FAKTORS AFFECTING EFFORTS TO REDUCE PLASTIC WASTE AMONG ELEMENTARY SCHOOL STUDENTS

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Abstract

Plastic waste is a significant environmental problem, especially among elementary school students as the next generation who are vulnerable to single-use plastic consumption patterns. This literature study conducted a systematic literature review of 30 articles discussing the factors that influence efforts to reduce plastic waste among elementary school students. The results of the review show that there are six main factors at play, namely: environmental knowledge and education, environmentally friendly attitudes and behaviors, school facilities and support, community participation, creativity and innovation in waste management, and family and home environment support. Knowledge and education have been proven to be dominant factors in increasing children's awareness and behavioral change towards plastic waste. Positive attitudes and environmentally friendly behavioral habits reinforce the reduction of plastic use. The support of school infrastructure and family involvement are drivers of sustainable environmentally conscious behavior. A multidimensional approach involving the entire school ecosystem and community has proven effective in fostering a culture of minimal plastic use. Therefore, the research recommendations emphasize the importance of integrating environmental education into the curriculum, teacher training, plastic reduction policies in schools, and the active role of parents and the community in supporting sustainable plastic waste reduction. This approach is expected to produce a generation that cares for and is responsible for the environment in a sustainable manner.

Keyword: Plastic waste, Elementary school, Environmental education, Environmentally friendly behavior, Waste management

INTRODUCTION

Waste is an inevitable part of human life because humans generate waste in their daily activities and household and industrial activities. Along with population growth and changes in consumption patterns, the amount of waste continues to increase (Lestari, et al., 2020). Plastic is one of the most common types of waste. This is because plastic is easy to use, inexpensive, lightweight, flexible, strong, and waterproof. Therefore, people around the world are very interested in producing more products made from plastic. However, unbeknownst to them, the basic properties of plastic and environmentally unfriendly methods of use are damaging the environment. This is an environmental problem faced by Indonesian society and the whole world (Marniati, et al., 2021).

According to Ashworth (2024), India produces around 9.3 million tons of plastic waste per year, followed by Nigeria (3.5 million tons), Indonesia (3.4 million tons), China (2.8 million tons), Pakistan (2.6 million tons), Bangladesh (1.7 million tons), Russia (1.7 million tons), Brazil (1.4 million tons), and Thailand (1.0 million tons). These figures place these countries among the world's largest contributors to plastic pollution and illustrate the enormous challenge of waste management, especially in relation to poorly managed waste that risks entering the environment and waterways. Based on this data, Indonesia ranks third after Nigeria and India as the countries that produce the most plastic waste in the world (Ashworth, 2024).

The most commonly found plastic waste includes unbranded plastic waste (37%), Wings (16.4%), Unilever (12.3%), Indofood (10.1%), Mayora (8.1%), PT. Santos Jaya Abadi (5.6%), Unicharm (2.4%), P&G (2.3%), Garudafood (2%), and Ajinomoto (1.8%) (Riski, 2024). The

negative impacts of plastic waste include disrupting the beauty of the environment, causing diseases due to harmful substances and unpleasant odors, and containing dangerous and toxic chemicals and heavy metals (Ainurriza & Ahdhianto, 2023).

All parties in Indonesia, including the government, private companies, and the general public, must take immediate action considering the dangers of plastic waste pollution caused by poor management. People's lifestyles are not influenced by waste management itself. The public will become aware and support these efforts. The public must learn about the dangers of plastic waste, reduce its consumption, and manage it properly. This awareness is expected to reduce the amount of waste disposed of in landfills and ending up in ecosystems (Lestari et al., 2020).

It is very important to start teaching elementary school children to reduce their use of plastic as early as possible. They generally have a habit of buying snacks or treats at the school canteen or shops around their school. These activities often result in large amounts of plastic waste, such as food wrappers, disposable water bottles, and plastic bags. This situation makes schools one of the main sources of plastic waste in urban environments. However, without systematic efforts to change children's habits and mindset, their consumptive behavior towards single-use plastics may continue into adulthood and exacerbate the environmental crisis (Lestari et al., 2020).

