

Beach Litter as Public Pedagogy: Moral Learning, Environmental Character Formation, and Thoreau's Ecological Thought

I Putu Raditya Arya Bagus Pinatih¹, I Gede Saman ^{*2}

^{1,2} Cendekia Harapan School, Bali, Indonesia.

E-mail: radit@cendekiaharapan.sch.id; saman@cendekiaharapan.sch.id

Article Info	Abstract
Keywords: Beach litter, Public pedagogy, Moral learning, Environmental character formation, Henry David Thoreau.	<i>Beach litter is not only a visible waste problem but also a pedagogical and moral issue that reflects how people learn to relate to coastal environments in public space. This article examines the causes and consequences of beach litter through Henry David Thoreau's ecological thought, public pedagogy, moral learning, and environmental character formation. Using a theory-informed qualitative literature review, the study synthesizes peer-reviewed journal articles, academic books, and selected policy-oriented publications on marine litter, pro-environmental behavior, environmental education, and sustainability pedagogy. The review shows that beach litter is driven by convenience-seeking behavior, weak social norms, inadequate waste infrastructure, limited ecological awareness, and a broader culture of disposable consumption. It also finds that beaches function as informal pedagogical spaces where conduct is modeled, observed, and socially normalized. Thoreau's emphasis on simplicity, attentiveness, moral restraint, and respectful coexistence with nature provides an ethical lens for interpreting these dynamics. The article argues that lasting change requires more than awareness alone. Effective responses must integrate experiential education, visible stewardship, supportive infrastructure, community participation, and value-oriented public communication to strengthen environmental responsibility and ecological character.</i>
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*Corresponding Author

I. INTRODUCTION

The accumulation of waste on beaches has become one of the most immediate and recognizable forms of environmental degradation in coastal areas. Unlike many environmental problems that remain distant from everyday observation, beach litter is encountered directly by residents, tourists, fishers, children, and local communities. Plastic bottles, food wrappers, cigarette butts, abandoned packaging, and other debris are not merely discarded objects. They are material signs of a particular way of relating to the environment, one in which convenience is prioritized over responsibility and short-term consumption is detached from long-term ecological consequences. Because beaches are spaces of recreation, mobility, tourism, and social gathering, they also become spaces where environmental values are enacted publicly. When people leave waste behind on sand, bury it under the surface, or ignore debris already present, they are participating in the normalization of ecological neglect.

The seriousness of the issue is reinforced by the relationship between beach litter and marine pollution more broadly. A large proportion of marine plastic pollution originates on land and reaches coastal and marine environments through inadequate waste management, runoff, wind transport, and direct disposal

(Kushwaha et al., 2024; Le et al., 2024). Once waste enters coastal systems, its effects are multiple. Marine organisms may ingest or become entangled in debris, coastal habitats may be degraded, and ecosystem services linked to recreation, heritage, fisheries, and well-being can be reduced (Beaumont et al., 2019; Kislay et al., 2026; Mammola et al., 2026). The beach, therefore, is not simply an endpoint where litter becomes visible. It is a transitional zone where human behavior intersects with wider ecological processes.

This article begins from the observation that beach litter must be understood not only as a technical waste management problem but also as a pedagogical and moral issue. A beach is not simply a coastline that receives trash. It is a public environment in which people watch one another, interpret shared norms, and learn what kind of relationship with nature is treated as ordinary. When a visitor places waste in a bin, joins a clean-up, or reminds a child not to leave packaging on the sand, that action teaches something. When a visitor throws waste aside, ignores overflowing bins, or leaves debris behind after recreation, that too teaches something. The beach therefore becomes a site where environmental responsibility is both enacted and communicated. Treating beach litter in this way allows the study to preserve its original concern with environmental awareness while strengthening its relevance to education and humanistic scholarship.

The topic also invites an ethical and philosophical lens. The present study adopts the ecological thought of Henry David Thoreau as its primary interpretive framework. Thoreau is frequently associated with simple living, attentiveness to the natural world, criticism of material excess, and a conception of human life as inseparable from the more-than-human environment (Matzke, 2014; Thoreau, 1995). His work does not offer a technical model of waste management, but it does offer an ethical orientation that remains relevant to contemporary environmental problems. In Thoreau's writing, nature is not a backdrop for human use alone. It is a living world that demands humility, restraint, and careful attention. This orientation is highly pertinent to beach litter. To leave waste behind in a coastal environment is not merely to violate a public cleanliness norm. It is to behave as though the coast exists as a disposable extension of human convenience rather than a shared ecological community.

