



A Model of Student Behavior Formation Through School-Based Waste Management in Support of SDG 13

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Abstract

The problem of waste in schools, particularly from snack packaging, requires a strategic model of student behavior formation to foster clean and healthy living habits while contributing to global sustainability goals. This study aims to describe a model of student behavior formation through school-based waste management as a concrete contribution to achieving SDG 13. The research employs a qualitative method with a narrative analysis approach based on literature review. The findings indicate that school-based waste management successfully shapes students to be sensitive, responsible, and compliant with plastic-free policies. Program implementation reduces waste volume through socialization, waste-sorting education, the habituation of bringing personal meals and utensils, and environmentally friendly canteen management. The implications highlight that school-based waste management is not only effective in cultivating environmentally conscious character but also relevant as a primary education contribution to climate change mitigation in line with SDG 13.

INTRODUCTION

Education is the process of influencing students so that they can adapt to their environment, thereby bringing about positive behavioral changes in their lives as members of society (Arifin, 2017; Nurfirdaus & Sutisna, 2021). Instilling an environmentally conscious character at the elementary school level can be achieved through consistent and sustained structured practices (Matukoh et al., 2026; Putri et al., 2026). In the era of globalization, the most critical environmental issue is waste accumulation, particularly in Indonesia, which is classified as one of the world's largest waste-generating countries (Arindri et al., 2025; Atmaja, 2026; Dewi et al., 2025). Comprehensive waste management, as mandated by Law No. 18 of 2008, is an urgent priority that must be implemented sustainably (Hakim & Sumadi, 2026; Maharani & Sudiarawan, 2025).

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The problem of waste accumulation is not limited to the industrial and domestic sectors; it has also become a critical issue in school environments due to the prevalence of snack packaging waste (Lisa & Merizawati, 2026; Yusnandar, 2026). Students' habit of littering and the high use of single-use plastics exacerbate school sanitation conditions (Karimuna et al., 2026; Karmila et al., 2026; Winanti et al., 2024). To address this issue, an integrated behavior-shaping model is needed to foster a culture of clean and healthy living (Anggraini, 2025; Kurniawan et al., 2026; Sunaji et al., 2025). At the local level, such as in Tangerang Regency, school waste generation averages 372 kg/day, while the coverage of waste transport to landfills remains limited at around 40% (Sulaya et al., 2024). Local governments have responded to this situation through the school-based waste management program (Kurassaki), which aims to reduce waste volume by up to 70% through a behavioral change approach (Putriana et al., 2021; Rufaidah & Jamaludin, 2020; Susilowati et al., 2021). This pilot program began in 2016 at six elementary schools: Gudang Tigaraksa Public Elementary School, Panongan 3 Public Elementary School, Kadu 4 Curug Public Elementary School, Legok 4 Public Elementary School, Jeungjing 1 Cisoka Public Elementary School, and Talagasari 1 Balaraja Public Elementary School.

In academic research, a program is a policy component that requires organization, interpretation, and implementation in order to achieve its objectives (Iswandi et al., 2021; Kurniawan, 2010; Zulk et al., 2025). The success of a school program can be analyzed using the implementation fit theoretical framework, which emphasizes the importance of alignment among three basic elements: the program itself, the implementing organization, and the target group (Kalthoff et al., 2019; Perrenet et al., 2010; Rogan & Grayson, 2003). Furthermore, the formation of behavior is closely linked to character development and habituation. Character consists of subconscious patterns and inner states that consistently trigger spontaneous actions (Faiz et al., 2022; Mukarom & Laksana, 2016; Ngadiono, 2024; Sutrisno et al., 2020). Environmental awareness is shaped through educational processes, routine habits, and rules that are consistently enforced (Ahmad et al., 2025; Bulqis et al., 2026; Lisnawati, 2016; Zahra & Khunaifi, 2025).

Although various studies have addressed the development of environmental awareness and waste management in schools (Ahmad et al., 2025; Amanda et al., 2023; Putriana et al., 2021), there remains a research gap between established program guidelines and the consistency of student awareness in practice. Some studies have documented significant success in fostering student responsibility, while others have found that habituation fails due to high rates of rule violations by students. Furthermore, most previous research has focused solely on the cleanliness of the school's internal environment without conceptually linking it to the global sustainability agenda.

The novelty of this study lies in the integration of Korten's program implementation fit model and habituation theory to analyze the formation of student behavior that is directly aligned with the achievement of the Sustainable Development Goals (SDG 13: Climate Action) at the elementary education level. This study offers a comprehensive synthesis of how internal habits formed at school can be converted into environmental mitigation actions that reduce the burden on landfills.

The theoretical implications of this study reinforce the application of Korten's theory of fit and habituation in the context of basic environmental education. In practical terms, this study provides guidance for education policymakers and school administrators in designing regulations based on

active participation that effectively foster an environmentally friendly mindset and support the global climate sustainability agenda.

