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IMPLEMENTATION OF SCIENCE LEARNING IN FORMING AWARENESS OF ENVIRONMENTAL CARE AMONG ELEMENTARY SCHOOL STUDENTS

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Abstract

This study aims to determine the implementation of science learning in forming the awareness of environmental love among grade V elementary school students at SD N 118 Gresik. The method used in this study is qualitative descriptive with source triangulation through observation and documentation and method triangulation through *Focus Group Discussion* (FGD), carried out on 20 students and homeroom teachers of grade V of SD Negeri 118 Gresik during science learning. The data analysis method goes through several stages: data reduction, data presentation, conclusion, and data verification. The study results showed that the science learning of the material "Humans and Waste" at SD Negeri 118 Gresik gave students an understanding of the types of waste, its impact on the environment, and the importance of waste management through discussions and presentations. Although students show enthusiasm, maintaining environmental cleanliness has not been fully internalized in daily practice, especially in applying the 3R (Reduce, Reuse, Recycle) principle. It appears that science learning has successfully formed the awareness of environmental love among students in class V of SDN 118 Gresik.

Keywords

Awareness of Love for the Environment, Science Learning, Humans and Waste, Elementary School Students.

INTRODUCTION

Environmental crises, such as climate change, pollution, and ecosystem degradation, have become global challenges that must be faced collectively. Globalization has accelerated the impact of human activities on the environment, where industrialization, urbanization, and consumerism have worsened the earth's condition. (Hussain & Zhou, 2022). As future leaders, the young generation is at the forefront of actively participating in managing and determining the earth's sustainability in the future. Effective environmental education can play a key role in preparing young people to face these challenges by instilling values to encourage pro-environmental behavior (Augustine & Nuha, 2024).

Environmental education must be designed to increase knowledge and motivate the younger generation to act more proactively in protecting the environment, with an approach to raising awareness of environmental love (Chandrawati & Aisyah, 2022). In grade V of SD Negeri 118 Gresik, students' awareness of environmental love showed an increased understanding of environmental issues, such as types of waste, its impact on the ecosystem, and the importance of waste management through the 3R (Reduce, Reuse, Recycle) principle (Samiha, 2013). However, although students understand these concepts, the habit of applying such awareness in daily actions has not been fully developed.

In practice, there is still a gap between the theoretical knowledge that students have and the actual implementation, such as sorting waste or reducing the use of plastic. To ensure that the younger generation can face global environmental challenges, a learning approach that emphasizes habituating environmentally conscious behavior is needed. This can be done through the innovation of eco-pedagogy-based learning tools, which provide knowledge and encourage students to actively participate in practical solutions to preserve the earth (Mulyanie & Setiawan, 2024).

Environmental education can be applied effectively through eco pedagogy, which emphasizes the mutual relationship between humans and nature and the moral responsibility to maintain the balance of the ecosystem (Handayani et al., 2021). This is under Sterling's (2021) assertion that eco-academia-based education is relevant to increasing environmental awareness among the younger generation, especially amid a global environmental crisis. Ecopedagogy focuses on transferring environmental knowledge and seeks to develop a critical awareness of the relationship between humans and nature. Through this approach, learners are invited to understand their duties as an integral part of the wider ecosystem and are responsible for maintaining

sustainability. This is in line with the emphasis that ecopsychology must equip students with critical thinking skills and the ability to act sustainably to face future environmental challenges more effectively (Monem, 2024). This kind of education is expected to change the paradigm of the younger generation (Widiyono, 2019) from simply knowing about environmental issues to being truly committed to engaging in practical solutions that support the earth's sustainability.

Previous studies have shown that eco-epidemiology-based education has an important role in instilling the values of love for the environment in students from an early age (Clark & Mayer, 2023; Krajcik & Czerniak, 2018; Lamb et al., 2018). They have highlighted that science learning can be a medium to help students understand the impact of human behavior on the earth (Irwanto et al., 2023; Nur et al., 2023; Subroto & Nugroho, 2024), underlining the importance of formal educational institutions as a place to form sustainable life values. Environmental learning that combines theoretical and practical approaches, such as the implementation of the 3R principles (Reduce, Reuse, Recycle), is effective in building concern for nature (Liu et al., 2020; Popescu et al., 2020; Topal et al., 2021). These studies provide a solid foundation for the importance of a holistic approach in environmental education to encourage pro-environmental behavior among students.

