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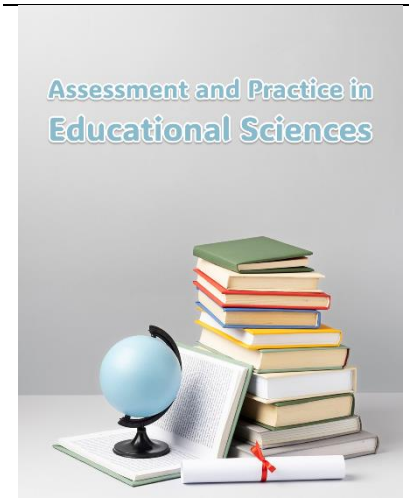


# Extraction and Elucidation of the Components of the Philosophical Foundations of Environmental Education at the Upper Secondary Level



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## ABSTRACT

The environment is in a critical condition, and education and training are essential to address its challenges. The purpose of this study is to extract and elucidate the components of the philosophical foundations of environmental education in order to propose a model for upper secondary education. The research employed a qualitative approach, utilizing meta-synthesis and theoretical inference methods. This study examined sources and articles related to the philosophical foundations of environmental education and used purposive sampling to collect data. The data collection instrument consisted of coding sheets, and data analysis was conducted using thematic analysis. The findings indicate that the educational model of environmental education comprises ontological, anthropological, epistemological, and axiological components. In addition, objectives such as the development of environmental ethics, the growth of spirituality, and the enhancement of environmental culture were identified as key outcomes of the study. Fundamental principles include viewing humans as stewards of nature, environmental justice, and coexistence. Instructional methods encompass education grounded in Islamic foundations, participation and experiential learning, critical thinking, and knowledge-based approaches. Ultimately, the study demonstrates that the success of environmental education at the upper secondary level depends on the institutionalization of philosophical components within an operational model that cultivates a generation that is conscious of and committed to ecosystem sustainability.

**Keywords:** Philosophical foundations; Environmental education; Upper secondary education; Educational model.

## Introduction

Environmental degradation has emerged as one of the most pressing global challenges of the twenty-first century, affecting ecological balance, human well-being, economic stability, and social justice across local, national, and international contexts. Accelerating climate change, biodiversity loss, pollution, and unsustainable consumption patterns have demonstrated that technological solutions alone are insufficient to address environmental crises. Instead, there is growing consensus that long-term solutions require profound transformations in human values, worldviews, behaviors, and decision-making processes, placing education at the center of sustainability efforts (1, 2). Within this framework, environmental education is increasingly

understood not merely as the transmission of ecological knowledge, but as a transformative process aimed at reshaping ethical orientations, philosophical assumptions, and civic responsibilities toward nature.

In recent decades, international policy agendas such as the Sustainable Development Goals have further emphasized the strategic role of education in fostering environmental sustainability, social equity, and responsible citizenship. Education systems are expected to cultivate environmentally literate individuals capable of critical thinking, ethical judgment, and collective action in response to complex socio-ecological problems (3, 4). Consequently, environmental education has evolved from an auxiliary curricular topic into a multidimensional field integrating philosophical inquiry, ethical reflection, cultural values, and experiential learning. This evolution has prompted scholars to reconsider the philosophical foundations underpinning environmental education, particularly in formal schooling contexts.

Philosophical foundations play a decisive role in shaping the goals, content, pedagogical approaches, and outcomes of educational systems. Educational philosophies implicitly define conceptions of knowledge, human nature, values, and the human–nature relationship, thereby influencing how learners interpret and engage with environmental issues (5). In environmental education, these foundations determine whether nature is perceived instrumentally or intrinsically, whether humans are positioned as dominators or stewards, and whether ethical responsibility extends beyond anthropocentric concerns. Recent philosophical debates have increasingly challenged anthropocentrism and called for ecocentric, biocentric, and relational perspectives that recognize the intrinsic value of ecosystems and non-human life (6, 7).

Within this philosophical shift, environmental ethics has gained particular prominence. Ethical frameworks grounded in responsibility, justice, and care for nature are viewed as essential for fostering sustainable behaviors and collective commitment to environmental protection (8, 9). Studies have shown that without ethical grounding, environmental knowledge alone rarely translates into sustained pro-environmental action (10, 11). Accordingly, contemporary environmental education emphasizes the integration of ethical reasoning, value clarification, and moral responsibility alongside scientific understanding.

