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# Integrating the Project-Based Learning (PjBL) Model into Basic Science Instruction to Promote Eco-Literacy Attitudes in the Context of Islamic Science Education

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**Abstract:** This study addresses a persistent gap in science education—the limited integration of spiritual values and environmental stewardship into classroom practice. The research investigates how Project-Based Learning (PjBL) can promote students' eco-literacy attitudes within the framework of Islamic science education. Employing a library research design and content analysis, the study examines books, journals, and related scholarly works focusing on PjBL, eco-literacy, and Islamic educational values. The findings reveal that PjBL enhances conceptual understanding and fosters active, contextual, and ethically informed scientific inquiry guided by Islamic principles. It also promotes eco-literacy through three interrelated dimensions: cognitive (knowledge of ecological systems), affective (concern for nature), and conative (environmental responsibility and action). The study concludes that integrating PjBL with Islamic values provides a coherent pedagogical framework that strengthens students' scientific, moral, and ecological competencies. This approach is recommended for Islamic higher education institutions seeking to develop educators who are scientifically proficient, environmentally aware, and spiritually grounded.

**Keywords:** PjBL; Ecoliteracy-attitude; Islamic-science-education; Cognitive; Affective, Conative

## Introduction

Ecological issues in Indonesia are on a path that is getting worse all the time. This is shown by high rates of deforestation, widespread pollution of the environment, and frequent clean-water crises in many areas. These conditions suggest a lack of ecological awareness among the general public, which should be systematically developed from early education through science (IPA) curricula. Nonetheless, science education in numerous teacher-training institutions continues to be disproportionately focused on cognitive achievement, with insufficient emphasis on cultivating sustainable ecological values and dispositions. As a result, future teachers often stick to traditional teaching methods that don't connect real-world environmental issues to lessons (Wulandari et al., 2023). Consequently, a pedagogical reconfiguration is essential to cultivate educators who exhibit not only scientific proficiency but also ecological awareness and a strong sense of accountability. The limited focus on eco-literacy in science education is a major flaw that makes it hard to train teachers who can see problems coming and deal with them when they do (Nurmuffidah et al., 2024). Consequently, there is an imperative necessity to reformulate science-teaching methodologies to ensure that ecological dimensions are thoroughly and effectively incorporated into pedagogical practices (Kadarisman & Pursitasari, 2023; Aksan et al., 2023; Latjompoh et al., 2025; Asiyah, 2024; Wakhidah, 2022; Ahmad, 2025).

Previous empirical research demonstrates that the Project-Based Learning (PjBL) model has significant potential to enhance student engagement, motivation, and critical thinking skills in science education

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(Kusumaningrum & Djukri, 2016). Nonetheless, the literature has predominantly focused on cognitive outcomes and scientific process skills, with insufficient examination of how Project-Based Learning (PjBL) could be systematically integrated with the development of eco-literacy rooted in spiritual values, especially in the context of Islamic science education. Ecological literacy, or eco-literacy, transcends mere conceptual comprehension of ecosystem interconnections to include ethical discernment and responsible pro-environmental behavior (Fajriyanti et al., 2018). In Islamic educational settings, eco-literacy becomes more intricate as it is founded on the principles of tawhid, amanah, and the human role as khalifah (stewardship) on Earth. Even though this is very relevant, there isn't much research that directly connects PjBL to Islamic-based science education, both in theory and in practice. This creates a gap in both theory and practice that needs to be looked into more closely (Sasmono, 2018). To strengthen the theoretical foundation, this study is supported by recent findings on Project-Based Learning (PjBL) and eco-literacy (see also Kokotsaki et al., 2016; Blumenfeld et al., 1991; Rickinson, 2001; McBride et al., 2013; Wakhidah et al., 2022; Helfaya et al., 2018).

