

Transforming Learning Through Ecopedagogy: A Sustainable Approach for Fostering Environmental Behaviour

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ABSTRACT

Environmental degradation has heightened the need for educational frameworks that boost environmentally responsible behaviour. Ecopedagogy provides a transformative, sustainability-oriented approach to education that integrates ecological principles into educational practice (i.e. teaching) to encourage and increase students' sustainable behaviours towards their environments. To achieve this, the paper addresses three main objectives: to provide an overview of how ecopedagogy is understood; to identify and analyse pedagogical approaches for fostering environmental awareness and responsible behaviours; and to propose strategies for educators and policymakers for incorporating ecopedagogy into schools' curricula. This review paper is based on a qualitative synthesis of secondary data from sources including peer-reviewed journal articles, policy documents, and scholarly books about ecopedagogy, environmental education, and sustainable practices, which were critically analysed. Thematic analysis was employed to highlight recurring themes in conceptual frameworks and pedagogical strategies in ecopedagogy. Findings reveal ecopedagogy's potential to nurture critical consciousness, environmental consciousness, ethical responsibility, and behavioural change/shift among learners. Effective pedagogical strategies include experiential or real-world experiences, teaching across multiple disciplines, dialogical learning, and promoting critical reflection. The study concludes that ecopedagogy offers a meaningful educational approach for strengthening environmental behaviour and encouraging the development of sustainability-oriented learning environments. The findings of this study have major implications for environmentally responsible practices within educational institutions. Also, it points to the need for sustained institutional and policy support for successfully integrating sustainability into education systems to assist with long-term behavioural change.

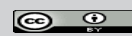
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The growing global environmental issues that range from climate change to loss of species to the constantly mounting trends of unsustainable consumerism have intensified the urgency of fundamental transformational change globally (IPCC, 2023). These issues threaten the ecological integrity of the planet, the well-being of people and generational equity among future generations, which is particularly poignant in the context of developing nations such as India, where the problems of environmental degradation are aggravated by population pressure and economic growth imperatives. These issues are compounded

by the rapid urban growth, expansion of industries, and shift from rural-agrarian livelihoods to urban ones, all of which are putting additional stress on already fragile ecosystems (MoEFCC, 2021). Education has not only been seen as a channel of scientific knowledge, but has been observed to be a central driver for developing critical environmental awareness, promoting ethical

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responsibility, and ecological values that will lead to a change in behaviour towards sustainability (Stern, 2000; Tilbury, 2011). However, mainstream environmental education in India has tended to focus on the conveyance of information, curriculumcentric approaches that emphasize factual knowledge while underaddressing the sociocultural, ethical, and structural dimensions of environmental breakdown and decline (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2014; Gadotti, 2008).

Environmental education has been developed in India through various government policy initiatives has taken great strides. Among these are the Environment Education Programme of the Ministry of Environment, Forest and Climate Change (MoEFCC) and the National Green Corps, which focus on raising awareness about conservation and sustainable living among students and youth (MoEFCC, 2021). Similarly, the National Education Policy (NEP) 2020 accentuates the need for schools and higher education institutions to incorporate sustainability and climate awareness into the curriculum. The NEP advocates for a shift in pedagogical approaches from a content-based model toward one grounded in experiential, skills and value-based learning (NEP, 2020). However, critical analyses indicate that much of the existing environmental education relies heavily on factual study and the encouraging urge for individual personal responsibilities, barely challenging the deeper systemic causes of environmental degradation. Such approaches tend to disseminate a compartmentalized understanding of humans and nature as opposed to fostering interconnectedness or systemic thinking (Tilbury, 1995). Moreover, despite increased environmental knowledge, pro-environmental behaviours among Indian consumers and youth indicate gaps between raising awareness and sustained action on an ongoing basis in support of the environment, thus revealing the inadequacy of conventional pedagogies to teach a true commitment to sustainability (Lavuri, 2021; None & Datta, 2011; Ghose *et al.* 2024).