In many cultural and educational contexts, particularly in societies with strong religious and philosophical traditions, environmental ethics is deeply intertwined with spiritual and metaphysical worldviews. Islamic philosophy, for example, offers a rich conceptualization of the human–nature relationship based on stewardship (khilāfah), trust (amānah), justice, and balance, which has been increasingly explored as a foundation for environmental education (12, 13). Research indicates that integrating religious and philosophical perspectives into environmental education can enhance moral motivation, internalization of values, and long-term behavioral commitment (14, 15). Such integration is particularly relevant in educational systems where philosophical and religious values play a central role in curriculum design and educational policy.

At the same time, critical perspectives in environmental education have highlighted the need to address issues of power, justice, and social inequality. Environmental problems disproportionately affect marginalized communities, making it imperative for education to engage with questions of environmental justice, civic participation, and social transformation (16, 17). From this standpoint, environmental education is not neutral but inherently political, requiring learners to critically examine dominant economic models, consumption patterns, and policy structures that contribute to ecological degradation (18). Such perspectives call for pedagogical approaches that empower students as active agents of change rather than passive recipients of information.

Formal schooling, especially at the upper secondary level, occupies a strategic position in advancing these educational goals. Adolescence is a critical developmental stage characterized by identity formation, moral reasoning, and increased capacity for abstract and philosophical thinking. Upper secondary students are cognitively and emotionally capable of engaging with complex ethical dilemmas, philosophical concepts, and socio-environmental controversies (19, 20). As future decision-makers, professionals, and citizens, their environmental orientations are likely to have lasting societal impacts. Therefore, designing

environmental education at this level requires a coherent philosophical framework that aligns educational objectives with learners' developmental capacities and societal needs.

Despite the growing body of research on environmental education, several gaps remain. Many studies have focused on program effectiveness, behavioral outcomes, or specific instructional interventions, such as technology-enhanced learning or experiential activities (21, 22). While these studies provide valuable insights, they often lack explicit articulation of the philosophical assumptions guiding educational design. As a result, environmental education initiatives may suffer from conceptual fragmentation, inconsistencies in objectives, or limited transformative impact (23, 24). Addressing these limitations requires systematic examination and clarification of the philosophical foundations underlying environmental education models.

Moreover, existing curricular frameworks frequently emphasize early childhood or primary education, leaving upper secondary education comparatively underexplored. Research conducted in elementary and lower secondary contexts demonstrates positive effects of environmental education on awareness and attitudes, yet these findings cannot be uncritically generalized to older students with more advanced cognitive and ethical capacities (25, 26). Upper secondary education demands more sophisticated philosophical engagement, including critical reflection on ontology, epistemology, axiology, and anthropology as they relate to environmental issues (27, 28).

In response to these challenges, recent scholarship has increasingly called for integrative models of environmental education grounded in explicit philosophical frameworks. Such models seek to harmonize scientific knowledge, ethical reasoning, cultural values, and pedagogical practices within a coherent structure (29, 30). Meta-analytic and theoretical studies further suggest that philosophically grounded environmental education is more likely to produce enduring cognitive, attitudinal, and behavioral outcomes (4, 31). Nevertheless, there remains a need for context-sensitive models that reflect specific cultural, philosophical, and educational traditions.

Within this context, the exploration of philosophical foundations of environmental education tailored to upper secondary education represents both a theoretical and practical necessity. Drawing on interdisciplinary insights from philosophy of education, environmental ethics, religious studies, and curriculum theory, such exploration can provide a conceptual map for educators, curriculum designers, and policymakers. It can clarify core assumptions about the nature of reality, the human–nature relationship, sources of knowledge, and value systems that should inform educational practice (5, 32). Furthermore, it can guide the development of educational models that are ethically grounded, culturally relevant, and pedagogically effective.

In addition, the rapidly changing global context—characterized by environmental uncertainty, technological advancement, and socio-political complexity—demands educational approaches that foster adaptability, critical consciousness, and moral resilience. Environmental education grounded in robust philosophical foundations can contribute to these capacities by encouraging reflective thinking, ethical deliberation, and responsible action (2, 33). Such education moves beyond instrumental learning outcomes and aspires to cultivate environmentally responsible worldviews that inform personal and collective decision-making.