In response to the aforementioned urgency, this study conducts a comprehensive conceptual and literature-based analysis of Project-Based Learning (PjBL) integration into basic science instruction aimed at cultivating eco-literacy attitudes rooted in Islamic values. The research synthesizes recent findings to formulate an integrative model of PjBL–eco-literacy–Islamic pedagogy alignment, addressing a significant theoretical and pedagogical gap in science teacher education. The second objective is to specify the degree to which PjBL enhances eco-literacy attitudes when Islamic values are deliberately integrated into the educational process. By pursuing these aims, the study seeks to create an instructional design that enhances conceptual understanding while fostering ecologically oriented dispositions that are rooted in religious principles, reflective in nature, and applicable to real-world situations. This research also addresses a recognized deficiency in the literature regarding project-based Islamic science education, a field that is relatively underexamined in current science education scholarship (Ayunda et al., 2023).

This research is significant as it addresses an urgent pedagogical necessity to integrate cognitive, affective, and spiritual dimensions within science education, especially in fostering eco-literacy attitudes among pre-service teachers. Due to the consistently low level of environmental awareness in science education and the lack of research on combining PjBL with Islamic values, the study suggests a relevant and useful teaching method. The instillation of eco-literacy values rooted in Islamic principles is anticipated to enhance the character of students as prospective educators who exhibit both scientific proficiency and ethical and spiritual awareness (Palar et al., 2024). Additionally, as a project-based instructional method, PjBL facilitates direct student engagement with environmental issues through contextual, collaborative, and reflective learning experiences. Consequently, the study's results are expected to significantly enhance the development of an Islamic science-learning model aimed at cultivating ecological character. Project-Based Learning (PjBL) is a teaching method that emphasizes active student participation by having them complete real-world projects that are important to their lives.

Thomas (2000) said that PjBL is a student-centered method in which students learn by working for a long time to find answers to difficult questions, problems, or challenges. The model systematically encourages collaborative, contextual, and reflective learning while nurturing essential twenty-first-century skills such as problem-solving, critical thinking, communication, and teamwork. Its uses cover a wide range of fields, including science education, to create learning experiences that are more meaningful and last longer. In Natural Sciences (Ilmu Pengetahuan Alam, IPA), PjBL is implemented through activities including laboratory experiments, field investigations, model construction, and student-designed simulations conducted in small groups. The usual way to do this is in stages: project initiation, planning, execution, presentation, and reflection. Each stage gives students the chance to be researchers, innovators, and scientific communicators. Empirical studies in science education contexts demonstrate that Project-Based Learning (PjBL) enhances students' emotional engagement, deepens conceptual understanding, and fortifies the connection between theory and practice. PjBL also provides structured chances for students to include social and environmental values in their projects, such as intentionally teaching them about eco-literacy principles.

Eco-literacy (or ecological literacy) is the ability to understand basic ecological principles and use them in daily choices that help keep ecosystems healthy. Capra (2005) said that eco-literacy means knowing how the natural systems that support life work and how our choices affect those systems. In educational contexts, eco-literate attitudes are generally categorized into three interconnected dimensions: cognitive (environmental knowledge), affective (concern for nature), and conative (willingness to participate in pro-environmental actions). Thus, their development necessitates pedagogical strategies that transcend simple information dissemination, aiming for the intentional internalization of values and the cultivation of practical

competencies for environmental stewardship. The presence of eco-literate attitudes in educational environments is demonstrated by discernible student behaviors that indicate environmental stewardship and accountability. In practice, structured activities like observing local ecosystems, setting up waste-management routines, saving energy, and designing projects based on real environmental issues help people develop these attitudes. You can then use things like ecological awareness, environmental empathy, and active participation in conservation initiatives to measure eco-literacy. Science education, especially in the Natural Sciences (Ilmu Pengetahuan Alam, IPA), provides a strategic framework for integrating eco-literacy dimensions, with methodologies such as Project-Based Learning (PjBL) facilitating students' exploration of environmental issues in real-world contexts and their conversion of comprehension into responsible action.