Using Thoreau as a lens is especially useful because beach litter involves both action and perception. Littering can be analyzed as an external behavior, but it is also a failure of attention, restraint, and moral regard toward a shared environment. This ethical dimension becomes even more significant when the beach is treated as a public learning space. People do not merely act on beaches. They model ways of inhabiting nature. In this sense, Thoreau's ecological thought can be connected productively to moral learning, because his writing insists that one's treatment of the natural world reflects habits of perception and discipline that are cultivated in ordinary life rather than in abstract principle alone.

The background of the present study is also shaped by the social transmission of environmental behavior. Littering on beaches is often learned and reproduced in everyday contexts. Children observe how adults handle food packaging, plastic bottles, cigarette butts, and other waste during leisure activities. Visitors

infer what is acceptable from the visible behavior of strangers and from the condition of the place itself. These observations are central to the concept of public pedagogy, which refers to forms of learning that occur beyond formal schooling in public culture, everyday practice, and shared spaces of social life. Beach behavior is therefore not only individual conduct but also a public lesson about environmental norms.

Although the literature on marine litter is extensive, an important gap remains in studies that connect four dimensions in a sustained way. First, many studies document the scale and impact of coastal and marine pollution. Second, a large body of research explains pro-environmental behavior through norms, attitudes, habits, and situational convenience. Third, educational studies show that environmental awareness and action are strengthened through place-based and experiential learning. Yet these strands are rarely integrated with the concept of public pedagogy or with the language of moral learning and environmental character formation. As a result, beach litter is often discussed either as a management problem or as a behavioral problem, while its function as a public lesson in ecological responsibility remains underdeveloped.

The research problem guiding this article is therefore clear: why does littering persist on beaches despite widespread recognition that coastal pollution is harmful, and how can the beach itself be understood as a site of public pedagogy through which moral learning and environmental character are either weakened or strengthened? In response, the study aims to explain the persistence of beach litter, examine its ecological and social consequences, interpret the problem through Thoreau's ecological ethics, and identify awareness-building strategies that support environmental character formation in public life.

The study makes four contributions. First, it offers a conceptually integrated reading of beach litter that brings environmental ethics into dialogue with behavioral, educational, and coastal management research. Second, it clarifies how Thoreau's thought can enrich contemporary discussions of environmental responsibility without displacing the need for structural interventions. Third, it interprets the beach as a site of public pedagogy, showing how norms of care or neglect are publicly modeled and learned. Fourth, it develops a synthesis of practical strategies through which schools, families, communities, and coastal managers can support moral learning and environmental character formation rather than merely temporary compliance. Taken together, these contributions position the article within education and social-humanities scholarship by showing how ecological responsibility is learned, modeled, and negotiated in everyday public spaces.

Conceptually, this article treats the four theoretical concepts as related but distinct. Thoreau's ecological thought provides the ethical lens for interpreting beach litter as a failure of attentiveness, restraint, and respectful coexistence with nature. Public pedagogy explains how beaches function as informal learning spaces where environmental norms are publicly modeled, observed, and normalized. Moral learning refers to the process through which individuals internalize values of care, responsibility, and ecological respect through repeated social and practical experience. Environmental character formation represents

the broader educational outcome of this process, namely the development of durable dispositions and habits that support responsible conduct toward shared environments. In this framework, Thoreau clarifies the ethical orientation, public pedagogy explains the social setting of learning, moral learning describes the internalization process, and environmental character formation identifies the desired educational result.

The significance of this argument extends beyond beaches as isolated sites. Beaches condense many pressures that define contemporary environmental life. They are places where tourism, consumption, family recreation, waste infrastructure, public norms, and ecological vulnerability meet in highly visible ways. For this reason, they are especially revealing environments for studying public pedagogy. A beach can appear clean in the morning and be scattered with debris by the afternoon. This rapid transformation does not only show how fragile environmental order can be. It also shows how quickly people learn from visible conduct and visible disorder. A place that looks cared for teaches that care is expected. A place that looks abandoned teaches that neglect is normal.

A further reason this topic matters is that beach litter sits at the intersection of symbolic and material harm. Symbolically, litter communicates disregard. It tells other users that the place is not worthy of respect and that responsibility can be deferred or displaced. Materially, the same litter may injure wildlife, break into smaller fragments, contaminate coastal sediments, or move into marine systems. These two dimensions are pedagogically linked. Where disregard is normalized, waste accumulates more easily. Where waste accumulates, disregard becomes more plausible and morally easier to imitate. The article therefore treats beach litter as both a visible environmental condition and a socially reproduced lesson about what human beings owe to the places they share.