Given the diversity of existing perspectives and the complexity of the field, synthesizing prior research is essential for constructing a comprehensive understanding of philosophical foundations in environmental education. Meta-synthesis and theoretical inference offer systematic approaches for integrating findings from diverse studies, identifying recurring themes, and generating higher-order conceptual frameworks (8, 34). Through such synthesis, it becomes possible to articulate a coherent set of philosophical components, principles, objectives, and pedagogical implications relevant to upper secondary education.

Accordingly, this study seeks to contribute to the literature by systematically extracting and explaining the philosophical foundations of environmental education with specific emphasis on the upper secondary school level, drawing on a comprehensive body of national and international research. By clarifying these foundations, the study aims to support the

development of an educational model that integrates ethical, philosophical, and pedagogical dimensions of environmental education in a coherent and contextually grounded manner.

The aim of this study is to extract and explain the philosophical foundations of environmental education in order to propose a coherent educational model tailored to upper secondary school students.

## Methods and Materials

The present study specifically focuses on the philosophical foundations of environmental education at the upper secondary school level and employs a qualitative approach using theoretical inference and meta-synthesis methods. Data collection was conducted through documentary and library-based research, and the data collection instrument consisted of coding sheets. Data analysis was carried out using thematic analysis. In the theoretical inference method, instead of collecting field data, the researcher engages in rational analysis and systematic review of scholarly sources in order to extract the concepts and principles of environmental education.

The meta-synthesis method consists of seven stages, ranging from the formulation of the research question to the presentation of findings. In this approach, validity and reliability are assessed based on specific qualitative research criteria, and measures such as documenting the stages of analysis and ensuring methodological transparency were undertaken to maintain rigor. Ultimately, data derived from both theoretical inference and meta-synthesis were coded and analyzed using thematic analysis.

## Findings and Results

**Main Research Question 1:** What components constitute the philosophical foundations of environmental education for upper secondary school students?

**Table 1. Components of the Philosophical Foundations of Environmental Education**

| Components | Description |
|---|---|
| Reflection on the signs of nature | Understanding nature as divine signs and manifestations of God |
| Contemplation of natural verses in the Qur'an | Using Qur'anic verses to develop environmental insight |
| Development of integrative insight through religious reflection | Integrating religious and scientific knowledge to better understand the environment |

The philosophical foundations of environmental education include components that facilitate students' deeper understanding of the human–nature relationship and their responsibilities toward the environment. These components encompass reflection on the signs of nature as divine manifestations, contemplation of verses and narrations related to nature, and the development of integrative insight through religious reflection on the laws of nature.

**Main Research Question 2:** What is the educational model of environmental education for upper secondary school students?

**Table 2. Educational Model of Environmental Education**

| Educational Models | Description |
|---|---|
| Participatory education | Use of interactive workshops and educational seminars |
| Practical activities in nature | Participation in environmental conservation projects |
| Encouragement of ethical responsibility | Cultivating a sense of responsibility toward the environment |

The educational model consists of instructional methods and learning activities that help students become familiar with environmental concepts and acquire the competencies necessary for environmental protection. This model includes participatory education, practical activities in natural settings, and encouragement of ethical responsibility.

**Sub-Question 1:** What are the philosophical objectives of environmental education for upper secondary school students?

**Table 3. Philosophical Objectives of Environmental Education**

| Objectives | Description |
|---|---|
| Development of environmental awareness | Familiarization with key environmental concepts |
| Change in attitudes toward the environment | Reducing tendencies toward consumerism |
| Development of practical skills | Empowering students to solve environmental problems |

The philosophical objectives include raising awareness, transforming attitudes, and developing the skills required for environmental protection. These objectives enable students to gain a better understanding of environmental issues and to act as responsible citizens.

**Sub-Question 2:** What are the philosophical principles of environmental education for upper secondary school students?

**Table 4. Philosophical Principles of Environmental Education**

| Principles | Description |
|---|---|
| Critique of anthropocentrism | Examining the negative consequences of anthropocentrism on the environment |
| Integration of religion and ethics with nature | Promoting ethical values in interaction with nature |
| Ecocentrism | Emphasizing the intrinsic value of life and ecosystems |

The philosophical principles include a critique of anthropocentrism, the integration of religion and ethics with nature, and ecocentrism as an alternative approach. These principles help students develop a deeper understanding of their responsibilities toward the environment.