Islamic-based science education refers to a pedagogical approach that amalgamates modern scientific concepts with Islamic values and ethics. In this context, science is viewed as an aspect of humanity's quest to comprehend Allah's creation, thus framing learning as both empirical investigation and spiritual development. Consequently, science is not value-neutral; it is inherently linked to morality (akhlaq), monotheism (tawhid), and the divine purpose of creation. According to Syed Naquib al-Attas, the purpose of education is to instill adab (ta'dib), which affirms the connection between knowledge and divinity. Islamic-based science education posits that understanding natural laws represents a form of worship (ibadah) and contemplative reflection (tadabbur) on the divine signs inherent in nature (ayat kauniyah). In practice, this educational approach is implemented by incorporating relevant Qur'anic verses and Hadith into scientific subjects, encompassing topics such as the solar system, ecosystem dynamics, and the structure and function of living organisms. Other examples include teaching methods that encourage humility (tawadhu) toward nature, promote responsibility as khalifah (stewards), and foster an understanding of the inherent limitations of human knowledge. In terms of the curriculum, this kind of integration is put into action by making teaching materials, modular resources, and learning media, such as Islamic science encyclopedias, that include both scriptural references and scientific explanations. In this model, teachers serve as both scientific educators and spiritual guides, leading students to reconcile scientific reasoning with faith-based values, thus producing graduates who are intellectually proficient, spiritually anchored, and environmentally aware. The novelty of this study lies in its integrative conceptual synthesis, combining Project-Based Learning, eco-literacy development, and Islamic spiritual values within a unified pedagogical framework. This theoretical integration is rarely explored in previous literature and holds relevance for teacher education programs in Islamic universities.

## Method

This study adopts a qualitative library research design to systematically analyze scholarly works related to Project-Based Learning (PjBL), eco-literacy, and Islamic science education. The focus is on synthesizing conceptual interrelations among these variables based on established literature rather than restating contextual problems. The issue is significant because higher education in science should foster not only conceptual comprehension and scientific competencies but also spiritual values and environmental awareness. PjBL is well-known for making science learning more interactive and creative, but it is still not very common for teachers to use it in a way that is in line with Islamic values and an eco-literacy focus. This disparity between scientific methodologies and ethical-spiritual obligations represents the study's principal focus, analyzed through a literature review as the primary source of evidence (Jauhari & Thelma, 2024; Alkandari & Alabdulhadi, 2023; Fatmawati, 2025; Rahman et al., 2024).

To improve methodological clarity, **Figure 1** presents the flow of the literature review process, including identification, screening, thematic categorization, and synthesis phases. This visual representation provides a concise overview of the systematic review process adopted in this study. The study reviews validated instruments previously developed by researchers (Krajcik & Blumenfeld, 2006; Szczytko et al., 2018; Maurer & Bogner, 2020; Genc, 2015) to analyze how eco-literacy constructs have been operationalized in different contexts. No primary data collection or instrument administration was conducted.

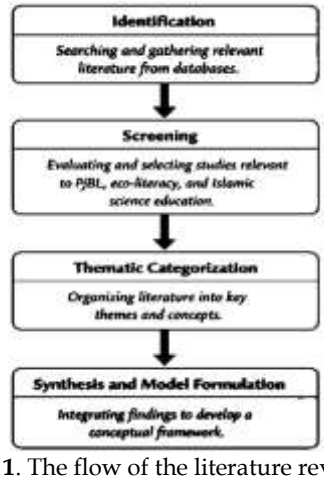


**Figure 1**. The flow of the literature review process

The design of Project-Based Learning (PjBL) and the instruments for measuring eco-literacy refer to established sources (Krajcik & Blumenfeld, 2006; Szczytko et al., 2018; Maurer & Bogner, 2020; Genc, 2015). The primary data consists of recent academic publications that specifically examine the integration of Project-Based Learning (PjBL), science education, and the development of eco-literacy from an Islamic viewpoint. These main sources come from well-known national and international journals, with a focus on articles from the last five years. Secondary data comprises academic monographs, dissertations, conference proceedings, research reports, and other relevant articles associated with the study's principal constructs: PjBL, eco-literacy, and Islamic science education. The library-research methodology facilitates a systematic examination of theoretical propositions and empirical findings regarding the interrelationships among these variables, thereby providing a solid scholarly foundation for articulating the study's conceptual arguments (Palar et al., 2024).