This study is similar to previous research that used an eco-pedagogical approach to increase awareness of environmental love. However, this study focuses on the material "Humans and Waste" in science learning at SD Negeri 118 Gresik, which evaluates the gap between theoretical understanding and real practice in applying the 3R principles. In addition, this research presents novelty by developing technology-based interactive teaching tools, namely Microsite 3R based on eco-pedagogy. This device is designed to consistently increase the habit of environmentally conscious behavior through an approach relevant to the digital era. This innovation makes a new contribution by integrating interactive digital learning to address the gap between students' knowledge and practices so that it can encourage them to become more active agents of change in preserving the environment.

The urgency of developing awareness of environmental love in the world of education is very important to maintaining and improving the quality of the environment. Integrated science learning is one of the effective and recommended approaches to be applied at various levels of education, including for elementary school students. In this learning, certain themes or concepts in science, including the material "Humans and Waste," can help students understand the impact of human behavior on the environment in depth. Through integrated science, students not only learn

about the importance of waste management from a biological perspective (for example, how waste impacts living things and ecosystems) but also through physics (waste decay processes) and chemistry (chemical reactions that occur in the decomposition of waste). Thus, students can see how daily behaviors, such as littering or recycling practices, can directly affect the quality of their environment.

METHOD

This study uses a qualitative approach with analytical descriptive research that aims to describe the phenomenon in depth based on data obtained from the field (Agustianti et al., 2022). The research data involved 20 students of grade V of SD Negeri 118 Gresik, the main subjects, and homeroom teachers as additional sources. The research focuses on students' behavior during science learning with the material "Humans and Waste," which took place on November 5, 2024, intending to evaluate their awareness of environmental love.

The data collection technique is carried out through triangulation, including three main methods: observation, documentation, and Focus Group Discussion (FGD). Observation is directed at student behavior during learning. Documentation includes learning recordings and notes, while FGD is carried out with homeroom teachers to deepen insights related to learning outcomes (Sugiyono, 2019). Data validation is carried out by triangulation of sources and methods to ensure the validity of the data. Data analysis follows three main stages, according to Sugiyono (2016): first, data reduction to filter and simplify relevant information from observations, documents, and FGDs; second, the presentation of data in the form of narratives or tables to facilitate pattern identification; and third, drawing conclusions and verifying to ensure consistency between field data and the final results of the research. The findings of this study are expected to provide concrete recommendations for developing eco-pedagogy-based learning tools that effectively instill awareness of environmental love.

FINDINGS AND DISCUSSION

Findings

Science learning materials on "Humans and Waste" can be designed to help students understand the impact of waste on the environment and how students can play a role in its management. The following is the learning material "Humans and Waste" implemented in class V

from SD Negeri 118 Gresik:

Table 1. Learning Materials "Humans and Waste"

Introduction	1. Learning Objectives Students will understand the concept of waste, the types of waste, the impact of waste on the environment, and ways to manage it. 2. Introduction to the Concept of Waste Explain what waste is, what types of waste (organic and inorganic) are, and what sources of waste are from human activities.
Types of Waste	1. Organic Waste Waste that can decompose naturally, such as food scraps, leaves, and twigs. 2. Inorganic Waste Waste such as plastic, glass, metal, and other synthetic materials cannot be degraded naturally. 3. Hazardous Waste Types of waste that can harm health, such as used batteries, expired drugs, and hazardous chemicals.
The Impact of Waste on the Environment	1. Soil Pollution Litter disposed of carelessly can pollute the soil, damage soil quality, and interfere with plant growth. 2. Water Pollution Garbage dumped into rivers or oceans can pollute water sources, affect ecosystems, and harm aquatic life. 3. Air Pollution Waste burning produces air pollution that can have a bad impact on human health. 4. Effects on Human Life The negative impact of waste on human health includes diseases transmitted through poorly managed waste.
The Role of Humans in Waste Management	1. The Importance of Environmental Love Awareness We are fostering students' awareness of the importance of good waste management and the role of students in maintaining environmental cleanliness. 2. Actionable Actions Please provide examples of actions that students can take in their daily lives, such as bringing their shopping bags, sorting garbage, and reducing the use of plastic. 3. Waste Management Innovation I teach students about new technologies or waste management methods, such as using waste as fuel or creative products.
Waste Management Process	1. Reduce Reduce the use of single-use items and choose environmentally friendly products. 2. Reuse (Menggunakan Kembali) Use items that can still be used, such as glass or plastic bottles. 3. Recycle (Mendaur Ulang) I was reprocessing inorganic waste into useful goods, such as recycled paper, plastic, and metal. 4. Composting The process of converting organic waste into useful compost fertilizer for plants.