Ecopedagogy steps in where traditional education falls short. It has emerged as a critical pedagogical approach that reimagines the classroom as a place to foster planetary consciousness, a planetary sense of responsibility, and a site of socio-ecological

transformation (Gadotti, 2008). Its roots run deep in popular education movements, and it draws heavily from critical pedagogy and ecological thought. Ecopedagogy foregrounds the interdependence of social justice, ecological health, and how we teach, i.e. pedagogical practices. So, what does ecopedagogy actually do? At its core, it pushes learners to question dominant paradigms regarding development, consumption, relations between humans and nature, and to develop visions of sustainable and just alternatives (Martusewicz *et al.* 2020; Misiaszek, 2016). Additionally, by connecting local ecological challenges alongside global structural inequalities, ecopedagogy aims to foster an active engagement with the issues of ecological and social injustice through the development of a planetary consciousness (Misiaszek, 2016). In the case of India, where environmental challenges are tangled with social inequalities and developmental priorities, ecopedagogy gives a viable path for promoting sustainable changes in the way individuals think and behave. Hence, ecopedagogy has great potential for transforming education to foster environmentally responsible behaviours in support of sustainability and environmental stewardship. In this context, the recognition is increasing that culture-based knowledge systems are a key element in deepening the ethical and practical aspects of such pedagogical approaches. Recent scholarly work has begun to explore how bringing Indian Knowledge Systems and indigenous environmental wisdom into ecopedagogy adds new layers of meaning, arguing that traditions rooted in restraint, reciprocity, and placebased stewardship can enrich contemporary sustainability education (Pandey & Mohanty, 2025; Asagar, 2025). There are examples of experimental research being conducted in Indian teacher education settings; for instance, studies demonstrated that using ecopedagogical interventions can significantly lead to improvement in preservice teachers' proenvironmental attitudes and behaviours. This implies that ecopedagogy could be a powerful way for developing sustainable dispositions and mindsets in the future (Rymbai & Sungoh, 2021).

The present study exists at the intersection of global urgency for environmental protection, Indian-specific educational reform and the field of ecopedagogy. It builds on previous studies

conducted in India, and it explores how transforming learning and reshaping the way students learn through an ecopedagogical framework can foster deeper, more lasting environmental behaviour among learners. The focus here is on planetary consciousness, critical reflection, and actions. The study aims to contribute a theoretically grounded and informed account of how education can move beyond merely raising awareness to achieving real transformation in environmental learning within the current socio-educational context in India.

Literature Review

Ecopedagogy was conceptualised as a combination of critical pedagogy and ecological thought and responsibility; it relies heavily on the Freirean notions of transformative education. According to Misiaszek (2019), ecopedagogy can be placed in the context of critical literacies. He believes that ecopedagogy is a reimagining of environmental pedagogy by approaching the critical reading and understanding of development and sustainability, and their associated political ideologies, through a local, global, and planetary lens, thus creating an authentic reading of these issues.

According to Iftekhar and Misiaszek (2019), ecopedagogy should be intertwined with non-western epistemological views. The authors argue that critical ecopedagogical approaches should be employed when developing global citizenship education in India, rather than relying on narrow models used for educational purposes. The use of critical ecopedagogies as a basis for global citizenship education is critical in the Indian context because, as Padgett (2018) found, traditional sustainability education has focused primarily on teaching about sustainability rather than nurturing the sustainability of education itself. In fact, bridging the gap in sustainable education is one of the main goals of ecopedagogy through its focus on transforming relationships between communities as well as with the environment.

Padhan (2023) studied environmental and nature education in India and found that there are still substantial barriers to implementing policy through practice, such as insufficient teacher training, an overabundance of curriculum, a lack of experiential pedagogy, infrastructural problems, and insufficient mechanisms for monitoring. Likewise, Mishra (2025)

investigated environmental education in Indian schools. Data was collected through interviews of key educational personnel (stakeholders) as well as by analysing textbooks of NCERT. It was found that the majority of environmental education courses in Indian schools are theoretical in nature and support a utilitarian view of nature, making it difficult for students to understand the ethical dimensions of ecological systems and develop strong relationships with nature. The author makes a compelling case for changing the paradigm of environmental education to one that draws on the great wisdom of ancient Indian eco-philosophies contained within the Indian Knowledge System.