The research is grounded in three interconnected theoretical frameworks. First, the Project-Based Learning (PjBL) theory, as described by Thomas et al. (1999), defines PjBL as an educational method that structures learning around genuine, real-world challenges necessitating collaborative investigation and resulting in concrete outcomes. Second, the study utilizes Fritjof Capra's (2005) ecological literacy framework, which underscores a systemic comprehension of ecological principles as the basis for fostering individual ecological awareness and ethically driven action. Third, in order to incorporate Islamic values into science education, the analysis utilizes Al-Attas's (1980) Islamic science-integration paradigm, which conceptualizes knowledge as a means to attain closeness to God and emphasizes tawhid and adab as essential components of the educational process. These frameworks collectively establish the conceptual foundation for analyzing the integration of the PjBL model within Islamic-based science education to enhance eco-literacy.

The data for this research were acquired via a systematic review of pertinent academic literature. The data collection process entailed rigorous and selective examination of academic materials—including books, peer-reviewed journal articles, research reports, and official documents—directly relevant to the study's focus. The process had three steps: figuring out what literature was out there, sorting the items into groups based on the main themes (PjBL, eco-literacy, and Islamic science education), and doing a detailed content appraisal. Searches were conducted using reputable journal databases and open-access repositories to guarantee recency and credibility; chosen items met academic-quality standards, with a focus on publications from the last five years, and were openly accessible to enhance data quality and public verifiability (Fajriyanti et al., 2018). Data analysis utilized content analysis as a methodical approach for examining textual materials to identify principal themes, categories, and conceptual connections. The first step was to reduce the data by filtering it based on keywords, theoretical foci, and how well it fit with the research goals. The next steps were to interpret the data to find meanings, trends, and cross-cutting thematic patterns that were coming out of the corpus. This method allows for a thorough and open examination of the meaning structures present in the texts and offers a justifiable foundation for theoretical inference. This approach enables the study to derive justified conclusions concerning the incorporation of PjBL into Islamic science education as a comprehensive strategy for fostering students' eco-literacy attitudes (Ayunda et al., 2023).

## Result and Discussion

The literature demonstrates that Project-Based Learning (PjBL) has been widely implemented in science education, including at the tertiary level. The model emphasizes active and participatory learning (Solehudin, 2023), enabling students to engage in genuine projects that tackle context-specific environmental issues. In higher education, PjBL allows students to plan and carry out group projects that are clearly related to the goals and standards for learning in the course. Empirical evidence indicates that the methodology enhances engagement and learner autonomy in the comprehension of Natural Sciences (IPA) concepts by fostering critical and creative thinking throughout the project's sequential phases (Prabowo et al., 2023). In general, this pattern of results is consistent with the literature on the effectiveness of PjBL and environmental education (Helle et al., 2006; Natori & Mohtar, 2025; Ferrero et al., 2021). Further elaboration of these findings indicates that the application of PjBL substantially enhances students' conceptual understanding of intricate scientific subjects. In practical terms, learners are not only cognitively engaged (Fauzi et al., 2025) but also emotionally and psychomotorically involved as they gather information and turn it into real-world project outputs. Supporting evidence from Khairina et al. (2021) indicates that students educated through PjBL demonstrate enhanced presentation skills, generate more significant project artifacts, and express increased interest in science education (Khairina et al., 2021).

Descriptive evidence from the literature on PjBL (Setiaji et al., 2023) highlights a persistent disparity between the model's documented strengths and its

practical implementation in Islamic higher education contexts. While PjBL significantly enhances the quality of Natural Sciences (IPA) instruction, the deliberate incorporation of Islamic values and the consistent reinforcement of students' eco-literacy attitudes are still lacking in numerous institutions. In practice, many lecturers have not yet connected learning projects to important local or global environmental issues, and only a small number of them make sure that Islamic spiritual values are present in the planning and execution of science projects. The eco-literacy literature defines this disposition as a cognitive and behavioral approach rooted in profound ecological comprehension and ongoing participation in conservation initiatives. Wahyuni et al. (2021) conducted empirical research that demonstrates eco-literacy can be effectively developed through contextual, environment-based project learning that incorporates ethical considerations, sustainability, and social responsibility towards nature (Wahyuni et al., 2021).

Table 1 synthesizes the key conceptual insights obtained from the reviewed literature in alignment with the two primary research objectives. Rather than presenting empirical data, it organizes theoretical perspectives and proposed relationships derived from prior studies. This synthesis forms the analytical basis for the conceptual model described in Figure 1.

