior, and r = .59 between Internalized Islamic Ecological Values and Pro-Environmental Behavior, all p < .001. The pattern illustrates meaningful theoretical association without problematic overlap.

Table 4. Illustrative Descriptive Statistics and Correlations (Synthetic Data)

Variable	M	SD	1	2	3
1. Perceived Environmental Education	3.78	.52	—		
2. Internalized Islamic Ecological Values	4.06	.48	.47***	—	
3. Pro-Environmental Behavior	3.85	.49	.54***	.59***	—

*Note. Scale range = 1-5. ***p < .001. Statistics are synthetic reporting exemplars.*

The synthetic multiple-regression model was statistically significant, F(2, 217) = 84.11, p < .001, and accounted for 43.7% of the illustrative variance in Pro-Environmental Behavior (R2 = .437; adjusted R2 = .431). Perceived Environmental Education showed a positive independent coefficient, B = .318, SE = .060, beta = .337, t = 5.30, p < .001, 95% CI [.200, .436]. Internalized Islamic Ecological Values also showed a positive independent coefficient, B = .440, SE = .062, beta = .432, t = 7.10, p < .001, 95% CI [.318, .562]. VIF = 1.28 for both predictors indicated no multicollinearity problem in the synthetic model.

Table 5. Illustrative Multiple Regression Predicting Pro-Environmental Behavior (Synthetic Data)

Predictor	B	SE	β	t	p	95% CI	VIF
Constant	.861	.226	—	3.81	<.001	.414, 1.308	—
Perceived Environmental Education	.318	.060	.337	5.30	<.001	.200, .436	1.28
Internalized Islamic Ecological Values	.440	.062	.432	7.10	<.001	.318, .562	1.28

Note. R2 = .437; adjusted R2 = .431; F(2, 217) = 84.11, p < .001. All coefficients are synthetic and illustrative.

Within the synthetic demonstration, the directional pattern is consistent with all three hypotheses. H1 is represented by the positive unique coefficient for Perceived Environmental Education after Internalized Islamic Ecological Values is controlled; H2 is represented by the positive unique coefficient for Internalized Islamic Ecological Values; and H3 is represented by their joint explanatory model. These coefficients must not be interpreted as participant-derived evidence or as proof of causal superiority. Their purpose is to demonstrate how the planned field analysis can evaluate whether educational opportunity and moral internalization provide nonredundant explanations of children's ecological behavior. The distinction between environmental knowledge,

reported action, and independently observed behavior is especially important in interpreting any later field estimates (van de Wetering et al., 2022; Liu & Green, 2024).

Discussion

The central contribution of this study lies in its conceptual differentiation of environmental educational provision, Islamic ecological value internalization, and pro-environmental behavior among primary school students. The illustrative three-construct model demonstrates how these domains can be examined as related but analytically distinct components of ecological learning. Within the synthetic regression analysis, Perceived Environmental Education (PEE; β = .337) and Internalized Islamic Ecological Values (IIV; β = .432) exhibited positive independent coefficients, jointly accounting for 43.7% of the simulated variance in Pro-Environmental Behavior (PEB). Although these coefficients are consistent with the proposed hypotheses, they represent artificially generated data rather than participant-derived findings. Consequently, their primary significance concerns the analytical feasibility of examining institutional opportunities and moral-spiritual internalization as complementary explanatory domains. This distinction responds to concerns about the conceptual overlap and methodological limitations frequently encountered in children's environmental behavior research (Liu & Green, 2024; Świątkowski et al., 2024).

The proposed relationship between environmental educational provision and ecological action is theoretically consistent with international research emphasizing the importance of experiential learning and institutional support. Van de Wetering et al. (2022), synthesizing 169 studies, demonstrated that environmental education positively influences environmental knowledge, attitudes, intentions, and behavior, although the magnitude of these effects varies considerably. Similarly, Ardoin et al. (2020) identified the importance of meaningful educational experiences for conservation-related outcomes. Whitburn et al. (2020) further established a positive association between connectedness to nature and pro-environmental behavior. Taken together, these studies suggest that environmental instruction becomes more behaviorally meaningful when knowledge acquisition is accompanied by opportunities for direct engagement. The present framework extends this interpretation by distinguishing school-provided opportunities from students' actual behavioral responses, thereby reducing the risk of conceptual circularity in educational assessment.

Nevertheless, international intervention studies caution against assuming that environmental learning necessarily produces sustained ecological action. In Chile, Jaime et al. (2023) found that school-based environmental education improved children's environmental knowledge, attitudes, and practices without generating corresponding behavioral changes among their parents. Similarly, Wichmann et al. (2022) reported largely nonsignificant behavioral changes following participation in a school-based citizen science project, while Sieg and Dreesmann (2021) observed that improvements in environmentally responsible behavioral intentions were not consistently maintained at follow-up. These findings introduce an important qualification: educational participation does not guarantee behavioral persistence. Accordingly, the five proposed dimensions of PEE—learning exposure, practice opportunities, role modeling, supportive facilities, and participation—should be interpreted as potentially enabling conditions rather than sufficient determinants of ecological behavior.