II. METHODS

This study employed a theory-informed qualitative literature review design. The choice of a literature review follows the nature of the research problem, which concerns the interpretation of causes, impacts, and awareness-building strategies related to beach littering rather than the measurement of a single field site or intervention. A review-based approach was especially appropriate because the study sought to place a concrete environmental issue within a broader conceptual conversation involving environmental philosophy, marine pollution studies, pro-environmental behavior research, environmental education, public pedagogy, and value-oriented learning. The review was interpretive and thematic rather than statistical or meta-analytic. Its main purpose was to identify recurring explanatory patterns in the literature and synthesize them through the conceptual framework outlined above. Thoreau's ecological thought was used as an ethical lens, public pedagogy as a lens for understanding learning in shared public spaces, moral learning as a lens for interpreting value internalization, and environmental character formation as a lens for identifying the desired educational outcome.

The data sources for the review consisted of five main categories. The first category included foundational philosophical texts related to Thoreau's environmental ideas, especially *Walden* (Thoreau,

1995), along with scholarly interpretations of Thoreau's contribution to environmental ethics (Matzke, 2014). The second category included peer-reviewed journal articles on marine litter, coastal pollution, plastic waste, and their ecological and social impacts. The third category comprised studies in environmental psychology and pro-environmental behavior that explain how norms, convenience, perception, moral identity, responsibility, and habit shape disposal behavior. The fourth category included scholarship on public pedagogy and sustainability-oriented learning beyond formal schooling. The fifth category included research on environmental education, values education, and character-related approaches relevant to ecological responsibility in public and community settings.

The review prioritized literature published within approximately the last ten years in order to ensure relevance to current debates on plastic pollution, coastal management, and environmental awareness. Earlier publications were retained when they were conceptually foundational and continued to be widely cited in later scholarship. This applied especially to Thoreau's primary text and to established behavioral studies on norms and pro-environmental action (Bamberg & Möser, 2007; Cialdini et al., 1990; Steg & Vlek, 2009). The combination of recent and foundational sources allowed the review to remain current without losing theoretical depth.

Search and selection procedures were conducted purposively, consistent with the theory-informed qualitative literature review design of this study. The literature was identified through several academic databases and scholarly search platforms, including Google Scholar, Scopus, ScienceDirect, SpringerLink, Taylor & Francis Online, and Routledge resources. The search focused primarily on literature published between 2014 and 2025 in order to capture recent debates on marine litter, coastal pollution, environmental education, and pro-environmental behavior. Earlier sources were retained when they were conceptually foundational and continued to be relevant to the theoretical framework, especially Thoreau's primary text and established studies on social norms and pro-environmental action.

The literature was identified through combinations of terms such as "beach litter," "marine litter," "marine debris," "plastic pollution," "environmental awareness," "public pedagogy," "moral learning," "environmental character formation," "values education," "pro-environmental behavior," "littering behavior," "social norms," "environmental education," "beach clean-up," and "Thoreau environmental ethics." Sources were screened based on their relevance to the study's core themes, academic credibility, and analytical contribution. Sources were included when they addressed at least one of the following areas: causes of littering, impacts of coastal waste, environmental awareness, public pedagogy, moral learning, environmental education, pro-environmental behavior, or Thoreau's ecological thought. Sources were excluded when they were only loosely related to coastal litter, focused narrowly on technical or laboratory aspects of plastic pollution without clear relevance to the behavioral and pedagogical focus of the article, repeated information already addressed more clearly elsewhere, or lacked sufficient academic reliability. The final synthesis included 28 sources consisting of peer-reviewed journal articles, foundational theoretical texts, academic books, and selected policy-oriented

publications relevant to marine litter, environmental behavior, environmental education, public pedagogy, and Thoreau's ecological thought.

The analytical procedure involved thematic synthesis. After the final sources were selected, each source was read in relation to the study's main questions. Relevant empirical findings, theoretical concepts, and practical insights were then grouped into a series of analytical categories. These categories included: (1) behavioral causes of beach littering, (2) beaches as sites of public pedagogy, (3) ecological and social impacts of coastal waste, (4) moral learning and environmental character formation, and (5) the relevance and limits of Thoreau's ecological thought in contemporary coastal contexts. This process enabled the review to distinguish between empirical evidence from previous studies and the conceptual interpretation developed in this article.

The interpretive role of Thoreau in the analysis requires clarification. Thoreau was not treated as an empirical predictor of modern littering behavior. Rather, his ecological thought served as a guiding ethical perspective through which the reviewed literature could be read. Public pedagogy, moral learning, and environmental character formation were likewise used as interpretive lenses rather than as variables to be measured directly. This means that empirical findings on littering, awareness, and interventions were not forced into a single theoretical vocabulary. Instead, the framework was used to illuminate how modern waste practices conflict with values of ecological respect, simplicity, attentiveness, and public responsibility, and how those values may be cultivated through visible practice in shared environments.