Conclusion	Students are expected to understand that waste is a problem that can affect the environment and human health. By managing waste wisely, we can reduce its negative impact on nature.
Evaluation and Reflection	1. Discussion Invite students to discuss ways to manage waste at home or school. 2. Assignment Please make a report on the waste management process through 3R in their neighborhood.

The learning process in implementing the material begins with explaining the learning objectives to instruct students about what will be learned and achieved during the session. The teacher then delivered material on the types of waste, which included an explanation of organic, inorganic, and hazardous waste. Students were introduced to various examples of waste around them and were invited to understand the differences. Next, the teacher discussed the impact of waste on the environment by playing a video of the damage caused by waste. This video will visually show how poorly managed waste can damage the environment, pollute soil, water, and air, and impact human health. This visualization helps students better understand the magnitude of waste's impact on nature and daily life.

Then, the teacher explained the role of humans in waste management, emphasizing the importance of awareness and the responsibility of each individual to reduce, reuse, and recycle waste (3R). As a follow-up, the teacher showed a 3R tutorial video that teaches practical ways to manage waste properly, such as sorting, recycling, and reducing single-use items. This video tutorial aims to provide students with a clear and easy-to-understand guide to applying the 3R concept in daily life. With this approach, teachers not only provide information about waste and its management but also invite students to think critically and practically so that they can play an active role in maintaining environmental cleanliness. This learning is explained using PowerPoint and videos as learning media to make the material more interesting, interactive, and easy to understand for students.

After the presentation of the material, the next step is to divide students into three study groups. Each group was given 30 minutes to identify and delve into one of the three main topics studied. The following are the tasks given in the study group:

Table 2. Group Discussion Materials

Group 1	Focus on identifying types of waste, where students will dig deeper into the difference between organic, inorganic, and hazardous waste. Students can collect examples of waste around the school or home environment and learn the characteristics of each type of waste.
Group 2	Identify the impact of waste on the environment. The group will analyze how waste can damage the environment, especially those not properly managed. Students will learn about the impact of waste on soil, water, and air pollution, as well as how this affects the lives of humans and other living things.
Group 3	Identify the role of humans in waste management. Students in this group will discuss how human actions—such as littering or sorting garbage—can affect the environment. Students will also discover how human awareness and responsibility in waste management can help prevent environmental damage.

Results of Group Discussion

In the group discussion stage, students were divided into three groups, each given 30 minutes to identify the theme of the material that had been given, including the types of waste, the impact of waste on the environment, and the role of humans in waste management. Although the classroom atmosphere becomes crowded and sometimes less conducive, the crowd reflects students' enthusiasm for the topic being discussed. Each group interacted with each other to exchange opinions about the given theme. Interaction in the group went well, although there was a fairly lively discussion dynamic with some of the more dominant students. Teachers actively supervise and approach each group, provide direction, and help answer questions that arise.

Some students even asked questions and statements that were critical in identifying some discussion themes. For example, students who are active in the classroom, such as Muhammad Irzi Al Farizi, Bagus Raka Siwi, Aulia Izzatun Nisa, and Hafsah Zulfia Auliya, ask the question, "Why do we have to sort organic and inorganic waste?" "The world will quickly end if everyone throws garbage carelessly!" "Is it true or not that plastic is a waste that cannot be recycled?" "We have to reduce the use of plastic!" These questions and statements show that learners not only understand basic concepts but also try to understand how to apply them in daily life. Although the classroom atmosphere sometimes sounds crowded, it shows the active involvement of students in the learning process. It creates a positive and interesting atmosphere for the topic of environmental love.