Muhammed (2024) conducted a mixed-methods, multi-site study examining how students' consciousness of sustainability can be promoted through innovative educational practices and processes in nine schools across the state of Kerala, India. The primary focus of the study was on the importance of using collaborative learning, critical thinking, experiential education, and establishing eco-schools or "green" campuses as means to encourage students' consciousness of sustainability.

Intsiful, Intsiful and Boateng (2025) examined the transformative potential of ecopedagogy in environmental education and believe that ecopedagogy provides a path for a more profound understanding of the relationship between social conflicts and environmental degradation; this perspective should lead to a complete reformation of traditional environmental education paradigms, which are based on neoliberal ideology, that contribute to the perpetuation of unsustainable behaviours.

Singh and Ahmad (2025) analysed the Indian curriculum in relation to climate change and sustainability through a qualitative content analysis of NCERT curricula from Grades VI-X and found that while climate change and sustainability are represented across the science and social science curricula of Grades VI-X, there is excessive content in the curricula and insufficient opportunities for students to engage in critical inquiry or hands-on experiential learning.

Research Questions

1. How is ecopedagogy conceptualized within the field of environmental and sustainability education?

2. What pedagogical strategies within ecopedagogy contribute to effectively enhancing learners' environmental awareness and behavioural transformation?
3. What strategies can educators and policymakers use to integrate ecopedagogy into school curricula for sustainable development?

Research Objectives

1. To examine the conceptualization of ecopedagogy within environmental and sustainability education in existing academic literature.
2. To identify and analyse pedagogical strategies in ecopedagogy that effectively enhance learners' environmental awareness and behavioural transformation.
3. To propose practical strategies for educators and policymakers to integrate ecopedagogy into school curricula to promote sustainable development.

Research Methodology

The study utilised a qualitative, review-oriented and analytical research methodology, which focused exclusively on secondary data to explore the transformative potential of ecopedagogy to engage in sustainable environmental behaviours. A comprehensive literature review was conducted by systematically selecting diverse types of academic sources and policy-oriented sources (e.g., reports issued by government agencies) to provide rigorous analysis and relevant context. Data sources used included well-known scholarly databases (e.g. ResearchGate, Google Scholar, ERIC, SpringerLink, Taylor & Francis Online, and Scopus) utilising specific keywords such as 'ecopedagogy,' 'environmental behaviour,' 'environmental awareness,' and 'sustainability.' The outcome of the data retrieval process resulted in a total of peer-reviewed journal articles, scholarly books, and significant policy-related documents, including the National Education Policy (NEP) 2020 and reports from the Ministry of Environment, Forest and Climate Change (MoEFCC). Following the data collection phase of this study, the data were analysed using a thematic analysis technique; therefore, enabling

recurring themes to be consolidated from conceptual frameworks and teaching methodologies. This methodological structure facilitated the synthesis of existing knowledge and provided a theoretical basis for how the educational process can extend beyond simply delivering information to creating transformative forms of environmental education through educational practice within India's socio-educational context.

Findings of the Study

(I) Conceptualization of Ecopedagogy within the field of Environmental and Sustainability Education

Ecopedagogy is a transformative and critical pedagogical framework based on Paulo Freire's popular education and critical pedagogy; it seeks to develop ecological literacy, planetary citizenship and social and ecological justice through dialectical (conversation) educational experiences (Misiaszek, 2019; Kahn, 2010). Ecopedagogy emerged from the late-twentieth-century Latin American critical movement, and it represents not merely an education about ecology but rather an education through ecology. As a result of their experience learning through ecological means, the way students view themselves, society, and the more-than-human world is significantly impacted (Hung, 2021). Ecopedagogy focuses on identifying the socio-political and economic grounds of environmental destruction, which includes the interrelated oppressions of colonialism, patriarchy, neoliberalism and anthropocentrism. As a result, ecopedagogy encourages students to critically assess the dominant expressions of development and sustainability; therefore, ecopedagogy fosters students' ability to read and understand the complexities of global-local changing aspects that lead to environmental harm and social conflict (Misiaszek, 2022; Kahn, 2010; Intsiful, Intsiful & Boateng, 2025).

