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Creating eco-friendly behaviors: Environmental education and plastic waste management

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ABSTRACT

This study explores the critical role of environmental education in addressing plastic waste management, focusing on integrating programs like Indonesia's Adiwiyata initiative and outdoor education. Through a literature review of peer-reviewed articles, books, and reports, this research highlights how environmental education fosters pro-environmental behaviors, particularly in reducing plastic pollution. The study emphasizes the importance of practical, hands-on learning experiences to instill a sense of environmental responsibility among students. Despite the potential of programs like Adiwiyata, challenges such as administrative prioritization over genuine behavioral change remain. Outdoor education is presented as a key strategy for bridging the gap between theory and practice, empowering students to become "green ambassadors" within their communities. The findings suggest that improving waste management systems and environmental education are essential for mitigating plastic pollution. Combining education, policy, and public awareness, this holistic approach is necessary for a sustainable future where plastic waste no longer poses a significant threat to ecosystems or human health.

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ABSTRAK

Penelitian ini meneliti peran krusial pendidikan lingkungan dalam pengelolaan sampah plastik, dengan menyoroti integrasi program seperti inisiatif Adiwiyata di Indonesia serta pendidikan berbasis luar ruangan. Melalui tinjauan literatur dari artikel ilmiah, buku, dan laporan, penelitian ini menyoroti bagaimana pendidikan lingkungan dapat mendorong perilaku pro-lingkungan, terutama dalam mengurangi polusi plastik. Studi ini menekankan pentingnya pengalaman belajar praktis untuk menanamkan tanggung jawab lingkungan pada peserta didik. Meskipun program seperti Adiwiyata memiliki potensi, tantangan seperti prioritas administratif dibandingkan perubahan perilaku yang nyata masih ada. Pendidikan luar ruangan diidentifikasi sebagai strategi utama untuk menjembatani kesenjangan antara teori dan praktik, serta memberdayakan peserta didik menjadi "duta hijau" di komunitas mereka. Hasil penelitian menunjukkan bahwa peningkatan sistem pengelolaan limbah, bersama dengan pendidikan lingkungan, sangat penting untuk mengurangi polusi plastik. Pendekatan holistik ini, yang menggabungkan pendidikan, kebijakan, dan kesadaran publik, diperlukan untuk masa depan yang berkelanjutan di mana limbah plastik tidak lagi menjadi ancaman signifikan bagi ekosistem atau kesehatan manusia.

Kata Kunci: *Adiwiyata; manajemen sampah plastik; pendidikan lingkungan; pendidikan luar ruang*

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INTRODUCTION

Plastic pollution has escalated into a global environmental emergency, with an estimated 4.8-12.7 million metric tons of plastic entering oceans annually, threatening biodiversity, ecosystems, and human health (Jambeck et al., 2015). Over 693 marine species, including 17% classified as threatened or near-threatened by the IUCN, suffer entanglement, ingestion, and sublethal harm from plastic debris (Gall & Thompson, 2015). Microplastics—particles under 5mm—permeate ecosystems worldwide, infiltrating oceans, soil, and human bodies. Derived from sources like synthetic textiles (35% of ocean microplastics) and degraded consumer products, these particles are ingested by marine life, raising concerns about food safety and human health risks, though toxicity and long-term impacts remain poorly understood (Barboza et al., 2018).

Plastic production has surged from 2 million tons in 1950 to 380 million tons in 2015, with packaging (42%) and construction (19%) as major contributors. However, only 9% of plastic waste is recycled due to contamination, diverse polymer types, and economic barriers (Chamas et al., 2020). By 2015, 4,900 million tons of plastic had accumulated in landfills or natural environments, and it is projected to reach 12,000 million tons by 2050. Brooks, in the website titled "*The Chinese Import Ban and Its Impact on Global Plastic Waste Trade*" states that exporting waste to developing nations exacerbated the crisis. However, China's 2018 import ban displaced 111 million metric tons of plastic globally, overwhelming countries like Malaysia and Indonesia. In Portugal, land-based sources drive contamination, including 5,717 tons of mismanaged waste and untreated wastewater, releasing 2.7 trillion microplastics. Microplastics from consumer products and fishing gear pervade marine life, with mussels, fish, and turtles ingesting plastic (Prata et al., 2020).