Results of Group Presentations

Students were allowed to share their findings at the stage of presenting the results of the discussion by each group. Each group presented the results of their identification related to various aspects of the material "Humans and Waste," such as the types of waste, the impact of waste on the

environment, and the role of humans in waste management. The presentation results showed that each group could identify various aspects of the material provided well. The following are the results of the presentations of four discussion groups from students of class V A SD Negeri 118 Gresik:

Table 3. Results of Group Presentations

Group	Theme	Presentation Results
1	Types of Waste	Students in group 1 explained the difference between organic, inorganic, and hazardous waste. Organic waste, such as food scraps and leaves, can decompose naturally and be composted. Inorganic waste, such as plastic, glass, and metal, is not easily degradable and can pollute the environment if not recycled. Meanwhile, hazardous waste such as batteries, used medicines, and household chemicals must be handled cautiously as they can damage health and the environment if not managed properly.
2	The Impact of Waste on the Environment	Students in group 2 explained how waste that is not managed properly can pollute soil, water, and air. Waste thrown carelessly into the ground can cause the soil to be infertile, interfere with plant growth, and pollute the surrounding environment. Garbage that pollutes water can harm aquatic ecosystems and living things that depend on it, such as fish and aquatic plants. Air pollution also occurs due to garbage burned carelessly, which can cause respiratory problems for humans and other living things.
3	The Role of Humans in Managing Waste	Group 3 conveyed the importance of sorting household waste to make it easier to manage and recycle. For example, organic waste can be composted, while inorganic waste can be collected for recycling. Students also emphasized the importance of public awareness, not throwing waste carelessly, and reducing the use of single-use plastics. Individual waste management awareness is important in keeping the environment clean and healthy.

After each group has finished identifying and exploring the topics that have been assigned, the next step is to give time for each group to present the results of their discussion in front of the class. Each group will be allowed to present its findings on the discussed topic. The time given for each presentation will be adjusted, ensuring that each group has enough time to explain the analysis results clearly and thoroughly. Through this presentation, each group had the opportunity to share the knowledge gained during the identification process and discussion on waste-related topics. For example, a group that discusses "Types of Waste" can provide important information regarding the difference between organic and inorganic waste, which can then help other groups understand "The Impact of Waste on the Environment." This presentation serves as a means to convey information and as a collaborative medium where each student can learn from the knowledge shared by their peers.

After each group finished their presentation, students were given a follow-up task by making a report on the waste management process through 3R in their neighborhood. Through this task, students are expected to be able to apply the knowledge that has been gained from the material and discussions in class to real situations. In the report, students were instructed to identify the types of waste commonly found around their homes, analyze how the waste is managed, and evaluate the application of the 3R principle in reducing the volume of waste. This task not only measures students' understanding of the 3R concept but also fosters environmental awareness and encourages them to contribute directly to maintaining the cleanliness and sustainability of the environment where they live.

Report Task Results

The task of making a report on the waste management process through the 3R (Reduce, Reuse, Recycle) principle aims to provide direct experience to students in practicing waste management in their living environment. In this task, students are asked to record and document 3R activities at home for one week. The report will cover activities related to reducing waste (Reduce), reusing items that are still fit for use (Reuse), and recycling waste (Recycle). This record contains information about the type of waste that is managed, how it is managed, and reflections on the benefits of this activity to the surrounding environment. Through this assignment, students will better understand the importance of personal responsibility in maintaining environmental cleanliness and strengthening awareness of environmental love from an early age.

The assessment indicators in this report cover various aspects of applying the 3R principle (Reduce, Reuse, Recycle) following the stages described by Suryati (2014) to form the character of love for the environment. In the Reduce aspect, six indicators must be considered: reducing the amount of waste produced, using durable goods, reducing the use of chemicals, using goods until they run out, avoiding disposable use, and choosing products that can be refilled. In the Reuse aspect, there are two indicators: reusing used goods and utilizing waste for other purposes. Meanwhile, in recycling, the assessment indicators include the ability to process waste into useful materials and create new creations from waste. Through these indicators, student reports will be assessed based on how students apply each principle in their daily activities at home, ultimately expected to strengthen the character of love for the environment.

Table 4. Report Task Assessment Indicators

It	Assessment Aspects	Assessment Indicators
1	Reduce	Reduce the amount of waste produced Using durable items Avoid disposable use Choosing a refillable product
2	Reuse	Reusing used goods Utilizing waste for other purposes
3	Recycle	Ability to process waste into useful materials Creating new creations from waste.