Efforts that can be made to reduce plastic waste in elementary school environments include providing early education on the importance of protecting the environment, increasing the participation of parents and teachers in instilling environmentally friendly habits, and implementing creative activities such as recycling or reusing plastic waste into useful items. In addition, students also need to be accustomed to bringing their own drinking bottles (tumblers) and food containers from home as a concrete step to reduce dependence on single- use plastics (Yudda et al., 2025). Factors such as knowledge level, attitude, availability of supporting facilities, and school policies play an important role in shaping environmentally conscious behavior in elementary school children. Thus, developing environmentally conscious behavior through efforts to reduce plastic waste among elementary school students is a long-term investment that not only affects the cleanliness of the school environment but also the sustainability of the global ecosystem in the future (Ainurriza & Ahdhianto, 2023).

RESEARCH METHODS

This literature study uses the Systematic Literature Review (SLR) method with the topic *"Factors Affecting Efforts to Reduce Plastic Waste among Elementary School Students."* This method was chosen because it allows researchers to examine, identify, and synthesize various relevant previous research results, thereby obtaining a more comprehensive understanding of the factors influencing plastic waste reduction behavior among elementary school students.

The SLR approach was carried out systematically following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. PRISMA was used to ensure that the article selection process was transparent, measurable, and replicable. This procedure included the following four main stages

1. Identification: Identification is the initial stage of the research process that aims to clearly define the research problem (Gumilang, 2021). The data used in this literature review were obtained from several academic databases, namely Google Scholar, ScienceDirect, and Semantic Scholar. The search used keywords Plastic waste, Elementary school, Environmental education, Environmentally friendly behavior, Waste management.
2. Screening : Screening is the process of selecting articles that are relevant to the research topic based on inclusion and exclusion criteria. The inclusion criteria in this study include

articles discussing factors affecting plastic waste reduction among elementary school students, publications from 2020 to 2025, articles published in national or international journals or conference proceedings, original articles available in full-text format, written in English or Indonesian, and freely accessible. Meanwhile, the exclusion criteria include publications before 2020, articles that are not relevant to the research topic, and articles that cannot be accessed freely.

3. Eligibility: Eligibility is the stage used to determine whether the selected articles meet the required criteria. This stage was conducted after the screening process by reviewing the feasibility of each article. The eligible studies included research involving elementary school students in plastic waste reduction efforts and examining factors influencing these efforts, such as environmental knowledge, motivation, support from teachers and parents, availability of recycling facilities, plastic use habits, and environmental campaigns or education. In addition, the studies used primary data and measured outcomes related to increased environmental awareness, behavioral changes in reducing plastic use, participation in recycling programs, and the reduction of plastic waste in the school environment.
4. Inclusion : Inclusion is the final stage of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram, where articles are included in the analysis after meeting all inclusion criteria and passing the eligibility evaluation. The selected articles were considered relevant for in-depth analysis in this systematic literature review. At this stage, the researcher conducted data extraction from the eligible articles and presented the results in a table containing the author's name, publication year, article title, research objectives, research methods, sample, and research findings.

Journal selection using the flowechart method:

IDENTIFCATION
↓
Search for articles using keywords through the Science Direct, Semantic Scholar, and Google Scholar databases (n=14,552)
↓
full-text articles excluded (n= 13,004)
↓
SCREENING
↓
number of articles that met the inclusion criteria (n=1,548)
↓
Eligibility
↓

Full articles were assessed for eligibility (n=40)
↓
Articles relevant to the research objectives (n=40)
↓
Journals discarded (n=0)
Journals excluded (n=10)
↓

INCLUDED
↓

Articles reviewed after elimination and relevant to the research topic (n=30)
-Nasional Journals : 24
- International Journals: 6

RESEARCH RESULTS

A total of 14,552 articles were collected from Google Scholar (13,100), Science Direct (732), and Semantic Scholar (720) using the keywords "Plastic waste" AND "Waste reduction" OR "Elementary school students" to match the formulation of this literature review. From this number, screening was carried out based on inclusion criteria, resulting in 1,548 articles, followed by an eligibility stage through topic and abstract review, which resulted in 50 articles. At the included stage, 30 articles were eligible for review. After going through the PRISMA process, these articles were extracted into a table to facilitate the presentation of the content.