The second explanatory pathway concerns the internalization of ecological responsibility within students' personal moral systems. The Value–Identity–Personal Norm framework examined

by Zeiske et al. (2021) indicates that children's environmental values, ecological self-identity, and personal norms are associated with energy-conservation behavior, although relationships vary across behavioral domains. This perspective complements the affective taxonomy of Krathwohl et al. (1964), which conceptualizes internalization as progressing from receiving and responding to valuing, organization, and characterization. Within Islamic education, ecological concepts such as *khalifah*, *amanah*, *mizan*, *ihsan*, and the avoidance of *israf* can provide culturally meaningful interpretations of environmental responsibility. However, religious knowledge and value endorsement should not automatically be equated with behavioral internalization. The theoretically relevant distinction concerns whether religious ecological principles become personally meaningful standards guiding students' everyday decisions.

International evidence concerning religion and environmental behavior reinforces this necessary qualification. Preston and Baimel (2021) demonstrated that religious beliefs can either strengthen or constrain environmental commitments, depending on their underlying psychological meanings. Similarly, Eom et al. (2021) found that particular beliefs about divine control could weaken the relationship between personally held environmental beliefs and pro-environmental support. Conversely, Zafar and Abu-Hussin (2025), examining Muslim respondents across 46 countries, identified context-dependent positive associations between religiosity and environmental concern. These contrasting findings challenge any deterministic assumption that religious identification necessarily promotes ecological responsibility. The present framework therefore advances a more differentiated proposition: Islamic ecological ethics may contribute to environmental behavior when stewardship principles are meaningfully internalized, reinforced through educational experiences, and translated into personally endorsed moral obligations.

The importance of educational context is further illustrated by research on family relationships and environmental socialization. Jia and Yu (2021) demonstrated that parent–child interactions involving action, communication, and engagement are relevant to children's pro-environmental behavior. This evidence offers an important contextual extension to the school-centered framework, particularly its proposed dimension of behavioral consistency between school and home. Environmental responsibilities learned through institutional routines may encounter different expectations within households, potentially constraining behavioral transfer. Accordingly, home–school continuity should be considered an important contextual condition in subsequent empirical applications. Moreover, the limited behavioral spillover identified by Jaime et al. (2023) suggests that strengthening children's environmental commitments may require explicit parental involvement rather than relying exclusively on children's classroom experiences.

Within Indonesia, Rahmania (2024) identified the combined relevance of environmental and psychosocial conditions for sustainable behavior in school settings. This finding supports the framework's emphasis on environmental infrastructure, organizational routines, and social reinforcement. Nevertheless, research among Jakarta primary school students by Wulandari et al. (2025) found that connectedness to nature did not mediate the relationship between nature experiences and pro-environmental behavior. This contrasting evidence suggests that pathways connecting environmental exposure, psychological orientations, and ecological action cannot be assumed to operate uniformly across Indonesian educational contexts. Importantly, the present model does not specify mediation between PEE and IIV; instead, it proposes their simultaneous and potentially independent predictive contributions. This theoretically restrained approach allows

subsequent field research to establish whether the two constructs remain empirically distinct before examining more elaborate mechanisms.

Studies conducted in Indonesian Islamic educational institutions provide particularly relevant contextual comparisons. Serly et al. (2025) documented environmental character formation through Islamic Religious Education, emphasizing value transformation, interaction, and transinternalization. Taufikin (2025) similarly highlighted the integration of ecological religious principles, experiential activities, and teacher modeling in Islamic elementary schools. Hadisi et al. (2025) further emphasized spiritual leadership and institutional practices within eco-madrasahs, while Khoirurrijal et al. (2026) identified a comparatively weak relationship between religiosity and ecological awareness despite strong religious commitment among eco-pesantren students. Collectively, these studies suggest that religiously informed ecological education requires more than normative instruction. Its practical relevance depends on the alignment of moral interpretation, participatory experience, institutional reinforcement, and everyday opportunities for ecological action.

Complementary research also highlights the educational significance of contextualized learning media and ecological meaning-making. Kamsir et al. (2025) explored the integration of eco-theological themes into Arabic learning through visual materials, illustrating how environmental ethics can be incorporated into disciplinary instruction. Ngololo et al. (2025) emphasized the developmental continuity of biological learning and its relationship to contextual meaning-making, while Handoko et al. (2026) examined how digital biology learning experiences can connect disciplinary knowledge with everyday environmental awareness. Although these studies investigate different educational populations and outcomes, they suggest that ecological responsibility may be reinforced through interdisciplinary and multimodal educational experiences. However, digital learning should not be interpreted as evidence of improved environmental behavior without direct assessment of its behavioral consequences.