Discussion

Learning Implementation to Increase Awareness of Love for the Environment

The results and discussions in this study are compiled to answer three problem formulations. *First,* related to science learning in "humans and waste" material to increase awareness of environmental love, this research will reveal how the material is taught to students and how this learning process can arouse students' awareness of the importance of protecting the environment. This discussion will focus on the approach used to convey concepts related to the impact of waste on the environment and how students are influenced to be more concerned about environmental issues. *Second,* this research will discuss the reactions and responses of students to the material presented. This section will explore the extent to which the implementation of the implemented learning successfully involves students and how students respond enthusiastically to learning activities that aim to deepen their understanding of the relationship between humans and waste. *Finally,* a learning evaluation will be carried out to assess the effectiveness of the material used in the learning process. Based on this evaluation, this study can identify the possibility of developing learning tools to improve the quality and effectiveness of learning in teaching environmental awareness to students.

Science learning should be provided in an integrated manner, following Permendiknas No. 22 of 2006, so that students can get direct experience that strengthens their understanding of the concepts learned (P. Y. A. Dewi et al., 2021). Integrated learning allows students to discover and understand science concepts holistically, meaningfully, and actively (You, 2017). The packaging of the learning experience designed by the teacher greatly influences the meaning of learning for students. Learning that shows the relationship between science concepts will strengthen students' understanding, form cognitive schemes, and provide a complete understanding of natural

phenomena (So et al., 2019). Science not only includes factual knowledge but also involves the process of scientific discovery. With an inquiry approach and direct experience, science education helps students understand the environment scientifically and apply it in daily life (Windschitl et al., 2020).

Science lessons that are emphasized to foster awareness of love for the environment for elementary school students can be carried out with various strategies, either through learning design, learning models, teaching materials, or the media used. One of the basic strategies to form the character of love for the environment is through science learning activities (Nasution, 2020). Environmental care and responsibility behavior can be cultivated in the designed learning activities. Learner-focused learning design (*student-centered learning*) is an important teacher guideline (Lee & Hannafin, 2016). In addition, learning that directs students to develop knowledge, thinking skills, and the ability to solve environmental problems is also important in realizing an attitude of caring for the environment. Modeling in science learning that encourages students to actively seek, process, construct, and apply knowledge needs to be considered by teachers in designing science learning (Kelana & Wardani, 2021).

The basis of various applications of learning strategies to form the character of love for the environment is to multiply the way of thinking critically for students. Through critical thinking, students are not limited to memorizing facts or information but can connect various concepts, analyze problems, and find innovative solutions. As for triggering students' critical power in the awareness of environmental love, the most basic learning can be done through science classes by applying the material "Humans and Waste." This material is an initial stimulus for awareness, and students are not only given information about waste problems but also invited to think critically about the impact of waste on the environment and daily life. Through critical thinking, learners can better understand the relationship between human actions and environmental conditions (Nugraha, 2018). Learning that prioritizes problem analysis and finding solutions will help students to realize the importance of their role in protecting the environment. Thus, this material is a starting point that encourages awareness of environmental issues, as well as forming an attitude of concern for the sustainability of nature.

Overall, through this presentation, students get information about the types of waste, its adverse impact on the environment, and how to manage it. They are also stimulated to think critically about their role in preserving the environment. The discussion about the difference

between organic, inorganic, and hazardous waste made students realize the importance of sorting waste from the beginning (S. Dewi, 2024). Understanding the negative impacts of waste left alone or disposed of carelessly also encourages it to consider the consequences of actions on ecosystems and public health. In addition, by learning how human actions, such as littering or not caring about waste management, can damage the environment, students are invited to introspect and develop an awareness of loving the environment. Through this presentation, students began to understand that everyone is responsible for reducing environmental damage, starting with small things that can be done by themselves (Ahada & Zuhri, 2020). This presentation has spurred students to think more critically and be aware of the importance of loving and protecting the environment.

Based on the results of the reports that have been collected, it can be seen that students, in general, have understood various important concepts related to waste management. Students can identify types of waste, understand the negative impact of waste on the environment, and recognize the importance of the role of humans in managing waste. This knowledge shows a good initial understanding of maintaining cleanliness and environmental sustainability (Mourent et al., 2023). However, in practice, the hygiene measures reported by students are still limited to basic activities, such as sweeping, mopping, and disposing of garbage. This shows that most students have not fully applied the 3R concept (Reduce, Reuse, Recycle). In fact, in some reports, acts of burning waste are carried out, even though this is prohibited because it can cause air pollution and harm the environment (Rosyadi & Wulandari, 2021).