Table 1. Literature Review

No	Author Name, Year & Article Title	Research Objective	Article Type	Instrument	Results Research
1	Taufik et al. (2024) – Processing Macroplastic Waste into Useful Products at SD Inpres Bontoala 1	Describing students' perceptions and knowledge about plastic waste management	Descriptive, qualitative, study at SD Inpres Bontoala 1, Gowa.	Education, training, documentation	Recycling education increases students' awareness and reduces waste through the creation of functional products from plastic.
2	Sulistyorini et al. (2025) – Analysis of Community Knowledge and Behavior Towards Plastic Waste Pollution Control	Analyzing the impact of Zero Waste on plastic Pollution control in Banyuwangi	Quantitative survey with 636 respondents.	Questionnaire on respondent characteristics and behavior	High community knowledge but poor attitudes; the Zero Waste program is knowledge but poor attitudes; effective in reducing pollution
3	Majid et al. (2024) – Ecobrick Making Training for Students at SDN 03 Tundagan	Describes the process and results of Ecobrick training for elementary school students.	Qualitativ e descriptiv e.	Interviews, observations, documentati on.	The training increased awareness and skills; 70% of students successfully made high-quality Ecobricks.

4	Lestari et al. (2020) – "Minim Plastik" Education at SDN Pejaten Timur 20 Pagi	Enhancing students' knowledge about plastic reduction.	Community development.	Knowledge questionnaire.	Education increased 75% of students' understanding of how to reduce plastic and foster environmental awareness.
5	Allison et al. (2022) – Reducing Plastic Waste: A Meta-Analysis of Influences on Behavior	Identifying behavioral factors and the effectiveness of plastic reduction interventions.	Systematic review & meta-analysis (60 studies).	Behavior coding & BCW-COM-B model.	Ability, opportunity, and motivation are strong influencing factors; the most effective interventions are persuasion and environmental restructuring.
6	Yudda et al. (2025) – Child-Friendly Environmental Education Encourages the Use of Tumblers	Increasing students' awareness about reducing single-use plastic bottles.	Participatory education.	Observation, questionnaires, interviews.	Tumbler usage increased from 30% to 70%; student knowledge increased from 40% to 85%.
7	Setyaningrum et al. (2021) – Educational Videos and Changes in Elementary School Students' Knowledge about Plastic Waste	To determine the effect of educational videos on students' knowledge and attitudes.	One Group Pretest–Posttest.	Knowledge and attitude questionnaire	There was a significant increase in knowledge and attitudes ($p < 0.05$) after the video was shown.
8	Widiyono et al. (2024) – PKM Rebricks- Paving Block at SD Gugus Ahmad Yani Demak	Empowering students and teachers in the utilization of plastic waste.	Descriptive.	Observation, interviews, TTG training.	90% of respondents rated the program as successful; Rebricks tools were 92% effective in plastic recycling.

9	Aryati et al. (2023) – Implementation of Plastic Waste Reduction at SD 01 Kampung Sawah	Reducing the use of plastic bags at school.	Socialization & education.	Observation, discussion, and presentation of materials.	Students begin bringing their own lunch boxes and bottles; environmental awareness increases.
10	Syarif et al. (2023) – Education and Utilization of Plastic Waste Using the Ecobrick Method at SDN 2 Jagabaya	Providing Ecobrick education and training to enhance students' creativity and responsibility.	Participatory descriptive (KKN).	Observation, interviews, educational pamphlets.	Program to increase student awareness, creativity, and sustainable behavior through Ecobrick products.
11	Nurfurqon et al. (2023) – Improving Elementary School Students' Environmental Care Skills	Assessing the effect of plastic bottle media on students' environmental care skills.	Quasi-experiment.	Pretest–posttest questionnaire	Plastic bottle media improves students' decision-making skills ($p < 0.05$).
12	Lahabu et al. (2024) – Plastic Waste Reduction at MIN 1 Manado	Building students' awareness of cleanliness and plastic reduction.	Descriptive qualitative.	Unstructured interviews.	Recycling programs and school campaigns effectively increase student awareness and concern.
13	Putriani et al. (2024) – Managing Plastic Waste into Ecobricks at SDN Jatireja 03	Reducing plastic waste through Ecobrick training.	Descriptive qualitative.	Socialization, education, documentation.	Students and teachers actively participate; understanding of waste management increases.
14	Bahtiar et al. (2022) – Basic Knowledge of the Dangers of Plastic Waste on Maitara Island	Measuring students' basic knowledge about the dangers of plastic waste.	Quantitative survey.	Knowledge test (10 questions).	Students' knowledge is adequate; still low on the topics of microplastics and the