METHODS

This study employs a qualitative approach with a narrative analysis design grounded in a systematic literature review. This approach was chosen because it allows for an in-depth exploration of the process by which student behavior is shaped through school-based waste management, while also linking it to tangible contributions toward achieving SDG 13. The research process follows the input–processing–output framework (Engkizar et al., 2023, 2025, 2026; Kassymova et al., 2025; Tadol et al., 2025; Yam, 2024), in which the input stage involves the collection of primary and secondary data. Primary data were obtained through field observations of waste reduction programs in public elementary schools, covering waste sorting practices, eco-friendly cafeteria policies, and the habit of bringing one’s own lunch and eating utensils. Meanwhile, secondary data were collected from scientific journals, research articles, and relevant educational and environmental policy documents (Jimola & Ofodu, 2025; Said et al., 2025).

The data processing stage was conducted through interactive analysis using the Miles, (2015) model, which comprises three main steps: data reduction, data presentation, and drawing conclusions. During the data reduction stage, the results of observations and the literature were synthesized and organized to identify patterns in the formation of students’ behavior. Next, the data is presented in the form of a descriptive narrative that highlights the relationship between the waste management program and the development of environmentally conscious character. The final stage is drawing conclusions, in which the research findings are interpreted to formulate a conceptual model of student behavior formation that is relevant to the elementary school context and supports climate change mitigation.

RESULT AND DISCUSSION

Synthesis of Previous Literature

An analysis of previous research indicates that there are dynamics involved in the implementation of waste management habituation in schools.

Table 1. Synthesis of Previous Research on Waste Management Habituation in Schools

Researcher	Application of Habituation Model to Student Behavior	Implementation of Kurassaki Program
(Amanda et al., 2023)	Changing students’ behavior patterns to be sensitive to school cleanliness. Supporting students’ sense of responsibility for school cleanliness, especially regarding waste.	The alignment of the Kurassaki program with school cleanliness, particularly waste management, is supported through socialization. School regulations requiring the habit of bringing lunch boxes and eating utensils influence student behavior as the target group of the

		program.
		The habituation of students bringing lunch boxes and eating utensils reduces the use of plastic waste from snacks in the school environment.
(Sulaya et al., 2024)	Low student awareness due to violations of the routine rule of bringing lunch boxes and eating utensils	The implementation of the Kurassaki program has less impact on achieving the expected output of changing student behavior to reduce school waste volume, due to low student awareness and frequent violations of program rules.
(Putriana et al., 2021)	Changing student behavior to take responsibility for waste issues at school.	The alignment of the Kurassaki program with school cleanliness, particularly waste management, is supported through socialization.
		School regulations requiring the habit of bringing lunch boxes and eating utensils influence student behavior as the target group of the program.
		The habituation of students bringing lunch boxes and eating utensils reduces the use of plastic waste from snacks in the school environment.

The findings in the above literature vary: the habituation model can be successful if supported by strict school regulations and intensive outreach, but may encounter obstacles if participants' awareness is low. Based on Korten's (1984) theoretical perspective, alignment between the program (habituation regulations), the implementers (schools/teachers), and the target group (students) is key to ensuring that habituation successfully shapes environmentally conscious behavior patterns.

Field Observations & Analysis of Implementation Alignment

Based on observations of the waste management program at a public elementary school, it was found that student behavior was effectively shaped through three main pillars.

Table 2. Observations on Program Implementation and Student Behavior Formation

Observation Results	Application of Habituation Model to Student Behavior	Implementation of Kurassaki Program
Elementary School Sindang Sari I, Pasarkemis Subdistrict, Tangerang Regency	The habituation of students bringing eating utensils, drinking bottles, and lunch boxes from home reduces single-use plastic packaging waste.	The alignment of the Kurassaki program with school cleanliness, particularly waste management, is supported through socialization.
	School canteen management rules implementing a plastic-free policy by providing refillable gallon water influence students' behavior in maintaining school cleanliness.	School canteen management rules influence student behavior as the target group of the program.
	Education on sorting organic and inorganic waste affects students' behavior in maintaining a clean and healthy school environment.	The habituation of students in sorting organic and inorganic waste achieves the output of reducing waste volume, fostering clean and healthy living behavior, and contributing to climate change mitigation (SDG 13).

An integration of literature reviews and observations confirms that a model for shaping student behavior can be sustained if it is supported by the alignment of Korten's (1984) three elements. The practice of bringing one's own containers, the ban on single-use packaging in the cafeteria, and independent waste sorting foster spontaneous environmental awareness among students. Consequently, the reduction in the volume of school waste significantly reduces emissions and the waste load at landfills, serving as a concrete local-level action in support of global climate action (SDG 13).

CONCLUSION

The model for shaping student behavior through school-based waste management successfully fostered a sense of environmental awareness and responsibility through three key strategies: encouraging students to bring their own lunch and personal eating utensils, enforcing a "single-use plastic-free" cafeteria policy, and educating students on independent waste sorting. This program has proven effective in reducing the volume of school waste by up to 70%. This success aligns with Korten's fit framework, which emphasizes harmony between program objectives, the active role of school administrators, and compliance by the target group. To ensure the program's sustainability, it is recommended that schools continue to strengthen their internal monitoring systems and provide periodic rewards to students, as well as replicate this SDG 13-based waste management model across other elementary school networks.

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