The problem of weak practices in waste management was also conveyed by the homeroom teacher of class V, Mrs. Sriani (November 5, 2024), during the learning evaluation. He stated that the results of the students' presentations were very good; Children already understand the types of waste, the dangers it causes, and how to manage it. However, in daily practice at school, it is still seen that the classroom is often dirty, and students still throw garbage out of place. The school has provided garbage cans separating organic and non-organic waste. This shows a gap between the knowledge that students have mastered and its application in real-life (Azizah et al., 2023). Although students already understand the theory of waste management, good habits in maintaining environmental cleanliness have not been fully formed. This situation indicates the need for a more practical and disciplined approach to get students used to applying the knowledge they have learned so that environmental awareness can be part of daily behavior at school (Kadarisman et al., 2023).

Learning Evaluation and Learning Tool Development Efforts

Based on the learning results that included discussions and presentations, students showed a fairly good understanding of the types of waste, the impact of waste on the environment, and the role of humans in its management. Students can identify and explain these various aspects well in theory. However, from applying the 3R concept (Reduce, Reuse, Recycle) in daily life, there is still a lack of critical power in implementing real actions. Even though they already understand the importance of 3R, some students have not fully implemented simple steps in waste management in the school or home environment (Pratiwi & Muharram, 2022). This indicates that there needs to be further encouragement to build critical awareness and consistency in behaving to care for the environment, not just understanding the concept (Lim, 2017).

Critical awareness in the practice of 3R (Reduce, Reuse, Recycle) is the understanding and attitude of students that should motivate them to apply the 3R principles in daily life, including in the school environment (Hurriyah & Ernyasih, 2023). Learners need to realize that carrying refillable drinking water bottles is a simple but important step to reduce plastic waste from single-use packaging bottles. However, schools still often use bottled mineral water, plastic cups, straws, and other disposable items. In addition, although schools have provided separate bins for organic and non-organic waste, garbage is often mixed up. This shows that students still lack critical awareness in sorting waste according to its type. Learners need to understand that the practice of 3R is not just a theory but must be carried out consistently in daily actions to maintain cleanliness and environmental sustainability (Jayadinata et al., 2024).

Following up and overcoming these problems, students need to be trained to get used to practicing the 3Rs directly. This means that learning about the 3Rs should not be limited to abstract material or theory but should be applied in real, continuous action (Cahyaningtyas et al., 2021). The gap between theory and practice needs to be addressed. A learning approach that focuses on behavior habituation is needed. This means that students are given theoretical knowledge about the importance of protecting the environment and trained to apply habits that reflect environmental awareness in daily life. This habituation-based learning helps students build sustainable skills and attitudes. Through activities such as sorting garbage, bringing refillable drinking bottles, or reducing the use of plastic, students learn to consistently maintain cleanliness and environmental sustainability (Akande, 2023). Thus, learning does not only stop at the realm of knowledge but also forms real and useful behavior for the environment.

A learning approach that focuses on habituating behavior can be done by developing teaching tools that are stimulant and relevant to the interests of today's students. Effective teaching tools in this regard need to be designed to attract students' attention and motivate them to actively participate in learning, especially in practices related to the application of environmental values (Dörnyei & Muir, 2019). For example, the Ecopediatric-Based Microsite 3R (Reduce, Reuse, Recycle) teaching tool can be developed to foster awareness of environmental love for elementary school students. This microsite will be a digital learning platform that can be accessed anytime and anywhere for students in Efforts to improve Environmental Love Awareness (Haleem et al., 2022).

This 3R microsite can have various interesting and interactive features, such as visual materials (images and tutorial videos) about 3R, daily tasks and challenges, educational games, a gallery of recycled works, and a reward and badge system. With teaching tools such as the 3R microsite based on eco-pedagogy, students learn about 3R theory and get directly involved in activities supporting environmentally conscious behavior. This is expected to build critical awareness and love for the environment from an early age in a sustainable manner.

CONCLUSION

This study shows that science learning with the material "Humans and Waste" in grade V of SD Negeri 118 Gresik has succeeded in increasing students' understanding of the types of waste, its impact on the environment, and the importance of applying the 3R (Reduce, Reuse, Recycle) principle. However, the gap between theoretical understanding and real practice in maintaining environmental cleanliness is still visible, with the habit of caring for the environment not yet fully internalized in daily behavior. The shortcomings of this study are the limitation of observation time, which makes it impossible to measure changes in student behavior in the long term. For further research, it is recommended to carry out more structured interventions, such as developing ecogeedraggios-based learning tools equipped with long-term evaluations and expanding the research subjects to various levels of education to obtain more comprehensive results.

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