To avoid conflating empirical evidence and conceptual interpretation, the analysis distinguished between two levels of synthesis. The first level concerned empirical and review-based evidence from previous studies, such as findings on littering behavior, social norms, disposal infrastructure, marine litter impacts, clean-up activities, and environmental education outcomes. The second level concerned the conceptual interpretation developed in this article, in which those findings were read through Thoreau's ecological thought, public pedagogy, moral learning, and environmental character formation. Thus, claims about behavioral patterns and intervention effects were grounded in reviewed studies, while claims about beaches as moral and pedagogical spaces were presented as the authors' theoretical interpretation.

Because the study is literature-based, its trustworthiness depends on transparency of selection and coherence of synthesis rather than replicability in the narrow experimental sense. To strengthen rigor, the review drew from multiple disciplines and favored convergence across studies rather than reliance on single-source claims. When studies from marine pollution research, environmental psychology, public pedagogy, and environmental education pointed toward similar conclusions, such as the importance of social norms, place-based learning, and supportive infrastructure, those recurring insights were treated as analytically robust. At the same time, the review preserved tensions and limitations in

the literature, especially the gap between awareness and action and the challenge of translating values into sustained public behavior.

The main limitation of this method is that it cannot determine causal effects in the same way as controlled intervention studies. It also cannot represent all regional contexts equally, since much of the published literature is concentrated in Europe, North America, and selected parts of Asia and Oceania. Nevertheless, a literature review remains suitable for the purposes of this study because the objective is conceptual and synthetic: to clarify how beach litter can be understood as a behavioral and ethical issue and to identify strategies for raising environmental awareness without departing from the study's original scope. To enhance clarity and provide a structured overview of the synthesis, the main analytical categories, their respective focus, and representative references are summarized in Table 1.

Table 1. Analytical categories and representative literature.

Analytical category	Focus of analysis	Representative references
Behavioral causes of beach littering	Convenience, existing litter, weak norms, low responsibility, disposable consumption, and implementation gaps	(Cialdini et al., 1990; Mori et al., 2024; Robinson, 2023; Schultz et al., 2013)
Public pedagogy of the beach	How public space teaches norms through visibility, imitation, stewardship, and shared environmental cues	(Bergdahl & Langmann, 2022; Sandlin et al., 2010; Wyles et al., 2017)
Ecological and social impacts	Wildlife harm, ecosystem degradation, reduced recreational quality, and degraded place experience	(Beaumont et al., 2019; Jambeck et al., 2015; Le et al., 2024)
Moral learning and environmental character formation	Value formation, role modelling, moral identity, connection to nature, and care-oriented habit building	(Alas & Korutürk, 2024; Jordan, 2023; Marchetti et al., 2025)
Ethical interpretation through Thoreau	Simplicity, restraint, attentiveness, and human embeddedness in nature	(Matzke, 2014; Thoreau, 1995)

III. FINDING AND DISCUSSION

A. Description of the reviewed literature

The reviewed studies indicate that beach litter is shaped by a layered interaction between individual action, social context, consumer culture, environmental governance, and environmental learning. Empirical studies provide evidence on behavioral causes, social norms, infrastructure, marine litter impacts, and intervention strategies, while the present article conceptually interprets these patterns through Thoreau's ecological thought, public pedagogy, moral learning, and environmental character formation. It is not adequately explained by a single cause such as lack of bins or ignorance alone. The reviewed studies indicate that the problem is not purely material. Beach litter is produced through everyday decisions that are shaped by what people notice, what they believe others do, how much effort proper disposal requires, whether they feel morally connected to the place in which they are acting, and what kinds of behavior are publicly modeled around them. This section presents the main findings of the review and discusses them through the ethical lens provided by Thoreau together with the educational lenses of public pedagogy, moral learning, and environmental character formation.

The reviewed literature clusters around four broad domains. The first concerns the scale and impacts of marine litter and plastic pollution. The second concerns behavioral explanations for littering and waste disposal, especially norms, convenience, attitudes, self-regulation, and environmental context. The third concerns public pedagogy, meaning the ways public spaces and shared practices teach social norms outside formal schooling. The fourth concerns environmental education, values education, and character-related approaches that connect knowledge to habit, responsibility, and ecological identity. Across these domains, beach litter appears not only as an outcome of disposal choices but also as a visible curriculum of public life in which people learn what kind of environmental conduct is considered normal or negligible.

Across these domains, one consistent finding emerges: litter on beaches is not merely a symptom of inadequate disposal systems but also a symptom of weak everyday ecological responsibility and weak public reinforcement of care. This finding is significant because it helps explain why clean-up campaigns, while valuable, do not solve the problem by themselves. If the social, pedagogical, and moral conditions that generate litter remain unchanged, waste continues to return. The beach must therefore be treated not only as a site to be cleaned but also as a site where environmental norms are publicly formed.

