

High School Students' Awareness of Environmental Issues in Indonesia: A Mini Review

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ABSTRACT: There were several environmental challenges in urban areas, especially related to solid waste management. Learning and community engagement in schools were crucial to promoting sustainability and environmental awareness. A mini-review was conducted to explore the potential of student-led efforts to divert organic waste, specifically fallen dry leaves. Using the Theory of Planned Behavior (TPB), we examined how environmental awareness impacted pro-environmental behavior. Students contributed to sustainable waste management by becoming aware of environmental issues and taking action. Educating students about environmental issues played a crucial role in cultivating environmental awareness. By integrating environmental concepts into the curriculum and organizing extracurricular activities, schools prepared students to address environmental challenges. Even after specific programs such as Adiwiyata were concluded, challenges remained in sustaining environmental initiatives. Schools needed to prioritize environmental education, engage students in active participation, and create an environment that fostered a sustainable culture to ensure long-term impact. Schools made a real difference to the environment by managing organic waste and promoting environmental awareness.

KEYWORDS: Student awareness; environmental issue; environmental awareness; sustainable education

1. Introduction

Environmental problems that occurred in big cities were inseparable from solid waste. Solid waste comprised both organic and inorganic materials. Organic solid waste was commonly found in areas that supported environmental sustainability. Several schools had developed nature conservation programs to teach students to care for the environment [1–3]. These programs included sorting and utilizing waste and planting seeds. Such initiatives reflected a broader global movement toward environmental education that encouraged youth participation in sustainable practices from an early age. Despite the implementation of these programs, a

recurring issue remained: the effective management of organic waste, particularly fallen dry leaves, which were abundant in green school environments. While numerous studies and reports emphasized the importance of student involvement in waste sorting and utilization activities, limited research specifically examined how students contributed to the management of dry leaf waste in schools. The existing literature tended to generalize student participation in conservation programs without clearly identifying their roles in handling specific waste types, such as seasonal leaf fall or decomposing plant matter. Therefore, this mini-review was conducted to investigate environmental concerns in high school environments.

2. Theory of Environmental Concern

Understanding student behavior in organic waste management, particularly regarding the disposal of dry leaves in school settings, required a behavioral framework that explained how environmental intentions translated into action. The Theory of Planned Behavior (TPB) provided a key model, asserting that behavioral intentions, shaped by attitudes, perceived social norms, and perceived control, were strong predictors of actual behavior. In the context of waste management, students were more likely to engage in sorting and composting when they valued the behavior, perceived social support, and felt capable of participating. However, intentions were not formed in isolation. Environmental awareness shaped students' attitudes toward sustainable practices, as understanding the ecological impact of waste promoted pro-environmental intentions. Additionally, social learning in schools through observing peers, teachers, and institutional practices, reinforced these behaviors. Behavior was also influenced by broader environmental systems, from classroom interactions to school policies and community engagement, as emphasized by Ecological Systems Theory. Furthermore, Education for Sustainable Development (ESD) supported these behaviors by embedding sustainability into educational curricula, fostering both knowledge and active participation.

3. The Importance of Environmental Education in Schools

Education was a vital tool in raising environmental awareness, particularly in developing countries, where gaps in knowledge often hindered effective waste management. Studies showed that older generations were more likely to practice waste segregation, likely due to their deeper understanding of the long-term environmental impacts of their actions. This highlighted the crucial need for targeted environmental education to bridge the knowledge gap, particularly among younger generations. Schools, as centers of learning and community engagement, were ideal places to cultivate this awareness and foster a sense of responsibility toward the surrounding environment. There, students could learn lessons about environmental waste management in order to care for their environment.

While students played a vital role in school-based waste management, their efforts needed support from the broader school community. Teachers were key agents in shaping environmental attitudes by integrating sustainability into the curriculum and modeling responsible behavior. Schools also needed to provide clear guidelines, resources, and support systems such as composting initiatives, to enable meaningful participation. A whole-school approach that engaged students, teachers, and staff was essential to fostering a culture of sustainability. Crucially, the success of these initiatives relied on the accuracy of the information delivered; misinformation could undermine environmental understanding and

decision-making. An integrated, collaborative effort was therefore necessary to develop informed and responsible environmental behaviors.