As a top plastic waste importer, Malaysia struggles with inadequate infrastructure—21% of waste is recycled or incinerated, while landfills and open burning dominate. Chemical leaching and microplastic accumulation threaten ecosystems and health. Challenges include inconsistent policies, low public recycling engagement, and land scarcity, necessitating circular economy approaches (Chen et al., 2021). A top contributor to ocean plastic, Indonesia generates 3.22 million metric tons of mismanaged waste annually (10.1% globally), driven by coastal populations (187.2 million) and high per capita waste (0.52 kg/day) (Jambeck et al., 2015). Plastic constitutes 14% of solid waste, with microplastics contaminating 55% of fish species in Makassar and dominating Jakarta's waterways (74-87% of litter). The Ciliwung River study found that single-use plastics, notably styrofoam, are 55% of litter by weight, underscoring urgent waste reforms (Cordova et al., 2024).

Despite importing 320,000 tons of plastic waste in 2018, Indonesia's formal sector recycles just 1%, relying on landfills, while the informal sector recycles 100% mechanically. Uncollected waste is either burned (59%) or dumped (Neo et al., 2021). National efforts to reduce marine plastic by 70% by 2025 focus on land-based solutions, neglecting sea-based sources and behavioral change. Research gaps persist in understudied regions, necessitating localized policies, infrastructure upgrades, and public education (Arifin et al., 2023).

Launched in 2006, Indonesia's Adiwiyata program (revised as GPBLH in 2019) integrates environmental education into school curricula, promoting eco-friendly practices like waste management and energy conservation. Successes include heightened student awareness and initiatives in Surabaya schools to reduce waste through recycling (Megawati et al., 2023). However, critiques highlight administrative prioritization over cultural change. Schools often focus on certification requirements—documentation and infrastructure—rather than fostering enduring environmental stewardship. For instance, policies like waste segregation may lack consistent student engagement, and entrepreneurship/discipline metrics overshadow personal ecological values (Nurhafni et al., 2019; Zaliyanti & Azani, 2024).

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Implementing the Adiwiyata program at one public elementary school (Fitra et al., 2023) shows several significant advantages in instilling the character of caring for the environment. One of the advantages is habituation activities such as *Jumat Bersih*, where all school residents, including students, teachers, and staff, work together to clean the school environment. This activity creates a clean and comfortable environment and forms positive habits in maintaining cleanliness. The study shows that integrating environmental materials into learning, such as environmentally friendly waste management, helps students understand environmental concepts theoretically and practically. Extracurricular activities such as scouting and taekwondo also support student character formation by instilling the values of discipline, responsibility, and cooperation.

However, the Adiwiyata program also faces challenges, especially regarding community participation and program sustainability. The study concludes that a lack of community participation can reduce the program's effectiveness, as support from the surrounding community is essential to creating a sustainable environment. For example, recycling or reforestation activities require collaboration with the community to ensure that the program stops at the school level and extends to the surrounding environment. In addition, maintaining the program's sustainability is often a significant challenge. Activities like *Jumat Bersih* or bringing a bottle of drink from home may work well initially. However, student and school citizen participation can decline without consistent evaluation and motivation.

LITERATURE REVIEW

Impact of Green School Certification on Children's Pro-Environmental Behavior

The role of environmental education in shaping children's pro-environmental behavior, especially concerning plastic waste, has been increasingly recognized. Environmental education gives students the necessary knowledge and attitudes to engage in sustainable practices and address environmental issues. One significant approach to implementing environmental education is through the green school certification programs, as seen in Chile (Salazar et al., 2024). These programs are designed to incorporate environmental principles directly into the curriculum and the broader management of schools. By doing so, they aim to foster a culture of sustainability within the educational community, encouraging students to develop environmentally conscious behaviors from an early age.