B. Beach litter as a moral and behavioral problem

A major finding of the literature is that littering behavior is strongly shaped by situational convenience. People are more likely to dispose of waste properly when bins are visible, abundant, and located where disposal requires little effort. When disposal is inconvenient, littering or improper placement becomes more likely. Experimental research on beaches found that increasing the number of receptacles and positioning them in more accessible areas significantly increased waste collection, suggesting that convenience can meaningfully modify disposal behavior (Robinson, 2023). Research on beach infrastructure design similarly found that the design and visibility of trash cans influenced engagement and could help reduce littering around recreational coastal spaces (Portman & Behar, 2020).

These findings matter because they complicate moralistic explanations that portray litterers simply as people who do not care. The literature suggests that concern may coexist with weak follow-through when situational barriers are present. This is further supported by recent work on littering behavior models, which argues that even individuals who report anti-littering intentions may still litter under specific contextual pressures or when implementation intentions are weak (Mori et al., 2024). In other words, general awareness does not automatically become disciplined action. Yet the persistence of this gap is itself a moral learning issue, because repeated failure to translate awareness into practice gradually forms habits of indifference.

At the same time, convenience is not the whole story. The literature consistently shows that social norms influence whether littering is perceived as acceptable. The focus theory of normative conduct demonstrated that both descriptive norms, meaning what people perceive others actually do, and

injunctive norms, meaning what people perceive others approve or disapprove, affect littering behavior when those norms are made salient (Cialdini et al., 1990). Later large-scale observations of public littering behavior confirmed that the presence of existing litter and the environmental cues it creates are important predictors of whether individuals litter (Schultz et al., 2013). In practical terms, a dirty beach communicates that neglect is already normal, and this weakens the psychological barrier against adding more waste.

This finding is especially important for beaches because beaches are public, open, and highly imitative spaces. People scan them quickly. If the sand is visibly polluted, the environment itself may communicate disorder and reduce personal inhibition. If adults litter in front of children, the effect is even stronger because behavior is not only observed but socially modeled. The persistence of beach litter is therefore partly a problem of social permission. It continues because enough people perceive that improper disposal is common, weakly sanctioned, or inconsequential.

The literature on pro-environmental behavior broadens this interpretation. Meta-analytic and review studies indicate that environmental behavior is shaped by attitudes, personal norms, perceived control, situational costs, and social context rather than a single psychological factor (Bamberg & Möser, 2007; Steg & Vlek, 2009). More recent work further shows that moral identity and connection to nature can influence pro-environmental behavior indirectly through personal norms and lower moral disengagement (Marchetti et al., 2025). Beach littering fits this pattern well. A person may know that littering is harmful, yet feel little personal accountability if others are doing the same, if a bin is far away, if the item appears small, or if the beach is seen primarily as a leisure site rather than an ecological habitat.

A related insight from more recent research is that some waste found in public space results from what has been termed unintentional or polite littering, in which people place items neatly in the environment or leave them where they believe they will be collected, thereby not recognizing their own actions as genuine littering (Kachef & Chadwick, 2023). This is highly relevant to beaches, where people may place cups, packaging, or other debris beside overfilled bins, under benches, or in semi-hidden spaces while feeling that they have not acted irresponsibly. Such findings suggest that the concept of littering must include not only deliberate disregard but also forms of self-excusing disposal shaped by ambiguous responsibility.

These behavioral findings align closely with the ethical concerns raised by Thoreau. In Thoreau's writing, environmental care is not reducible to compliance with external rules. It is rooted in attentiveness, restraint, and a clear sense that one's life is interwoven with the surrounding world (Matzke, 2014; Thoreau, 1995). The convenience-centered logic of littering represents the opposite orientation. It reflects inattentiveness, excess, and separation. Waste is discarded because the immediate goal is to remove inconvenience from one's own body or leisure space, while the environmental afterlife

of that waste is ignored. Seen from the perspective of moral learning, repeated acts of such disregard teach the self and others that the environment can absorb what we do not wish to carry any longer.

C. The beach as a site of public pedagogy

Building on the reviewed literature on social norms, environmental behavior, and public learning, this article interprets the beach as a site of public pedagogy. Public pedagogy refers to forms of teaching and learning that occur beyond formal schooling through public culture, shared environments, and everyday practice (Sandlin et al., 2010). This concept is relevant because beaches are open, visible, and socially imitative spaces. Visitors do not only use the beach; they observe how others inhabit it, infer what forms of conduct are acceptable, and adjust their behavior accordingly.

Public pedagogy helps explain why both littering and stewardship can spread socially. Existing litter, overflowing bins, visible clean-up activity, anti-litter signage, and family interactions communicate messages about what kind of behavior is expected in that place. Research on sustainable educational environments suggests that public settings can become pedagogical publics when they create conditions for shared responsibility, reflection, and collective response to environmental problems (Bergdahl & Langmann, 2022). Applied to beaches, this means that the environment teaches through visibility, arrangement, and repeated social use.