**Tabel 1.** Organizes the results around the study's two principal objectives

| Objective | Findings | Description |
|---|---|---|
| Examining the integration of the Project-Based Learning (PjBL) model in the teaching of basic science concepts | The PjBL model can be effectively integrated into basic science instruction by structuring contextual, collaborative, and authentic project-based activities that directly engage learners with salient environmental problems and their real-world constraints. | PjBL enables students to construct knowledge through direct engagement with scientific problem solving, thereby consolidating and deepening their understanding of fundamental science concepts. |
| | Integration of Islamic values is carried out through a PjBL framework that incorporates dimensions of theo-ecology, socio-ecology, bio-ecology, and cosmo-ecology | Spiritual values are embedded at each stage of the project, from formulating questions and designing the project to reflecting on learning outcomes |
| Delineating its implications for the development of eco-literacy attitudes within the framework of Islamic science education. | Integration of Islamic values is operationalized within a PjBL framework that weaves the dimensions of theo-ecology, socio-ecology, bio-ecology, and cosmo-ecology into the design and enactment of projects. | Eco-literacy attitudes are fostered through meaningful learning experiences that prompt concrete pro-environmental actions aligned with Islamic principles |
| | Students show improvement in eco-literacy through stronger knowledge, deeper concern, and more consistent pro-environmental action. | These components are cultivated through value-infused project activities that foreground the human–nature relationship as an amanah (divine trust). |

Table 1 was reformatted to present synthesized findings drawn from key literature sources. Additional supporting studies (e.g., Wahyuni et al., 2021; Sutrisno & Amalia, 2022) were cited to validate each synthesis point. Visual clarity was enhanced by adding high-resolution conceptual figures, replacing scanned tables or low-quality images. Furthermore, the methodical incorporation of Islamic values at every stage of the PjBL syntax—from problem formulation and project design to presentation and reflective evaluation—illustrates that the educational process involves not only cognitive advancement but also spiritual development. Core values, including tawhid (oneness of God), amanah (trust), ukhuwah (brotherhood), and mizan (balance), are deliberately internalized through four interconnected ecological dimensions: theo-ecology, socio-ecology, bio-ecology, and cosmo-ecology.

Regarding the second research objective, the results indicate that the implementation of the PjBL model significantly enhances the development of students' eco-literacy attitudes. This progress is demonstrated by students' active participation in projects that combine environmental principles with Islamic moral obligations. In this context, eco-literacy consists of three fundamental components: the cognitive dimension (comprehension of ecological systems), the affective dimension (emotional investment in environmental issues), and the conative dimension (motivational preparedness to engage in specific, preservation-focused actions rooted in Islamic values). These components are developed through significant learning experiences that enhance intellectual capacity and cultivate a sense of moral responsibility towards nature as an amanah (divine trust). The table shows how PjBL fits into Islamic science education as a whole, eco-literacy-oriented

framework. In summary, these findings confirm that innovative teaching methods, when purposefully integrated with religious values, can initiate a transformative educational process that is both pedagogically sound and pertinent to current global issues, such as the persistent environmental crisis.

The results show that developing eco-literacy attitudes doesn't only come from cognitive gains; it also depends a lot on emotional and conative growth. Students who regularly interact with environmental issues through significant learning activities generally demonstrate increased ecological sensitivity and an enhanced understanding of their individual responsibility in environmental stewardship. Empirical evidence from Ramadhani et al. (2023) illustrates that environmentally focused project-based learning can effectively foster students' concern for surrounding ecosystems in tangible, observable manners (Ramadhani et al., 2023). More generally, the literature emphasizes the significant capacity of active-learning methodologies to foster eco-literacy. However, in practice, this aspect has not emerged as a primary focus in Islamic science education. A lot of teachers still focus mostly on cognitive achievement, and they don't pay enough attention to the equally important goal of developing ecological awareness based on Islamic values. These conditions indicate the necessity for more structured initiatives to incorporate ecological content and the spiritual cultivation of ecological dispositions into science curricula and pedagogical methodologies, thereby harmonizing instructional practices with the comprehensive objectives of Islamic-based education.