Chile's national system for environmental certification of schools categorizes educational institutions into three levels: basic, intermediate, and excellent. Each level represents a progressively deeper integration of environmental education into the school's operations and teaching practices. The certification system is structured to promote sustainable behavior by gradually increasing the environmental commitment of schools (Gomes et al., 2023; Sharma et al., 2021). Schools achieving higher certification levels are expected to integrate environmental education into their curricula, resource management more comprehensively, and their relationship with the community, thereby fostering more assertive pro-environmental behaviors in their students.

The study measures the effects of this certification system on children's knowledge, attitudes, and practices (KAP) regarding environmental sustainability, specifically in the context of plastic waste management (Salazar et al., 2022). The findings indicate that higher certification levels are generally associated with more positive pro-environmental behaviors among students. For example, students attending schools with excellent certification levels demonstrated improved practices in reducing plastic waste, such as using reusable containers for their lunches. In this area, children have a more significant influence on decision-making. This suggests the certification system can successfully promote behavior change when the school's environmental commitment is more substantial.

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However, the study also reveals a non-linear relationship between school certification levels and students' pro-environmental behavior. In some cases, children in schools with intermediate certification performed worse in certain pro-environmental behaviors than those in schools with basic certification. This finding points to potential inefficiencies in the certification system, as the intermediate level may not be providing sufficient incentives or educational benefits to further enhance students' sustainable practices.

The study recommends reassessing the incentive structure to improve the effectiveness of the green school certification program (Amaripadath & Sailor, 2024). Specifically, it suggests that the benefits and requirements of each certification level need to be more clearly differentiated to motivate schools to aim for higher environmental performance. By better-aligning certification incentives with desired behavioral outcomes, the program could more effectively encourage students to adopt long-lasting pro-environmental practices.

A Multilayered Framework for Behavioral Change in Environmental Education

Environmental education (EE) has some role in influencing and changing the environmental behaviors of learners (Hungerford & Volk, 1990). Hungerford and Volk propose a model for environmental behavior change that includes three variables: 1) entry-level variables; 2) ownership variables; and 3) empowerment variables.

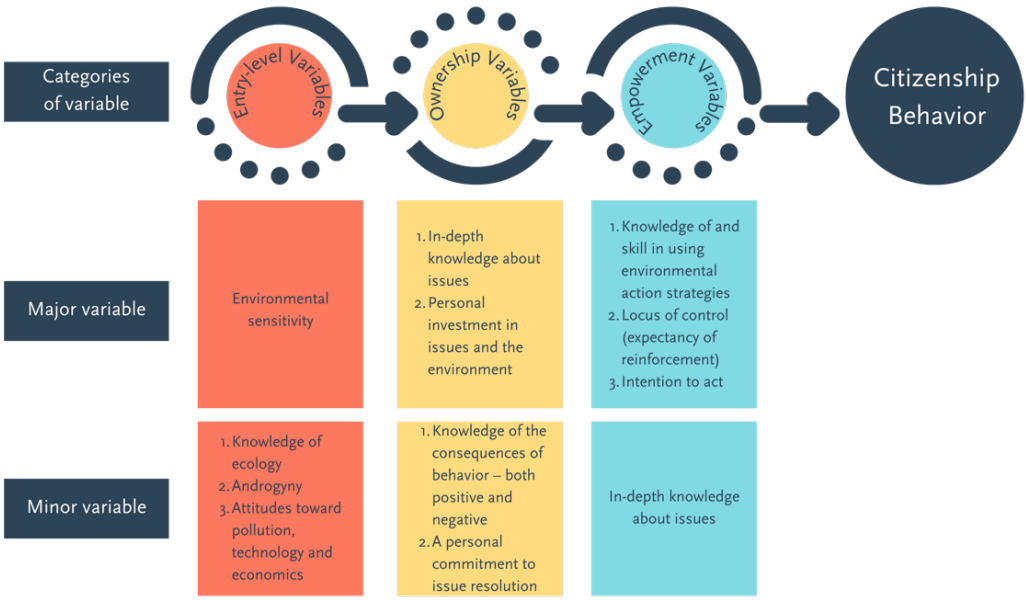

Figure 1. Environmental Education Model
Source: Hungerford and Volk, 1990

This model focuses on promoting responsible citizenship behavior through environmental education. This aligns with the need to educate individuals on their role and responsibility in addressing climate change (Hadiapurwa et al., 2024a). The framework for driving behavioral change in environmental education begins with entry-level variables, which establish a foundational understanding and emotional connection to environmental issues. These variables include environmental sensitivity, where individuals develop a personal concern for the environment; knowledge about environmental issues, which involves a factual grasp of problems and their causes; and attitudes toward the environment, reflecting an individual's overall stance on environmental protection. While these entry-level factors are essential in initiating awareness, they cannot induce significant behavioral changes. Learners may be informed and emotionally connected, yet without deeper engagement, their knowledge may not translate into action.