4. Level of Self-Awareness and Frequency Related to Individual Behavior

Understanding the varying levels of environmental self-awareness was essential for effectively integrating sustainability into school-based education. Self-awareness was commonly divided into five categories: high awareness, product awareness, solution awareness, problem awareness, and unawareness [27, 28]. These levels reflected an individual's environmental literacy and behavioral readiness. Individuals with high awareness were actively involved in sustainability efforts and often advocated for environmental causes. Those with product or solution awareness recognized eco-friendly practices or possible interventions but lacked a deeper understanding of their broader environmental impact. Those at the problem awareness stage acknowledged environmental challenges but were uncertain about how to address them, while the unaware group lacked even fundamental knowledge, making them a key target for foundational environmental education.

To address these varying levels, schools played a crucial role by embedding environmental education into both formal curricula and extracurricular activities. Interdisciplinary integration across subjects such as science, geography, and civics enabled students to explore issues like waste management, ecosystem dynamics, and sustainable consumption within academic settings. Beyond the classroom, extracurricular initiatives—such as composting programs using dry leaves, gardening projects, and waste segregation campaigns, offered experiential learning that reinforced environmental values. These hands-on activities cultivated student agency and fostered behavioral change, particularly among those with lower awareness. Additionally, tracking participation frequency, from “always” to “never”, helped educators tailor interventions, encouraging less-engaged students through structured activities while empowering environmentally active students to lead by example.

5. Future Challenge

A case study using an instrument in the form of a questionnaire [29], consisting of 29 questions and involving 251 respondents, aimed to determine students' perspectives and attitudes regarding the environment and the integration of environmental education into the language learning process. The findings showed that most students had implemented environmentally friendly behavior and agreed on the importance of integrating environmental education into the learning process. The majority of students preferred language lessons that were combined with environmental themes. Another case study [30] involving SMAN 1, SMAN 3, SMAN 4, and SMAN 7 in Malang, East Java, Indonesia, demonstrated that the implementation of the environmentally aware school program (Adiwiyata) affected environmental literacy (EL), which included ecological knowledge, attitudes toward the environment, cognitive skills, and environmental behavior. The results of the multivariate analysis indicated that students' EL levels were significantly influenced by both the type of school and class level. However, the interaction between these two variables did not significantly affect students' EL.

Univariate analysis of the school type factor revealed significant differences in all aspects of EL, with students in Adiwiyata schools exhibiting lower EL levels than those in non-Adiwiyata schools—specifically in the behavioral aspect. On the other hand, the significant

influence of class level was found only in the cognitive skills aspect. In general, the data analysis concluded that the Adiwiyata program had a positive impact on students' EL levels [31]. There was also a tendency for EL levels to improve with increasing class level. The Adiwiyata program aimed to encourage environmental awareness and concern among students and school communities [32, 33]. Awards such as Adiwiyata often motivated schools to become more environmentally conscious. However, challenges arose when the award was removed. Without external recognition or incentives provided by such programs, environmental awareness in schools risked declining. The absence of such initiatives often led to a deprioritization of environmental efforts in favor of academic concerns, resulting in reduced motivation among students and neglect of existing eco-friendly infrastructure, such as compost areas or school gardens. To maintain environmental awareness, schools could take independent initiatives by integrating environmental education into the curriculum, forming environmental clubs, implementing eco-friendly school policies, and organizing regular environmental activities [21, 34–36]. These self-driven actions offered sustainable alternatives to ensure that environmental values continued to be instilled, even in the absence of formal awards or programs.

Conclusion

The survey results revealed varying levels of environmental awareness and participation in waste management practices among students, highlighting key areas for educational intervention. Notably, while some students demonstrated consistent engagement in activities such as composting and waste segregation, others showed limited awareness or irregular participation. This discrepancy underscored the need for structured and inclusive educational strategies. These findings highlighted the critical role schools played as influential institutions in shaping both academic and social development. By embedding environmental education into formal curricula and reinforcing it through extracurricular initiatives, schools could foster pro-environmental behavior more effectively. Student-led actions, when supported by school programs and active teacher involvement, could lead to measurable improvements in sustainable practices, particularly in managing organic waste such as fallen dry leaves. Therefore, cultivating a culture of sustainability within schools, guided by data-driven insights, could empower students to become proactive agents of environmental stewardship both within and beyond the school community.

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Author Contribution

Conceptualization: Keisya Auliayanti, Isti Faizati Zainiyah; Methodology: Keisya Auliayanti, Eko Weni; Data Collection: Keisya Auliayanti, Eko Weni; Data Analysis: Keisya Auliayanti, Eko Weni; Writing: Keisya Auliayanti, Eko Weni, Isti Faizati Zainiyah, Michael biney, Shivi Shrotriya; Supervision: Isti Faizati Zainiyah, Eko Weni

Competing Interest

All authors should disclose any financial, personal, or professional relationships that might influence or appear to influence their research.

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