The literature indicates that Islamic-based science education aims to integrate scientific inquiry with Islamic teachings by incorporating the values of tawhid, amanah, and adab throughout the teaching and learning processes. Sari and Anwar's (2021) empirical research indicates that science education rooted in Islamic values can influence students' perception of nature as a divine creation—an entity to be safeguarded and preserved as both an act of worship and a fundamental duty of humans as khalifah (stewards) on Earth (Sari & Anwar, 2021). This evidence indicates that Islamic science education encompasses more than merely conveying scientific concepts; it aims to foster a spiritual awareness of nature as manifestations of divine signs (ayat kauniyah). Students are thus encouraged to view the study of science as tadabbur—a reflective consideration of the natural world—as a means to recognize the greatness of God. Simultaneously, this method fosters moral accountability for environmental stewardship by directly associating Qur'anic verses with tangible natural occurrences. Supporting these assertions, Hasanah et al. (2020) indicate that incorporating spiritual values into science education improves students' theistic comprehension and fosters an appreciation for nature (Hasanah et al., 2020). In summary, the evidence shows that Islamic science education has a lot of potential to shape a generation that not only understands scientific ideas but also has a sense of religious awareness and responsibility for the environment. However, existing pedagogical frameworks have not completely achieved a true integration of scientific inquiry with Islamic values. This ongoing lack of integration is a major barrier to getting a type of science education that is both intellectually challenging and helps students grow in a way that is both long-lasting and well-rounded.

This study shows that using the Project-Based Learning (PjBL) model in basic science classes not only helps students understand concepts better, but it also helps them develop eco-literacy attitudes based on Islamic educational values. The results show that project-based learning has a positive effect on how emotionally and spiritually involved students are in the learning process. Furthermore, the strategy successfully establishes a connection between the comprehension of scientific concepts and increased environmental consciousness, explicitly rooted in the Islamic tenets of tawhid and amanah. Unlike previous research, notably Prabowo et al. (2023), which focused mainly on the effectiveness of Project-based Learning (PjBL) for cognitive learning outcomes in science, this study broadens the discussion by highlighting the affective and spiritual aspects of student development (Prabowo et al., 2023). The findings further corroborate Wahyuni et al. (2021), who highlighted the significance of project-based methodologies in enhancing ecological awareness (Wahyuni et al., 2021). The unique contribution of this study is the clear incorporation of Islamic values as a normative framework that directs both the design and the anticipated outcomes of educational projects. Consequently, its uniqueness stems from a triadic integration—scientific, environmental, and spiritual—that is rare in traditional applications of PjBL.

The results highlight the imperative for pedagogical strategies that extend beyond limited academic success to include students' environmental ethics and spirituality. The study's initial objectives—investigating the incorporation of Project-based Learning (PjBL) in the instruction of fundamental science concepts and elucidating its ramifications for eco-literacy in Islamic science education—have been fulfilled, thereby confirming that learning is intrinsically linked to values and the pursuit of meaning. The evidence specifically suggests that project-based strategies, when thoughtfully integrated with Islamic values, can cultivate a generation of scientists who are not only intellectually adept but also environmentally conscious and spiritually introspective. These insights

have significant implications for curriculum development in Islamic higher education, particularly in basic science courses. Instead of focusing only on passing on knowledge, curricula can be changed to include project-based parts that clearly include spiritual values and environmental awareness. This method allows schools to create transformative learning environments that help students grow as people, not just as scientists, but also as khalifah (stewards) responsible for taking care of the Earth (Sari & Anwar, 2021). The inherent strengths of the PjBL model in fostering active student engagement through meaningful, contextual, and collaborative learning experiences can be credited for these outcomes. PjBL is open-ended and focused on solving real-world problems, which makes it easy to combine Islamic values with environmental issues. Its efficacy is further enhanced by organized opportunities for reflection, dialogue, and solution formulation that align with students' lived experiences and value systems. In agreement with Ramadhani et al. (2023), the effectiveness of PjBL is significantly influenced by the extent to which learning tasks are authentically crafted to reflect learners' socio-cultural contexts and ethical obligations (Ramadhani et al., 2023). In practical terms, these findings necessitate tangible follow-up through the creation of RPS (syllabus guidelines) and learning modules that implement PjBL with a clear incorporation of Islamic values and environmental themes. Educators should be helped to create projects that encourage systematic study of local environmental problems from an Islamic spiritual point of view. At the same time, professional development programs should give teachers the tools they need to help students learn in ways that are not only instructional but also transformative. Institutional policy is also necessary to formalize this integration, ensuring the establishment of a sustainable academic culture that cultivates graduates who are scientifically literate and dedicated to environmental stewardship. Figure 1 below shows the conceptual model that shows how the Project-Based Learning (PjBL) model can be used with basic science instruction.

