



## FOSTERING ENVIRONMENTAL AWARENESS AND RESPONSIBILITY IN YOUNG STUDENTS THROUGH A ZERO WASTE LIFESTYLE

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### ABSTRAK

Karakter cinta terhadap lingkungan jika dipelajari oleh seseorang sejak usia dini, maka akan menjadi kebiasaan baik dalam kegiatan sehari-hari dan akan bertahan lama dalam pikiran dan hati seseorang. Pengabdian masyarakat kemitraan dilaksanakan di PAUD Mutiara Kids, Temanggung. Berdasarkan hasil evaluasi yang dilakukan oleh tim pengabdian masyarakat, 92% anak didik sudah bisa membedakan jenis sampah organik dan sampah non organik, namun aspek keterampilan teridentifikasi bahwa minimnya pembelajaran yang memanfaatkan barang-barang bekas menjadi mainan edukasi. Selain itu, belum ada upaya sekolah bagaimana menjadikan karakter cinta lingkungan terinternalisasi dalam aktivitas kehidupan sehari-hari siswa. Solusi yang dirancang dalam pengabdian ini adalah dengan memberdayakan guru, siswa dan juga staf sekolah melalui program "Zero-Waste Life Style". Kegiatan dilakukan melalui 1) memperkenalkan dan mensosialisasikan program "Zero-Waste Life Style" sebagai alternatif mewujudkan literasi lingkungan di sekolah, 2) kegiatan belajar bersama membuat mainan edukasi dari barang bekas melalui mata pelajaran Proyek Penguatan Profil Pelajar Pancasila (P5), 3) Membudayakan karakteristik cinta lingkungan dengan membiasakan diri mengumpulkan dan membuang sampah sesuai dengan jenis sampah. Melalui kegiatan "Zero-Waste Life Style" yang dilakukan oleh tim pengabdian masyarakat menunjukkan perubahan positif dalam sikap dan perilaku siswa dalam hal pengelolaan terhadap sampah yang secara beriringan mendukung tercapainya tujuan pembangunan berkelanjutan melalui karakter cinta lingkungan.

### ABSTRACT

Environmental awareness, when nurtured from an early age, can develop into a positive habit that becomes embedded in one's daily life. This community service partnership program was implemented at PAUD Mutiara Kids in Temanggung as a concrete step to build environmental awareness among young learners. Based on evaluations conducted by the community service team, 92% of the students were already able to distinguish between organic and non-organic waste. However, practical skills in waste utilization were still lacking, particularly in using recycled materials for educational purposes. In addition, environmental values had not yet been integrated into students' daily routines. To address these issues, the "Zero-Waste Lifestyle" program was introduced as a strategic solution to empower teachers, students, and school staff. The program consisted of three key activities: (1) Introducing and promoting the "Zero-Waste Lifestyle" as a method for developing environmental literacy, (2) Facilitating collaborative workshops to create educational toys from recycled materials through the Pancasila Student Profile Strengthening Project (P5), and (3) Cultivating environmentally responsible behavior through consistent waste sorting habits. The program led to positive behavioral changes in students, particularly in waste management, and helped foster an environmental awareness aligned with the broader goals of sustainable development.

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## INTRODUCTION

Environmental problems faced by society are increasing over time, stemming from water, soil, and air pollution. This is not only caused by industrial activities; domestic activities and human actions can also contribute. Many problems occur globally, including in Indonesia, where environmental issues are still prevalent in both urban and rural areas. Therefore, public awareness and concern for their surroundings are crucial. This awareness can also be interpreted as environmental literacy, a condition where a person not only possesses environmental knowledge but also demonstrates a responsive attitude and can provide solutions to environmental issues (Siregar et al., 2020). This attitude and responsibility for environmental conditions can be realized if each individual possesses characteristics of environmental awareness.

Environmental awareness is an attitude inherent in someone who loves the environment, thus fostering a sense of responsibility for preserving the existence and sustainability of all natural resources (Parker & Prabawa-Sear, 2019). Environmental awareness should be instilled in children from an early age. Motivation to develop these behaviors is expected to have lifelong effects. Education and other elements can guide students in preparing their mental state to become adults who are responsive to their environment.