This perspective also connects beach litter to consumer culture. Much beach waste consists of single-use items, and global studies show that plastic pollution is tied to production systems, packaging practices, and inadequate end-of-life management (Jambeck et al., 2015; Lau et al., 2020). The beach therefore becomes a public stage where throwaway culture is either reproduced or challenged. Each visible act of carrying waste home, sorting rubbish correctly, joining a clean-up, or correcting careless disposal can function as public instruction. Conversely, visible neglect teaches that ecological responsibility is optional.

D. Ecological and social consequences as public lessons

Empirical studies on marine litter consistently report serious ecological and social consequences of coastal waste. At the broadest level, land-based plastic waste enters marine systems in substantial quantities and contributes to widespread ecological harm (Borrelle et al., 2020; Jambeck et al., 2015; Le et al., 2024). Yet in the context of this article the impacts are important not only because they damage ecosystems, but also because they shape how people experience and interpret the beach. Harm to wildlife, degraded aesthetics, and visible disorder become public lessons about the consequences of human behavior when they are made perceptible in concrete settings.

One of the most compelling reasons beach litter is ethically significant is that its harm is often imposed on nonhuman life that has no capacity to refuse or avoid human waste. Marine organisms can ingest plastic fragments or become entangled in debris. The image of turtles, birds, fish, and other animals harmed by plastic has become emblematic of the marine litter crisis because it condenses a wider reality:

items designed for brief human convenience can produce prolonged suffering in ecological systems. Even when beach litter is not immediately washed into the sea, it can be buried, fragmented, re-exposed by tides, or transported by wind and runoff. In other words, the distinction between litter on the beach and litter in the ocean is often temporary rather than absolute.

The impacts are not only ecological. Beach litter also changes how people experience coastal spaces. Polluted beaches are less aesthetically attractive, less restorative, and less inviting for recreation. This matters pedagogically because environmental awareness is partly experiential. People who encounter the coast as a degraded, trash-filled place may normalize its condition or become desensitized to deterioration. Conversely, people who experience the coast as a cared-for environment may more easily perceive that care is both possible and expected. The condition of the beach therefore teaches not only about pollution but also about whether environmental responsibility still has social force.

This social dimension matters because environmental awareness is partly experiential and relational. A child who sees marine debris wrapped around driftwood or plastic lodged near nesting grounds encounters not an abstract theory but a vivid moral scene. An adult who sees a clean beach transformed into a littered one after a crowd leaves witnesses the speed with which disregard can damage a shared environment. Such experiences can either fade into resignation or become moments of moral learning, depending on whether they are framed, discussed, and acted upon.

From a Thoreauvian perspective, these impacts reveal a deeper problem: the reduction of nature to a passive receiver of inconvenience. Thoreau's work repeatedly insists that the natural world is not merely a backdrop for human utility but a living context that demands disciplined attention. When beach litter becomes ordinary, the lesson being taught is that nature can absorb the remains of leisure without moral consequence. The ecological crisis of litter is therefore inseparable from a crisis of perception and value.

E. Thoreau, moral learning, and ecological responsibility

The central conceptual argument developed from this review is that Thoreau's ecological thought offers a relevant ethical lens for interpreting beach litter as a problem of attentiveness, restraint, and ecological responsibility. Thoreau offers more than a critique of pollution *avant la lettre*. He offers an ethic of living deliberately, of refusing excess, and of attending carefully to the natural world. These themes help clarify why beach litter is not only a policy failure but also a failure of ecological self-discipline. The first relevant theme is simplicity. Thoreau's critique of unnecessary consumption speaks directly to the disposable material culture that underlies much beach litter. A significant share of coastal waste comes from items designed for brief use and rapid abandonment. Read through moral learning, simplicity is not merely a lifestyle preference. It is a discipline that limits the production of situations in which careless disposal becomes likely. The less leisure is organized around needless excess, the less public space is burdened by its residue.

The second theme is attentiveness. Beach litter often persists because people do not fully perceive the beach as an ecological space. They see a leisure destination, a picnic site, or a temporary recreational surface rather than a habitat shared with nonhuman life. Thoreau's ecological attentiveness challenges this perceptual narrowing. It encourages a form of presence in which objects, organisms, and place relations are noticed with care. Such attentiveness is central to moral learning because people rarely protect what they habitually fail to see.

The third theme is the idea that humans are part of nature rather than external to it. Scholarship on Thoreau's environmental ethics emphasizes his rejection of a purely instrumental relation to the natural world (Matzke, 2014). This idea supports environmental character formation because it shifts responsibility from external rule-following toward identity. If people understand themselves as participants within ecological systems rather than detached users of scenery, pro-environmental conduct becomes part of who they are trying to become, not merely what they are temporarily required to do.