**Sub-Question 3:** What teaching and learning methods are appropriate for environmental education for upper secondary school students?

**Table 5. Teaching and Learning Methods of Environmental Education**

| Methods | Description |
|---|---|
| Direct activities in nature | Participation in practical and conservation projects |
| Experiential learning | Learning through experience and group activities |
| Educational workshops and seminars | Conducting interactive and instructional sessions |

Teaching and learning methods include practical activities, experiential learning, and participatory approaches that contribute to deeper learning. These methods allow students to interact directly with the environment and acquire the skills necessary for its protection.

**Sub-Question 4:** What is the philosophical content of environmental education for upper secondary school students?

**Table 6. Philosophical Content of Environmental Education**

| Content | Description |
|---|---|
| Reconsideration of the human–nature relationship | Transition from anthropocentrism to ecocentrism |
| Ecophilosophical literacy | Developing a deep understanding of environmental issues |
| Responsibility and conscious agency | Encouraging action and responsibility toward the environment |

The philosophical content includes topics such as reconsidering the human–nature relationship, ecophilosophical literacy, and responsibility toward the environment. This content helps students achieve a deeper understanding of environmental issues.

**Sub-Question 5:** What are the outcomes of implementing environmental education for upper secondary school students?

**Table 7. Outcomes of Implementing Environmental Education**

| Outcomes | Description |
|---|---|
| Cognitive transformations in students | Increased awareness and understanding of environmental issues |
| Attitudinal and value transformations | Formation of positive attitudes toward the environment |

| | |
|---|---|
| Behavioral transformations | Changes in lifestyle and adoption of sustainable behaviors |
| Cultural, social, and legal transformations | Improvement of environmental regulations and public awareness |

The outcomes include individual and social changes that lead to improved environmental awareness and behaviors. These outcomes may manifest as cognitive, attitudinal, and behavioral transformations among students, as well as broader cultural and social changes within society.

## Discussion and Conclusion

The findings of the present study provide a comprehensive and philosophically grounded framework for environmental education at the upper secondary level, emphasizing that effective environmental education cannot be reduced to the transmission of ecological facts or isolated behavioral interventions. Rather, the results demonstrate that environmental education must be rooted in clearly articulated philosophical foundations encompassing ontological, anthropological, epistemological, and axiological dimensions. This finding is consistent with scholarship arguing that educational practices inevitably reflect underlying philosophical assumptions about reality, knowledge, values, and the human–nature relationship (5, 28). The identification of these dimensions confirms that environmental education requires a coherent worldview capable of shaping learners' ethical orientations and long-term commitments toward sustainability.

One of the central results of this study is the prominence of ontological reflection on nature as a meaningful and value-laden reality rather than a mere resource for human exploitation. The emphasis on understanding nature as possessing intrinsic value aligns with ecocentric and biocompatibility perspectives that challenge dominant anthropocentric paradigms (6, 7, 32). This ontological shift is critical, as previous research has shown that anthropocentric worldviews are strongly associated with unsustainable behaviors and instrumental attitudes toward the environment (27). By contrast, educational models that highlight the intrinsic worth of ecosystems foster deeper moral engagement and responsibility, a conclusion supported by studies in environmental ethics and philosophy (17, 35).

The anthropological dimension identified in this study positions humans as morally responsible agents and stewards of nature rather than dominant controllers. This conception resonates strongly with Islamic philosophical and ethical traditions, which emphasize stewardship (khilāfah), trust, and accountability in the human–nature relationship (12, 13). Empirical and theoretical studies suggest that such responsibility-based anthropological frameworks significantly enhance pro-environmental attitudes and behaviors by linking environmental action to moral identity and spiritual meaning (14, 34). The present findings therefore reinforce the argument that integrating culturally and philosophically grounded views of humanity can strengthen the internalization of environmental values among adolescents.

From an epistemological perspective, the study highlights the importance of integrative knowledge that combines scientific understanding with philosophical, ethical, and, where culturally relevant, religious insights. This integrative epistemology challenges the fragmentation often observed in school curricula, where environmental issues are treated as purely scientific or technical matters (15, 24). Prior research indicates that fragmented knowledge limits students' ability to comprehend the complexity of environmental problems and to connect knowledge with action (4). In contrast, integrative approaches promote systems thinking, critical reflection, and deeper cognitive engagement, which are essential for addressing multifaceted sustainability challenges (1, 2). The findings of the present study thus corroborate calls for epistemological pluralism in environmental education.