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The second layer, ownership variables, moves beyond basic understanding by fostering a deeper, more complex comprehension of environmental issues. Here, learners develop a nuanced understanding of the interconnections and intricacies of environmental problems. More importantly, these variables instill a sense of personal investment and responsibility in addressing these challenges. Ownership emerges when individuals see themselves as stakeholders in the effort to protect the environment, realizing that their actions matter. This personal connection strengthens their commitment to environmental causes, making them more likely to take proactive steps toward sustainability.

Finally, empowerment variables are crucial as they give learners the confidence and tools to act. A key aspect of this layer is the perceived ability to make a difference; learners must believe that their actions can have a meaningful impact on solving environmental problems. Equally important is acquiring the practical knowledge and skills required for environmental action. Without the necessary capabilities, even those with strong commitment and concern may feel helpless in the face of environmental challenges. Empowerment variables thus bridge the gap between intention and action, equipping individuals with the means to engage in effective pro-environmental behaviors.

The strength of this model lies in its argument that effective environmental education must address all three levels of variables—entry-level, ownership, and empowerment. Programs that focus only on increasing environmental knowledge, for example, risk falling short if they do not also cultivate personal responsibility and agency. By addressing this comprehensive set of variables, environmental education can guide learners toward meaningful behavior change, equipping them with knowledge and the motivation and skills needed to become engaged environmental stewards.

Promoting Sustainability Education Through Outdoor Education

Outdoor education offers significant potential in promoting sustainability education, particularly in plastic waste management. By engaging students in hands-on activities and project-based learning, outdoor education creates a more dynamic and innovative approach to teaching sustainable practices (Hou et al., 2023; Yeung & Chow, 2020). Instead of relying solely on traditional classroom instruction, outdoor settings allow for direct interaction with the environment, making the learning process more effective in fostering sustainable thinking and habits.

One key advantage of outdoor education is its immersive and interactive nature, which can better facilitate learning about complex environmental issues like plastic waste management (Aguayo & Eames, 2023; Buchanan et al., 2018; Mironenko & Mironenko, 2022). In an outdoor setting, students are exposed to real-world scenarios, allowing them to connect theoretical knowledge with practical applications. This approach enhances understanding and encourages students to adopt sustainable behaviors in their daily lives, reinforcing the importance of environmental conservation.

Moreover, outdoor education helps deepen students' comprehension of sustainable development and the necessity of conserving natural resources (Brahma, 2025; Gómez-Ruiz, 2021; Kalla et al., 2022). By participating in activities that highlight waste management and sustainable consumption, students gain a greater appreciation for their role in protecting the environment. This understanding is crucial for shaping future generations to be more mindful of their environmental impact.

Outdoor education also has the potential to transform students into "*green ambassadors*" empowering them to share their knowledge with others (Cheung et al., 2018; So & Chow, 2019). Through outdoor learning, students can be trained to create educational materials, such as presentations and visual aids, which they can use to teach their peers about plastic waste management and the benefits of recycling. This peer-to-peer learning model helps spread awareness and reinforce sustainable community practices.

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Additionally, outdoor education excels in teaching the practical aspects of plastic waste management, such as recycling techniques and proper disposal methods (Boca & Saraçli, 2019). By engaging in hands-on activities, students understand how their actions directly affect the environment. This practical learning experience is often more impactful than theoretical lessons, as it allows students to see the tangible results of sustainable practices.