At the same time, the literature suggests that Thoreau's perspective cannot be applied uncritically. One limitation is that Thoreau emphasizes individual moral orientation more than institutions, infrastructure, or policy. Contemporary beach litter problems clearly require those structural dimensions. A second limitation is social context. Thoreau's ideal of simplicity emerged in a nineteenth-century setting and can be difficult to translate directly into mass tourism economies, consumer packaging systems, and heavily mediated public cultures. These limitations mean that Thoreau should function as a normative compass, not a self-sufficient program.

Nevertheless, this combination of relevance and limitation is productive. It allows Thoreau's thought to be joined with research on public pedagogy and values education. Thoreau helps articulate what is morally at stake when beaches are treated carelessly. Public pedagogy helps explain how such carelessness is learned or contested in shared spaces. Moral learning and environmental character formation help explain how values of restraint, care, and responsibility might be cultivated over time rather than merely asserted in slogans.

The result is a framework in which beach litter can be interpreted as a problem of ecological ethics lived in public. The beach becomes a setting where character is visibly practiced, where moral identity is reinforced or weakened by routine acts, and where environmental responsibility depends on both inner disposition and outer conditions. This interpretation remains faithful to the article's original concern with awareness, while giving that concern greater educational depth.

F. From awareness to environmental character formation

The reviewed studies suggest that environmental awareness can be strengthened through participatory, place-based, and action-oriented educational strategies. However, awareness should not be treated as the endpoint of environmental education. What matters is whether awareness becomes a durable disposition of care, responsibility, and restraint. This is where environmental character formation

becomes important. It directs attention to how values are shaped through repetition, reflection, modelling, and practice rather than through information alone.

Studies on marine litter education show that awareness initiatives become stronger when they foster co-responsibility, confidence, and practical engagement (Bettencourt et al., 2023; Veiga et al., 2016). Meta-analytic evidence also shows that environmental education can improve environmental knowledge, attitudes, intentions, and behavior among children and adolescents (van de Wetering et al., 2022). These findings suggest that environmental learning is strongest when knowledge, concern, social norms, and opportunities for action are aligned.

Beach contexts are especially suitable for this kind of learning because they provide direct sensory and moral contact with environmental problems. Beach clean-ups, for example, can provide not only environmental service but also educational and motivational value (Wyles et al., 2017). Volunteer clean-ups may also support education, advocacy, research, and broader civic stewardship (Jorgensen et al., 2021). From a Thoreauvian perspective, such activities cultivate attentiveness, restraint, and deliberate care. From a pedagogical perspective, they make responsibility visible and repeatable in public life.

Nevertheless, awareness campaigns remain limited if they are symbolic, episodic, or unsupported by practical conditions. Media exposure may raise concern, but concern does not automatically produce consistent behavior (Dunn et al., 2020). Environmental character formation therefore requires repeated opportunities to practice care, social reinforcement that makes such care meaningful, and material settings that make responsible action feasible.

G. Community participation, infrastructure, and the pedagogy of stewardship

Another major finding is that awareness-building becomes more durable when linked to community participation and supportive infrastructure. Studies of marine litter perceptions show that people are more willing to act when responsibility is shared and when pathways to action are visible (Bettencourt et al., 2023; Hartley et al., 2018). Community-based strategies such as beach clean-ups, school partnerships, volunteer monitoring, and local campaigns help transform environmental care from a private intention into a public practice.

Infrastructure also has pedagogical significance. Research on waste disposal behavior at beaches shows that bin placement, abundance, visibility, and design influence disposal practices (Portman & Behar, 2020; Robinson, 2023). Well-designed disposal systems do more than make compliance easier. They signal that responsible conduct is expected and supported. Poorly designed systems, by contrast, may communicate that care is burdensome or optional.

Policy matters at a broader scale because beach litter is also shaped by production, consumption, collection, recycling, and regulation. Global plastic scenarios show that pollution reduction requires combined interventions rather than downstream behavior change alone (Borrelle et al., 2020; Lau et al., 2020). In public pedagogical terms, policy and infrastructure help shape the material environment in

which ecological responsibility is learned and practiced. To synthesize these insights into a more practical framework, the main strategies, mechanisms, and expected contributions for environmental education and public pedagogy are summarized in Table 2.

Table 2. Public pedagogy, moral learning, and environmental character formation strategies for beaches.