Theoretical, Pedagogical, and Policy Implications. Theoretically, the framework offers a complementary explanation of ecological behavior by distinguishing institutional provision from moral-spiritual internalization without assuming a causal or mediating relationship. Pedagogically, schools should integrate environmental inquiry, experiential activities, ecological reflection, teacher modeling, student participation, and consistent school–home practices into a coherent educational system. Environmental media literacy can be incorporated through age-appropriate evaluation of online ecological information, although digital behavior was not measured in the present model. Furthermore, ecological instruction should support students' emotional well-being by emphasizing achievable collective action rather than presenting environmental problems exclusively through threatening narratives; research by Becht et al. (2024) underscores the relevance of emotional experiences to adolescents' environmental engagement. At the institutional level, schools should establish environmentally supportive facilities, teacher-development programs, participatory sustainability projects, and measurable ecological indicators. Policy development may also benefit from linking sustainability education with broader ethical and environmental governance principles, consistent with the preventive sustainability orientation discussed by Fardiansyah and Fikri (2026). Nevertheless, these recommendations remain theoretically informed propositions pending empirical validation.

Novelty and Contribution. The novelty of this study lies in developing an analytically

differentiated framework that integrates school-provided environmental educational experiences with the internalization of Islamic ecological values as complementary predictors of children's pro-environmental behavior. Unlike approaches that conflate educational exposure, moral knowledge, and behavioral outcomes, the framework separates institutional provision, affective internalization, and ecological action into three explicitly operationalized constructs. Its distinctive theoretical contribution involves adapting Krathwohl's affective taxonomy to Islamic ecological ethics while retaining the explanatory relevance of environmental education and environmental psychology. Methodologically, the proposed measurement structure provides a basis for examining discriminant validity and independent predictive relationships without prematurely assuming mediation. The contribution is therefore conceptual and methodological rather than a claim of newly established empirical effects. Its principal value resides in providing a culturally grounded and potentially transferable model for future empirical investigation within Islamic primary education.

Limitations and Future Research. Several limitations must be acknowledged. Most importantly, the numerical analyses were conducted using a synthetic dataset, meaning that the reported coefficients, model fit, reliability estimates, and explanatory variance cannot establish actual relationships among students. The planned cross-sectional design would also restrict causal inference, while student-reported measures may introduce common-method variance, social desirability, and inaccuracies in behavioral reporting. Furthermore, the proposed sampling frame is limited to three integrated Islamic primary schools in East Java, potentially restricting generalizability across educational, religious, socioeconomic, and geographical contexts. Future research should collect participant-derived data, establish age-appropriate measurement validity, account for student clustering within schools, and incorporate teacher assessments, parental reports, and direct behavioral observations. Longitudinal and intervention-based designs would be particularly valuable for examining behavioral persistence, school–home transfer, contextual moderation, and the potential interaction between educational provision and moral internalization. Comparative studies involving public, Islamic, urban, and rural primary schools could further clarify the model's cultural specificity and broader applicability.

Conclusion

This manuscript develops a framework that distinguishes environmental educational provision, ecological value internalization, and pro-environmental behavior among primary-school students. The distinction addresses a recurring weakness in environmental education research in which educational exposure and behavioral outcomes can become conceptually mixed. Perceived Environmental Education represents what students experience schools providing; Internalized Islamic Ecological Values represent the depth to which ecological responsibility is integrated into students' personal value systems; and Pro-Environmental Behavior represents what students report doing. Keeping these domains separate creates a clearer basis for empirical testing.

The synthetic analytical demonstration illustrates how Perceived Environmental Education can be modeled as a distinct predictor of Pro-Environmental Behavior through learning exposure, practical opportunities, role modeling, supportive facilities, and participation. It also shows how the measurement model can test whether school provision remains empirically distinguishable from students' reported behavior. In the eventual field study, this distinction will allow a more defensible assessment of whether environmental opportunities at school are associated with ecological action without embedding the outcome inside the predictor itself.

The framework likewise positions Internalized Islamic Ecological Values as an independent explanatory domain rather than as a synonym for religious knowledge. The progression from receiving toward characterization provides a structured way to assess whether stewardship, responsibility, balance, moderation, and avoidance of harm have become personally valued. Field evidence will be needed to determine whether this internalization contributes uniquely to pro-environmental behavior after school environmental experience is taken into account.

The larger conceptual contribution lies in complementarity. Environmental education can provide children with an ecological behavioral repertoire, whereas internalized values can provide reasons to use and maintain that repertoire. One pathway concerns opportunity, competence, and institutional support; the other concerns personal meaning and self-regulation. Neither should be treated as a substitute for the other. Sustainability education may become more durable when children know what to do, know how to do it, have opportunities to act, and experience personally meaningful reasons for continuing to act.

For school management, the framework implies that environmental responsibility should become a whole-school educational design rather than an isolated curricular topic. Environmental curriculum, teacher behavior, facilities, school routines, student participation, religious-value formation, and family practices should reinforce rather than contradict one another. Measurement should likewise distinguish weaknesses in institutional provision from weaknesses in value internalization and behavioral consistency. Such diagnostic separation can help schools select interventions that respond to the actual source of the gap between environmental learning and ecological action.

The manuscript therefore offers a culturally grounded model for future empirical testing in Islamic primary education. Its educational proposition is straightforward but consequential: sustainable behavior may require more than knowing what should be done. It may also require meaningful opportunities to act and a sufficiently internalized reason for why the action matters. The next step is to test this proposition with participant-derived data using validated measures and transparent multi-source or longitudinal designs.

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