					properties of plastic.
15	Paryono et al. (2023) – Understanding Plastic Waste Management at SDN 4 Jerowaru	Improving students' understanding of the dangers and management of plastic.	Descriptive qualitative	Questionnaires and discussions.	Students' understanding significantly improved after counseling and waste sorting practices.
16	Tuerah et al. (2023) – Plastic Waste Education and Independent Curriculum at SD Inpres Pangu	Improving students' knowledge about plastic waste management.	Descriptive qualitative	Questionnaires, counseling, documentation.	After education, the majority of students fell into the good knowledge category (79%).
17	Gunadi et al. (2020) – Minimizing the Use of Plastic Food Packaging by Elementary School Students	Understanding the use of plastic packaging and raising awareness of health hazards.	Descriptive qualitative	Observation and interviews.	Education increased students' knowledge about the dangers of plastic food packaging; plastic use decreased.
18	Ramadhan Firdaus et al., (2020) – The Importance of Bringing Lunch Boxes to Reduce Plastic Waste	Improving teachers' understanding of bringing lunch boxes and student nutrition	Descriptive qualitative	Counseling and interviews.	Teachers understand the benefits of bringing lunch boxes as a way to reduce waste and improve nutrition.
19	Budiman et al. (2024) – Ecobrick Innovation as an Effort to Reduce Plastic Waste	Evaluating the effectiveness of the Ecobrick program in school waste management.	Qualitative descriptive.	Observation, interviews, documentation.	The Ecobrick program reduces waste burning practices and increases student awareness.
20	Kalyanasundaram et al. (2024) – The intergenerational learning effects of a home study	Enhancing plastic awareness through intergenerat	Quasi experiment (mixed methods).	Knowledge and attitude questionnaires.	Family-based learning effectively improves understanding and plastic

	program for elementary and junior high school children on knowledge and awareness of plastic consumption	ional learning.			reduction behavior.
21	Parejo et al. (2021) – Plastics as an Educational Resource for Sustainable Development	Exploring the use of plastics as a resource for learning about sustainability.	Descriptive qualitative (case study in Ghana).	Observation, interviews, audiovisual documentation.	The use of plastic in learning enhances knowledge, skills, and environmental awareness.
22	Rasidi et al. (2020) – Science and Technology for Plastic Waste Mitigation in Elementary Schools in Magelang	Fostering a culture of plastic waste mitigation in schools.	Descriptive qualitative	Questionnaires, FGDs, checklists.	Teachers' knowledge increased by 18%; students and teachers responded very well to the mitigation program.
23	Fujiaturrahman et al. (2025) – Plastic Waste Management for Student Art Creativity at SDN 1 Keruak	Developing students' artistic creativity through plastic management	Descriptive qualitative	Interviews, training, documentation.	Students are able to create artworks from plastic and are more concerned about the environment.
24	Handayuni et al. (2021) – Reducing Plastic Food Packaging at SD 06 Ulak Karang Utara Padang	Raising awareness of the dangers of plastic in students' snacks.	Descriptive.	Observation and interviews	Students and vendors understand the dangers of plastic; awareness of bringing lunch boxes has increased.
25	Soares et al. (2021) – On the Path to	Identifying factors that shape environmen	Descriptive (survey in Portugal).	Public perception questionnaire	Environmental education is considered important;