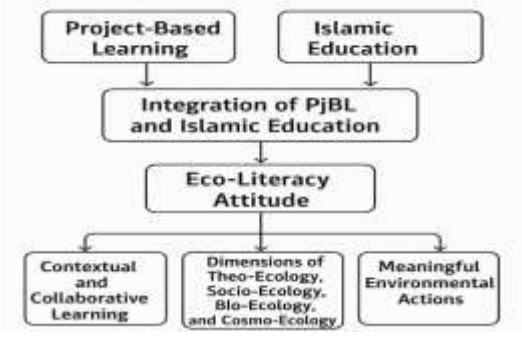


**Figure 1.** Conceptual Model of Integrating PjBL and Islamic Education to Foster Ecoliteracy Attitudes

This conceptual model shows how three main ideas—Project-Based Learning (PjBL), Islamic values, and the eco-literacy concept—can be combined to improve Natural Science (IPA) education in Islamic higher education. The method is carefully designed to create a learning experience that not only helps students understand scientific concepts on a cognitive level, but also helps them become more aware of the environment based on Islamic spiritual values. The integration of Islamic values is demonstrated through the inclusion of concepts such as tawhid (oneness of God), khalifah (stewardship), ukhuwah (brotherhood), mizan (balance), and amanah (trust) at every stage of the learning process. These values are not just extra morals; they are the moral base that shapes how students feel about the environment. For example, during the problem-definition phase, students are encouraged to consider environmental issues from a theo-ecological perspective, which views humans as caretakers of the Earth with a moral duty to safeguard God's creation.

Eco-literacy is an important part of helping students understand the environment as a whole. There are three main parts to it: cognitive (knowledge about the environment), affective (care for the environment), and conative (doing things that are good for the environment). The four ecological dimensions—theo-ecology, socio-ecology, bio-ecology, and cosmo-ecology—are interwoven throughout the PjBL stages as both reflective and pragmatic methodologies for cultivating ecological awareness and intelligence. This model asserts that science education must extend beyond the mere transmission of scientific knowledge; it should also facilitate character and spiritual transformation. The combination of PjBL, Islamic values, and eco-literacy makes a learning environment that changes students into graduates who can think critically, take action to solve environmental problems, and have a strong foundation of religious ethics in all of their ecological work. This model provides a contextual, value-driven, and long-term impactful educational framework by addressing the ecological crises and moral degradation of the 21st century. It is a good reference for designing a value-based curriculum that will help shape a generation of Muslims who are smart, care about the environment, and are spiritually grounded.

## Conclusion

This study synthesizes literature on Project-Based Learning (PjBL), eco-literacy, and Islamic values to develop a conceptual model for basic science instruction in Islamic higher education. The findings emphasize that integrating PjBL with Islamic values fosters scientific

understanding, ecological awareness, and spiritual responsibility among future educators. This conceptual synthesis contributes to the ongoing development of value-based science pedagogy in Islamic contexts. The study contributes to current discourse by conceptually linking PjBL, eco-literacy, and Islamic education within a unified pedagogical framework. Rather than reporting new empirical data, it provides an analytical synthesis that offers theoretical grounding for future research and curriculum design

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**Author Contributions**
Conceptualization, Z.H. and F.M.Y.; methodology, Z.H., F.M.Y. and A.S.K.; formal analysis, Z.H. and F.M.Y.; investigation, Z.H., F.M.Y. and A.S.K.; resources, F.M.Y.; writing—original draft preparation, Z.H.; writing—review and editing, F.M.Y. and A.S.K.; visualization, F.M.Y.; supervision, A.S.K.; project administration, Z.H.; funding acquisition, Z.H. and F.M.Y. All authors have read and agreed to the published version of the manuscript.

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**Conflicts of Interest**
The authors declare no conflict of interest.

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