METHODS

This study takes a closer look at how environmental education can help tackle the issue of plastic pollution, specifically through initiatives like the Adiwiyata program and outdoor education. To do this, a literature review draws on various sources, including peer-reviewed articles, books, and reports, gathered from databases like Google Scholar and ScienceDirect. Literature review as a research methodology can provide a comprehensive understanding of a topic, identify research gaps, and inform future research directions. This information can guide researchers in developing more robust and impactful research projects that address the identified gaps and contribute to advancing the field (Snyder, 2019). The focus was on exploring how education can promote better waste management practices and foster sustainable behaviors, with a special emphasis on the role of outdoor learning.

The literature was analyzed qualitatively, identifying key themes related to integrating environmental education in addressing plastic pollution. The analysis involved 1) reviewing the role of environmental and outdoor education in fostering pro-environmental behaviors, especially regarding plastic waste management; 2) evaluating the effectiveness of school programs in creating long-lasting, sustainable behaviors and the challenges associated with their implementation; and 3) highlighting the importance of integrating practical outdoor activities in enhancing environmental education's effectiveness. This study also points out challenges in implementing these educational programs and suggests ways to improve them.

RESULTS AND DISCUSSION

The findings of this study, informed by the insights synthesized in the Literature Matrix (see **Table 1**), culminate in a compelling call to action for addressing plastic pollution through transformative environmental education. Rather than treating environmental education as a peripheral or administrative exercise, this study proposes actionable strategies grounded in the matrix's evidence to drive meaningful behavioral change and long-term sustainability. Central to this approach is the need to reimagine programs like Indonesia's Adiwiyata and Chile's green school certification as dynamic, action-oriented frameworks that prioritize hands-on learning, community engagement, and systemic integration over mere compliance.

One of the most urgent actions proposed is the shift from certification-driven metrics to sustained, participatory learning. For instance, the Adiwiyata program, while commendable for its efforts to integrate environmental education into school curricula, often prioritizes administrative requirements over fostering genuine environmental stewardship (Roswita, 2020). To address this, schools must adopt project-based and outdoor learning models (Cheung et al., 2018; Mironenko & Mironenko, 2022). These approaches empower students to become "green ambassadors," bridging the gap between theoretical knowledge and practical action through waste segregation, recycling initiatives, and community clean-up drives. By embedding such practices into daily school life, educators can cultivate a culture of responsibility and innovation, transforming students into active participants in the fight against plastic pollution.

Another critical action is integrating environmental education into curricula in a way that goes beyond superficial inclusion. Environmental education must be deeply embedded into standalone subjects and cross-disciplinary approaches to foster a holistic understanding of sustainability (Boca & Saraçli, 2019).

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This study recommends establishing permanent recycling stations within schools, organizing regular workshops on reducing plastic consumption, and partnering with local governments and NGOs to create sustainable waste management systems. Such initiatives call for holistic approaches to ensure that environmental values are consistently reinforced and practiced rather than relegated to sporadic events or temporary projects (Chen et al., 2021).

Furthermore, this study emphasizes the need for long-term commitment and community collaboration. Programs like Adiwiyata and Chile's green schools must evolve from short-term initiatives to enduring frameworks prioritizing lifelong learning and behavioral change (Wals & Benavot, 2017, Matrix Entry 10). While the Adiwiyata program has raised awareness, its long-term efficacy depends on fostering enduring behavioral change. Students exposed to nature-based education exhibited sustained ecological actions, such as reduced plastic use, years after participation (Otto & Pensini, 2017). Besides, schools should work closely with local communities, recycling centers, and environmental organizations to provide resources, expertise, and support. For example, UNEP's global findings underscore the importance of localized, hands-on initiatives in reducing plastic pollution, highlighting the need for schools to serve as hubs of environmental innovation within their communities.

Ultimately, the actions proposed by this study—grounded in the evidence from the Literature Matrix—aim to transform environmental education from a passive, compliance-driven exercise into a dynamic, action-oriented force for change. By prioritizing participatory learning, systemic integration, and community collaboration, schools can empower students to tackle real-world environmental challenges, fostering a generation of environmentally conscious leaders. This shift is essential for addressing the plastic pollution crisis and building a sustainable future where education and action converge to protect our planet and its inhabitants.