Misiaszek's (2017) extends this conceptualisation by aligning ecopedagogy within the framework of critical global citizenship education and presents a model for how all levels of teaching and learning about sustainability can be achieved with an understanding of the interconnectedness of local, national, and global contexts. Educators should

strive to create learners who will be able to act reflexively in the face of sustainability challenges, while being capable of understanding the various perspectives from which the global environment is viewed, such as through the lenses of globalization, colonialism, gender, race and indigenous knowledge. The literature provides an emerging consensus on ecopedagogy as an alternative educational model that provides a counter to hegemonic or dominant anthropocentric and technocentric worldviews, creating a biocentric ethic that recognises and values the Earth's existence and deserves attention and care; this reframes learners as active participants in creating sustainable social and ecological transformation (Lummis, 2002; Chen & Liu, 2020).

(II) Pedagogical Strategies within Ecopedagogy for Effectively Enhancing Learners' Environmental Awareness and Behavioural Transformation

Numerous pedagogical methods integrated into ecopedagogy have been recognised as key in improving environmental knowledge amongst learners and helping them change their behaviours in regard to the environment in Indian contexts. Methods used are based on significant, transformable, socially relevant approaches and align with the principles of ecopedagogy in relation to creating a sustainable future.

1. Experiential and Outdoor Learning: Experiential Learning is one of the most supported strategies supporting the ecopedagogical framework. It takes lessons from the classroom into real life, providing students with hands-on experience interacting with the environment and bridging the gap between theoretical environmental knowledge and behaviour that encourages a sustainable way of life. Saputri *et al.* (2026) created the experiential learning-based ecopedagogy model, including five experiential stages: experience, reflect, create, act, and continue. They have reported a considerable increase in student environmental awareness, reflective capacity, and ecological responsibility as a consequence of the use of this model. Focusing on India, Mahapatra and Vijayalatha (2024) conducted a quasi-experimental study using an experiential learning-based ecopedagogy intervention with primary school students in Hyderabad. The study found that the intervention had a statistically

significant positive effect on environmental knowledge, with students' mean scores increasing from 9.97 to 16.80, along with improved engagement and critical thinking regarding environmental issues. Collectively, these findings indicate that experiential pedagogy, when systematically embedded in ecopedagogical design, serves as a strong force for ongoing behavioural change (Cornet *et al.* 2024; Cuenca-Soto *et al.* 2023).

2. Critical Pedagogy and Dialogical Inquiry: Critical pedagogy, which draws heavily on the teachings of Paulo Freire, acts as a primary component in ecopedagogy. It encourages students to examine the relationship between social conflict and environmental destruction, allowing for an in-depth understanding of how to solve problems in a sustainable way (Intsiful, Intsiful & Boateng, 2025). According to Marouli (2022), environmental education aimed at behaviour modification must also incorporate a pedagogy of critical inquiry that enables students to become critical thinkers, independent, and empowered citizens who can solve socio-environmental issues. By engaging in a dialogic process, questioning established beliefs, deconstructing human-centred narratives, and examining patterns of consumption, students develop their critical environmental consciousness. In India, this approach is especially important.