The axiological findings underscore the centrality of values such as environmental justice, ethical responsibility, coexistence, and care for future generations. These values are consistent with both global sustainability discourses and local

ethical traditions (3, 9). The results suggest that value education is not a peripheral component but a core element of environmental education, shaping learners' attitudes and behavioral intentions. This conclusion is supported by research demonstrating that value-oriented education significantly predicts pro-environmental behavior beyond knowledge and awareness alone (10, 11). By embedding values within a philosophical framework, environmental education can move from superficial attitude change to deeper moral commitment.

The educational model derived from the findings emphasizes participatory, experiential, and ethically oriented pedagogical approaches. The prominence of experiential learning and direct engagement with nature aligns with extensive research highlighting the effectiveness of hands-on and participatory methods in fostering environmental awareness and responsibility (26, 31). Moreover, the inclusion of critical thinking and reflective dialogue corresponds with critical environmental education perspectives, which argue that learners must be empowered to question dominant narratives, consumption patterns, and socio-political structures contributing to environmental degradation (16, 18). The present findings thus reinforce the view that pedagogy is inseparable from philosophy in environmental education.

Importantly, the results demonstrate that upper secondary education is a particularly appropriate stage for philosophically grounded environmental education. Adolescents' cognitive capacity for abstract reasoning, ethical deliberation, and identity formation enables meaningful engagement with complex philosophical and environmental issues (19, 20). This supports earlier findings that environmental education interventions at this level can produce lasting cognitive and attitudinal changes when they go beyond behaviorist or informational approaches (21, 22). The present study adds to this literature by clarifying the philosophical structures that can guide such interventions.

The outcomes identified in this study—cognitive, attitudinal, behavioral, and broader cultural transformations—are consistent with models of transformative learning and education for sustainable development. Prior evaluations of environmental education programs have shown that philosophically and ethically grounded approaches are more likely to result in sustained behavioral change and civic engagement (23, 36). Furthermore, the linkage between individual learning outcomes and societal transformations highlighted in the findings echoes arguments that education plays a foundational role in shaping environmental governance, policy awareness, and social norms (37, 38). The present study therefore situates environmental education within a broader socio-cultural and ethical context.

Overall, the findings suggest that the effectiveness of environmental education at the upper secondary level depends on the coherence between philosophical foundations, educational objectives, pedagogical methods, and expected outcomes. Fragmented or technically oriented programs risk limited impact, whereas philosophically integrated models offer greater potential for cultivating environmentally responsible and ethically engaged citizens (29, 30). By synthesizing insights from philosophy, ethics, education, and sustainability studies, the present research contributes a holistic perspective that addresses both theoretical and practical gaps in the field.

Despite its contributions, this study has several limitations. First, the research is based on qualitative meta-synthesis and theoretical inference, which rely on existing literature rather than primary empirical data from schools or students. Second, the findings are context-sensitive and largely grounded in philosophical, cultural, and educational traditions reflected in the reviewed sources, which may limit direct generalizability to different cultural or educational systems. Third, the study focuses on conceptual and philosophical dimensions and does not empirically test the proposed educational model in real classroom settings.

Future studies could empirically examine the implementation of the proposed philosophically grounded environmental education model in upper secondary schools using mixed-methods or longitudinal designs. Comparative research across different cultural and educational contexts would also be valuable to assess the adaptability and universality of the identified

philosophical foundations. Additionally, future research could explore the perspectives of teachers and students regarding the feasibility and impact of integrating philosophical and ethical dimensions into environmental education curricula.

Educational policymakers and curriculum designers are encouraged to explicitly articulate the philosophical foundations of environmental education when developing upper secondary curricula. Teacher training programs should emphasize philosophical literacy, ethical reasoning, and integrative pedagogical strategies alongside scientific environmental knowledge. Schools can enhance environmental education by adopting participatory and experiential approaches that connect ethical reflection with real-world environmental action, thereby fostering deeper student engagement and long-term commitment to sustainability.

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## Authors' Contributions

All authors equally contributed to this study.

## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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