Table 1. Literature Matrix Research

No	Article Title	Authors/Year	Method	Key Findings	Relevance
1	Environmental education outcomes for conservation: A systematic review	Ardoin et al., 2020	Systematic review	Transformative learning in environmental education effectively changes behavior and enhances critical thinking.	Emphasizes the importance of environmental education in driving behavioral change, including plastic waste management.
2	A train-the-trainer design for green ambassadors in an environmental education program on plastic waste recycling	Cheung et al., 2018	Case study with a "train-the-trainer" approach	The "Green Ambassadors" program effectively raises awareness and recycling skills among students.	Demonstrates a peer-to-peer environmental education model for plastic waste management.
3	Environmental Education and student's perception for sustainability	Boca & Saraçli, 2019	Survey and quantitative analysis	Environmental education improves students' perceptions of sustainability but requires deeper integration into the curriculum.	Highlights the importance of integrating environmental education into curricula to address plastic waste issues.
4	The plastic waste problem in Malaysia: management, recycling, and disposal of local and global plastic waste	Chen et al., 2021	Policy analysis and case study	Challenges in plastic waste management require a holistic approach, including environmental education and community participation.	Shows the need for environmental education to support effective plastic waste management.

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No	Article Title	Authors/Year	Method	Key Findings	Relevance
5	Environmental education in primary schools: A case study with plastic resources and recycling	So & Chow, 2019	Case study	Using plastic resources in environmental education at primary schools effectively raises awareness and recycling skills.	Provides a concrete example of integrating plastic waste management into environmental education at the primary school level.
6	Education Against Plastic Pollution: Current Approaches and Best Practices	Mironenko & Mironenko, 2022	Literature review	Best practices in environmental education include project-based learning, outdoor education, and community collaboration.	Presents effective strategies for environmental education to address plastic pollution.
7	Environmental Education and children's pro-environmental Behavior on plastic waste	Salazar et al., 2024	Quantitative and qualitative analysis	Chile's green school certification program effectively promotes pro-environmental behavior among students regarding plastic waste management.	Demonstrates the positive impact of green school programs on students' behavior in plastic waste management.
8	The adiwiyata-program-based school management model can create an environment-oriented school	Roswita, (2020).	The qualitative and quantitative study	The Adiwiyata program successfully creates environmentally oriented schools but requires long-term commitment and community participation.	Highlights the role of the Adiwiyata program in environmental education and plastic waste management in Indonesia.
9	From Pollution to Solution: A Global Assessment of Marine Litter and Plastic Pollution	United Nations Environment Programme (UNEP) 2021 (https://www.unep.org/)	Global report	Environmental education and community awareness are crucial for reducing plastic pollution, especially locally.	Emphasizes the importance of environmental education in addressing global plastic pollution.
10	Can we meet the sustainability challenges? The role of education and lifelong learning	Wals & Benavot, 2017	Literature review	Environmental education should focus on lifelong learning and behavioral change to achieve sustainability.	Highlights sustainable environmental education's importance in addressing plastic and other environmental issues.

Source: Research 2025

Discussion

Integrating environmental education more effectively into school curricula is essential. Instead of merely meeting administrative requirements, programs like Adiwiyata in Indonesia and Chile's green school certification must evolve to inspire lasting eco-friendly behaviors. Schools should move beyond fulfilling formal criteria and work towards cultivating a deeper environmental consciousness in students. Teachers and administrators must focus on embedding environmental values into daily practices, shifting the emphasis from meeting external expectations to fostering meaningful engagement with sustainability. Providing incentives for schools to achieve higher environmental performance, rather than focusing on certification levels, will help promote authentic, sustainable behaviors among students. For instance, recent studies emphasize the importance of transformative learning in environmental education, which goes beyond knowledge acquisition to inspire behavioral change and critical thinking (Wals & Benavot, 2017; Singer-Brodowski, 2023; Southworth, 2022). By adopting such approaches, schools can create a culture where sustainability becomes a lived experience rather than a checklist. Teachers are important in

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improving students' knowledge and critical thinking skills regarding environmental education (Hadiapurwa et al., 2024b).