3. Interdisciplinary and Integrated Curriculum Approaches: The nature of ecopedagogy requires that academic disciplines be reorganised as ways to understand environmental issues as interconnected phenomena, and therefore cannot be properly taught in isolation. Ubaydullaeva (2026) found that students' cognitive, emotional, and behavioural engagement occurred at moderate to very high rates when they were taught using an interdisciplinary approach, and students who were taught with a combination of hands-on and interdisciplinary methodologies demonstrated the most positive results in pro- environmental behaviour. In India, Sharma (2025) comments on how Indigenous knowledge systems can be integrated into the educational process and support the development of environmental literacy, as well as provide students with knowledge and experience related to traditional ecological practices and modern-day environmental concerns. The National Education Policy (NEP) 2020, as Padhan (2023) points out, emphasises

experiential, action-oriented, and interdisciplinary approaches to education that develop and increase environmental literacy; however, many barriers exist to the effective implementation of this policy in practice (e.g. curriculum overload; teacher unpreparedness).

4. Community Engagement and Participatory Learning:

Ecopedagogy covers the learning space beyond a formal institutional orientation to community-based participation and collective environmental action. Kalorth and Sreekumar (2015) evaluated creative environmental education practices in Kerala, India. These include the Nalla Paadam (good lesson) program, as well as the Palathulli (many a drop) Project. Both programs provide community-based, student-centred participatory curricula that link environmental communication with local ecological action. Agashe (2005) identified cooperative learning as an effective method for sustainable development within India's formal education system. It is suggested that using cooperative learning with purpose can facilitate greater democratic participation and, in turn, support the establishment and continuation of education for sustainable development. Cachelin and Nicolosi (2022) have provided evidence that critical community-engaged pedagogies will change the way that students develop their understanding of systems, gain an experience of a sense of agency, and articulate their positionality in creative ways. Furthermore, where many parts of India have strong cultural roots in what is referred to as traditional community structure and have retained indigenous ecological knowledge, participatory strategies can connect to these cultural resources to promote environmentally friendly behaviours.

5. Technology-Enhanced Environmental Instruction:

Digital technologies such as virtual field experiences, simulations, and ICT-enhanced learning platforms represent complementary ecopedagogical strategies, particularly important in countries where access to ecologically diverse field sites is inconsistent or nonexistent. Ubaydullaeva (2026) found a significant increase in cognitive and behavioural engagement when technology-supportive instructional techniques, especially with respect to digital simulations, were used. Padhan (2023) describes ICT-enabled learning as a key example of innovative practice representing

possible sources of revitalisation in the area of environmental education in India. Technology, by itself, is insufficient when it is embedded within a larger ecopedagogical framework that includes experiential components and critical reflection; then it can create greater access and an upsurge in understanding about the environment.

6. Transformative Learning and Reflective Practice:

The application of transformative learning theory in ecopedagogy helps students to experience a worldview shift rather than just an increase in knowledge about the environment. Alguren (2025) conducted research that examined the role of experiential learning methods in developing self-awareness and achieving systems thinking and action as an effective method for supporting students in their efforts to overcome both psychological and practical barriers to the continuing development of pro-environmental behaviours. In another study, Okur-Berberoglu (2015) found evidence that ecopedagogy-based outdoor education using reflection writing and critical self-reflection was effective in developing increased awareness of environmental science and biodiversity within students. According to Sharma & Sharma (2017), in the Indian educational system, despite having introduced environmental education into India long ago, we have yet to see the goal achieved. Therefore, implementing reflective & transformative pedagogies can help to move beyond the information-deficit model.

These ecopedagogical strategies foster learner empowerment, global-local understanding of the environment, and promote active participation, thereby laying an important foundation for the transformation of the educational experience to better meet sustainability goals.

(III) Strategies Educators and Policymakers Can Use to Integrate Ecopedagogy into School Curricula for Sustainable Development

Achieving ecopedagogy integration in formal education for sustainability requires a cohesive approach of curriculum redesign, teacher capacity building, and supportive policy frameworks. Research suggests that adopting an interdisciplinary, project-based, and experiential learning model, which views the local environment as a primary resource for learning, will enhance learning outcomes