	Minimize Plastic Pollution	tal awareness of plastic pollution.			education level influences perceptions and sources of information.
26	Cahyani & Rahmi. (2021) – Factors in Waste Management in Elementary Schools in Bantul Regency	Identifying systems and factors that influence waste managemen t in elementary schools.	Qualitative deductive.	Questionnaires, interviews, observation.	Main factors: infrastructure, school policies, human resources, and funding.
27	Kurniawan et al. (2021) – Educational Videos on Waste Management and the Attitudes of Elementary School Students in Makassar	Assessing the effect of educational videos on students' attitudes toward waste management.	Quasi-experimen t (Pretest–P osttest).	Attitude questionnaire before and after the video	Students' attitudes improved significantly ($p < 0.05$) after watching the educational video.
28	Ainurriza & Ahdhianto. (2023) – Healthy Canteen to Reduce Plastic Waste at SDN Madyopuro 2	Increasing awareness of plastic reduction in schools.	Descriptive qualitative	Observation, interviews.	Students bring their own containers; support from teachers and parents strengthens the sustainability of the program.
29	Putra et al. (2024) – Education on Reducing Single-Use Plastic Use in Schools	Educating students about the dangers of single-use plastics.	Descriptiv e.	Observation, pamphlets, documentation.	Students' awareness and knowledge increased after the education.
30	Marniati et al. (2021) – Efforts to Control Plastic Waste at Langung Elementary School in West Aceh	Increasing students' awareness of the dangers of plastic.	Descriptive qualitative	Observation, socialization, documentati on.	Students' knowledge and participation increased; environmentally conscious behavior was formed.

DISCUSSION

The synthesis of the 30 articles analyzed shows that efforts to reduce plastic waste among elementary school students are influenced by six interrelated factors, namely knowledge and education, environmentally friendly attitudes and behaviors, school facilities and support, community participation, creativity and innovation, and family and home environment support. These six factors play an important role in shaping awareness, knowledge, and sustainable behavior among students from an early age.

The first factor, knowledge and education, is the most dominant component in driving behavioral change towards plastic waste. Educational programs and media-based activities have proven effective in increasing student understanding by up to 75% and raising awareness of the importance of responsible waste management. Environmental education integrated into the school curriculum can instill sustainability values from an early age and encourage active student participation in plastic reduction practices at school.

The second factor is environmentally friendly attitudes and behaviors, which are formed through habit formation and direct practice. Activities such as Ecobrick-making training and tumbler use campaigns have been proven to foster social responsibility and sustainable behaviors. The formation of positive attitudes towards the environment is an important foundation for maintaining consistency in students' behaviors in reducing daily plastic waste. Furthermore, school facilities and support also play an important role in the success of plastic waste reduction programs. Research shows that the availability of infrastructure, support from school principals, institutional policies that support plastic minimization programs, and parental involvement are determining factors in the sustainability of these programs. Schools that implement structured environmental policies generally show more optimal results in plastic waste management.

The fourth factor is community participation and involvement. Collaboration between teachers, students, and the surrounding community has been shown to increase environmental awareness by up to 79%. Community involvement expands the impact of school education, builds a collaborative culture, and strengthens social networks that support sustainable waste management in primary education environments.

The next factor, creativity and innovation, emphasizes the importance of a project-based learning approach in plastic waste management. The implementation of creative activities such as making Ecobricks, recycling plastic into aesthetic products, and waste-based art activities provides added educational value, increases interest in learning, and instills the concept of sustainability through direct experience.

Finally, family and home environment support plays a role in reinforcing the positive habits developed at school. The intergenerational learning (IGL) approach, which is cross-generational learning between children and parents, has been proven effective in raising collective awareness in reducing plastic consumption at home. In addition, the habit of bringing lunch from home also helps reduce the use of single-use plastics in the school environment.

Overall, these six factors indicate that reducing plastic waste in elementary schools cannot be achieved through educational interventions alone, but requires a multidimensional approach involving the entire educational ecosystem. Synergy between schools, families, and communities is key to creating a culture of environmental awareness and sustainable behavior among elementary school students.

CONCLUSION

Efforts to reduce plastic waste among elementary school students are influenced by six main factors, namely knowledge and education, environmentally friendly attitudes and behaviors, school facilities and support, community participation, creativity and innovation, as

well as family and home environment support. These six factors are interrelated in shaping students' awareness and habits to manage waste responsibly. Improved environmental education, the implementation of green school policies, and collaboration between schools, families, and communities have proven to be effective strategies in fostering sustainable behavior and reducing plastic use in elementary school environments.

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