A holistic approach can be applied in curricular development to a deeper understanding, active involvement, and responsibility for environmental sustainability (Andriani & Robandi, 2025). Outdoor education should play a central role in this revised approach. By engaging students in hands-on activities that demonstrate the tangible impact of plastic pollution, outdoor learning fosters a stronger connection between students and the environment. This immersive learning experience helps students grasp the importance of plastic waste management and equips them with practical skills to reduce their environmental impact. Encouraging schools to adopt outdoor education programs will help instill a lasting environmental ethic in students, empowering them to act as "green ambassadors" within their communities. This peer-to-peer education model, where students share their knowledge with others, can reinforce sustainable practices at the grassroots level. The effectiveness of outdoor and experiential learning in fostering environmental literacy and pro-environmental behaviors, particularly when students are given opportunities to engage directly with local environmental issues (Ardoin et al., 2020). Digital technology has the potential to enhance outdoor education, but it also poses significant challenges to maintaining presence. Educators must carefully consider how and when to use technology to ensure it supports, rather than detracts from, the learning experience. The future integration of wearable technology will require ongoing research and thoughtful management to preserve the unique benefits of outdoor education (Hills et al., 2024).

Finally, public awareness campaigns are essential to encourage responsible waste disposal and recycling behaviors. These campaigns should be designed to target local communities and address the specific behavioral changes needed to manage plastic waste effectively. Governments, NGOs, and local organizations must collaborate to launch continuous education and outreach efforts emphasizing plastic pollution's long-term environmental and health consequences. Furthermore, involving local governments in plastic waste management and research will be key to making meaningful progress. For example, UNEP's (2021) global report on plastic pollution underscores the importance of community engagement and policy interventions in reducing plastic waste. This study suggests that the long-term sustainability of waste management programs in schools depends on the active involvement of the community. Schools should work closely with local governments, NGOs, and community organizations to provide resources, expertise, and support for waste management initiatives. This collaboration ensures that the programs are not limited to the school environment but extend to the surrounding community (Haniva et al., 2024; Zikargae et al., 2022). Conversely, UNESCO's roadmap underscores the need for policy-driven curriculum reforms to institutionalize environmental values. By fostering a culture of environmental stewardship and reinforcing sustainable practices through education, we can work toward a more sustainable future where plastic waste no longer threatens ecosystems and human health.

CONCLUSION

This study shows how important environmental education is in tackling the global plastic pollution problem. By looking at programs like Indonesia's Adiwiyata and the benefits of outdoor education, this research highlights how teaching kids about the environment can encourage them to adopt eco-friendly habits, especially when managing plastic waste. The key takeaway is that hands-on, practical learning experiences are crucial for helping students feel responsible for the environment and motivating them to take action.

While programs like Adiwiyata have done a good job raising awareness, they often focus too much on meeting administrative goals rather than creating fundamental, lasting behavioral changes. To fix this, this study suggests moving toward more hands-on and action-based learning, like outdoor education. Outdoor

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learning lets students connect with nature, see the impact of plastic pollution firsthand, and learn how to make a difference in their communities. It is not just about learning facts—it's about giving students the tools and motivation to live sustainably.

The study also stresses the need for a well-rounded approach to environmental education. Schools should include activities like recycling, waste sorting, and community clean-ups in their regular curriculum. Schools need to work closely with local communities, governments, and NGOs to make these efforts stick. Public awareness campaigns are also important to teach people about the long-term effects of plastic pollution and encourage better waste disposal habits.

Another significant point is that environmental education should not be a one-time thing. Programs must focus on long-term goals, helping students develop a lifelong commitment to sustainability. By making environmental values a part of everyday school life, schools can create a culture where students grow up caring about the planet and taking action to protect it.

In short, tackling plastic waste requires a mix of education, better waste management systems, and strong community involvement. By teaching students—and everyone else—how to manage plastic waste responsibly, we can make a real difference in reducing pollution. This approach is essential for building a future where plastic waste no longer harms the environment or our health.

AUTHOR'S NOTE

The author states that there is no conflict of interest regarding the publication of this article. The author emphasizes that the data and content of the article are free from plagiarism.

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