(Sharma, 2025). In India's education system, while the National Curriculum Framework (NCF) 2005 and National Education Policy (NEP) 2020 provide institutional frameworks for environmental education, Singh & Ahmad (2025) argue that it is essential to embed systems thinking and action-oriented pedagogy as an expansion of knowledge beyond simply raising awareness. Mochere (2025) further supports this idea through embedding ecopedagogy modules into teacher training programs and redesigning content for project-based ecopedagogy education that aligns with Sustainable Development Goals (SDG) Target 4.7 (Sustainable Development and Global Citizenship). In addition, addressing significant barriers such as inadequate teacher preparedness and an underdeveloped infrastructure (Padhan, 2023), alongside integrating indigenous knowledge systems and culturally specific pedagogical approaches (Bhatt, 2025), is essential to transforming environmental education from a content-driven approach to transformation in the learner's environmental behaviour. Collectively, these strategies will help create an educational environment that is transformative and supports a shift in sustainability-related behaviours consistent with global development goals (Frank & Ricci, 2023; Alali *et al.* 2025).

Implications

The findings of this research study have the implications mentioned below:

- ❑ Ecopedagogy can establish the sustainability vision of NEP 2020 through NCERT and state curriculum bodies by incorporating ecological awareness, bridging the gap between policy articulation and classroom practice (Saluja, 2024).
- ❑ The findings highlight the need to integrate ecopedagogical training as an integrated component of pre-service and in-service teacher training programs (such as ITEP-Integrated Teacher Education Program), as the current insufficient capacity of teachers is a fundamental obstacle.
- ❑ Reviving indigenous knowledge, ecopedagogy can provide a vehicle for reintroducing into the formal education system the large body of ecological knowledge and practice that exists in India, including that of Vedic and

Tribal Traditions, opposing the predominantly utilitarian framing of environmental content in existing curricula.

- ❑ The study suggests that moving from didactic teaching approaches to experiential or action-oriented ecopedagogical approaches has a positive effect on promoting environmental behaviour among learners. The empirical evidence from Indian schools confirms the effectiveness of active teaching-learning methodologies over traditional instructional methodologies.
- ❑ An ecopedagogy framework fosters a global/local view of how we learn about citizenship and being citizens. As learners grow towards planetary citizenship, they develop a better understanding of how local environmental problems are connected to global ecological problems. An ecopedagogical worldview encourages learners to behave responsibly and in an environmentally sensitive manner at the local level and helps bridge the gap between acting locally and achieving global sustainability goals.

CONCLUSION

Ecopedagogy utilises Freire's critical pedagogy and ecology-based perspectives, offering a transformative and theoretically robust educational framework capable of nurturing environmental behaviour among learners by moving beyond information-deficit models. Through a qualitative synthesis of existing research literature, the present study establishes that the strategies associated with ecopedagogy are experiential and outdoor learning, critical dialogic inquiry, interdisciplinary and integrated curriculum approaches, community-based participatory approaches, technology-enhanced methods of delivery, and reflective, transformative practices. Collectively, these strategies are capable of developing a critical consciousness regarding the environment, creating a sense of ethical obligation towards sustainability, and leading to long-term behaviours among students that will improve the environment. These findings further indicate that while national policies such as The National Education Policy (NEP) 2020 provide a supportive framework for sustainability-based education; there are still many

obstacles, including overloaded curriculums, a lack of teacher preparation to effectively implement ecopedagogy, a lack of pedagogical infrastructure to provide learners with opportunities to participate in ecologically-focused activities, and a lack of acknowledgement of indigenous knowledge systems in current curriculums. Accordingly, the study recommends that educators and policymakers should adopt a cohesive strategy, which includes redesigning the current curriculum so it reflects the principles of ecopedagogy, systematically integrating ecopedagogy into both pre-service and in-service teacher education programmes, utilizing India's vast collection of traditional indigenous ecological knowledge, and providing ongoing institutional and policy support to assist educational institutions in moving from awareness focused environmental education to transformation (focused on environmental education) is necessary to fulfil both national and global Sustainable Development Goals.

GENERATIVE AI DECLARATION

The author(s) confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI. The authors developed and verified all scientific content, data analysis, interpretation of results, and conclusions. The authors take full responsibility for the accuracy, integrity, and originality of the work presented, and no AI tool was listed as an author.

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