Strategy	Main mechanism	Expected contribution
Place-based environmental education	Connects ecological knowledge with direct coastal experience	Strengthens awareness, reflection, and early habit formation
Experiential learning and beach clean-ups	Links observation, shared action, and visible stewardship	Builds empathy, responsibility, and public modelling of care
Visible and accessible disposal infrastructure	Reduces effort and signals that responsible conduct is expected	Converts intention into repeatable practice in public space
Norm-based public messaging	Makes anti-litter norms and shared standards socially salient	Reduces perceived acceptability of littering and strengthens moral cues
Family and community participation	Uses role modelling and co-responsibility across generations	Supports moral learning and environmental character formation
Policy and waste-reduction regulation	Addresses upstream causes and stabilizes supportive conditions	Reduces waste generation and aligns public lessons with stewardship

H. Practical implications for environmental education and public pedagogy

The synthesis has several practical implications for schools, coastal managers, families, and local communities. For schools, beach litter can be integrated into environmental education through place-based learning activities. Teachers can connect classroom lessons on pollution, ecosystems, and civic responsibility with guided beach observations, reflective writing, waste audits, and student-led clean-up projects. These activities should not be designed only as occasional service events, but as structured learning experiences that encourage students to reflect on the relationship between personal habits, public norms, and ecological consequences.

For coastal managers, the findings suggest that infrastructure should be treated as part of the pedagogical environment. Waste bins need to be visible, accessible, well-designed, and placed near points of consumption and exit. Signage should not only warn visitors not to litter, but also communicate shared norms, such as collective responsibility for keeping the beach clean. Coastal managers can also display simple information about the amount and type of waste collected from clean-ups, so that visitors can see the consequences of public behavior and the value of stewardship.

For families, beach visits can become everyday settings for moral learning. Parents and adults can model responsible conduct by bringing reusable items, carrying waste until proper disposal is available, separating rubbish when facilities allow, and explaining to children why coastal environments should be treated with care. Such practices are important because children often learn ecological responsibility through imitation and repeated observation rather than formal instruction alone.

For communities, anti-littering efforts should be organized as continuous public pedagogy rather than one-time campaigns. Local groups, youth organizations, tourism actors, and residents can collaborate in regular beach clean-ups, public monitoring, community reporting, and norm-based communication. These activities make environmental care visible and socially reinforced. When schools, families, coastal managers, and communities work together, beach litter prevention becomes not only a waste

management effort but also a shared educational process that strengthens environmental character formation.

I. Synthesis: public pedagogy and environmental character formation

The synthesis shows that environmental responsibility is not produced through education alone, nor through infrastructure alone. It emerges from the interaction of messages, habits, designs, institutions, and public examples. This is why public pedagogy is a useful frame for understanding beach litter. The beach is a setting where what people see, do, permit, correct, and repeat becomes part of the educational process. Taken together, the reviewed empirical evidence and the conceptual framework support the interpretation that beach litter can be understood as a breakdown in ecological responsibility shaped by disposable consumption, weak norms, inadequate support systems, and insufficient moral learning in public life. Public pedagogy explains how this breakdown is reproduced through visible conduct and environmental cues. Environmental character formation explains why change requires durable habits rather than temporary concern. Thoreau's ecological thought clarifies what is ethically missing when convenience overrides attentiveness, restraint, and respect for shared environments.

This synthesis also suggests that anti-littering initiatives should be designed as layered interventions. Awareness campaigns without infrastructure may frustrate people. Infrastructure without education may produce only temporary compliance. Community programs without policy support may remain fragile. More durable change requires alignment among formal education, family modelling, community stewardship, supportive facilities, and waste-reduction policy. By reframing the beach as a pedagogical environment, the article strengthens its relevance to education and social-humanities inquiry while preserving its focus on the causes, impacts, and prevention of beach litter.

IV. CONCLUSION

This article argues that beach litter should be understood not only as an environmental management problem but also as a moral and pedagogical issue shaped through everyday conduct in public space. Through a theory-informed qualitative literature review and a Thoreauvian ethical lens, the study shows that beach litter is sustained by weak ecological awareness, permissive social norms, inadequate infrastructure, and disposable consumption habits. At the same time, beaches can be interpreted as informal learning spaces where environmental values are modeled, observed, normalized, or weakened through visible public behavior.

The main contribution of this article lies in connecting marine litter studies with environmental education, public pedagogy, moral learning, and environmental character formation. For education scholarship, the article emphasizes that environmental awareness should develop into repeated practices of care, responsibility, restraint, and stewardship. For social-humanities inquiry, it shows that beach litter reflects not only waste management failure, but also social norms, moral habits, consumer culture, and public learning in shared spaces.

Practically, the study suggests that durable responses to beach litter require collaboration among schools, families, coastal managers, and communities through place-based learning, responsible role modelling, accessible waste infrastructure, public messaging, regular clean-ups, and shared stewardship. As a literature-based study, this article is limited by its non-empirical design. Future research can examine how public pedagogy, moral learning, and environmental character formation operate in specific coastal communities, tourism settings, school programs, or community-based environmental initiatives.

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