Students, as part of society, are prepared to become the next generation and agents of change within society, and need to be equipped with environmental awareness. The Environment Education and Training Partnership (EETAP) emphasizes that a person is environmentally literate if they know what they will do for the environment (Hollweg et al., 2011). This issue was reiterated at a workshop session on October 12, 2020, where representatives from the Climate

Literacy Network gathered to discuss Climate Change Education: Science, Solutions, Inspiration, and Empowerment. The workshop recommended the crucial role of early childhood education in instilling environmental awareness and how educational institutions can contribute to protecting and nurturing the environment by integrating solutions to environmental issues into education and learning. This means that education must include components of student competency or character in protecting and preserving the environment.

In line with this, in the process of forming a character of environmental awareness from an early age, Indonesia has a foundational concept for environmental literacy-based schools, namely Decree No. Kep.07/MenLH/06/2005 and No. 05/VI/KB/2005 of the Minister of Environment and the Minister of National Education concerning the development and guidance of environmental education. This joint decision emphasizes the need for environmental education to be integrated with existing subjects. This is a follow-up to the "Green School" program. The goal is to instill a foundation for environmental education from an early age, equip the younger generation with an understanding of the environment, and educate students to behave in a caring and loving manner. Through the education of environmental awareness, it is hoped that students will be environmentally literate and responsive, based on the knowledge they gain, and can implement it in their daily lives. The education of Environmental awareness must be integrated into the learning process so that students can internalize their role as future agents who care about the environment. Efforts can be made through cultivating a habit of caring for the environment, starting with small actions such as disposing of waste properly and recognizing plants in the school environment (Boeve-de Pauw & Van Petegem, 2018). Greening the school environment and maintaining and preserving green schools.

Environmental awareness education needs to be introduced as early as possible, considering the global crisis, and to correct mistakes that have left the Earth in a dire state for human life (Prayitno et al., 2019). Environmental awareness education is essential to creating an environmental awareness society, one that is aware of and concerned about the importance of ecology and the environment for human survival. Developing an environmental awareness education for students aims to foster environmental stewardship, not just through exploiting or consuming nature, but also through developing the understanding and ability to understand and address environmental problems arising from actions and behaviors related to utilizing the natural environment around them (Devi & Idrus, 2023). Developing an environmental awareness education at the early childhood level is challenging. Therefore, collaboration with various parties is necessary to foster environmental awareness among students, as an effort to create environmental awareness.

Environmental awareness education is a concrete action to foster a caring attitude toward the environment, ensuring its sustainability and benefit for human life. Values instilled in students from an early age are long-lasting and easily accepted. This aligns with the statement (Yulius et al., 2019), which states that the best time to instill character education is in early childhood. If this period is missed, it will be increasingly difficult to develop good character in children.

To foster an environmental awareness in students, environmental learning activities in early childhood must be planned, prepared, and implemented using an approach that is appropriate to the development of early childhood mindsets and developed creatively, while still considering the child's characteristics and the educational environment (Kusumaningrum, 2018). This is

because the role of educators and the approaches used in early childhood education are crucial in developing the potential of children aged 4-6 years.

To instill environmental awareness education in early childhood education, it is necessary to develop an ideal learning approach that aligns with the developmental needs and interests of each child and that harnesses their curiosity to explore the world around them (Nuzulia & Purnomo, 2019). The prepared learning must be able to illustrate the diversity of educational ideas that stimulate the growth and development of all children's intellectual potential (Firani, 2023)

The target partners for this community service activity in developing environmental literacy are students at Mutiara Kids Early Childhood Education (PAUD) in Temanggung. This preschool aims to prepare intelligent and faithful Indonesian children and develop basic skills. Mutiara Kids Early Childhood Education (PAUD) is located in Gamblok Hamlet, RT 04/RW 02. The school received an operational permit from the Temanggung Education Office in 2017. Since its inception, the school has been operating for almost eight years and has 268 students, divided into Early Childhood Education, Kindergarten A, and Kindergarten B groups.

Mutiara Kids Early Childhood Education (PAUD) was established in 2017, under the leadership of Mr. Mujiyono, S.Pd.I., and assisted by 10 teachers. In 2024, the community service team conducted an environmental literacy program, teaching students to recognize and sort waste according to its type. Based on the team's evaluation, 92% of students were able to sort and dispose of waste according to its type after the previous year's community service (Figures 1 and 2). However, there has been no follow-up process to the waste sorting process that has been carried out. The collected waste remains piled up and has not been optimized into items with economic value.

Based on the results of a survey evaluation conducted by the community service team, 92% of students can distinguish between organic and non-organic waste. However, in terms of skills, there is a lack of learning that utilizes used items as educational toys. Furthermore, there has been no effort from schools to cultivate a culture of environmental awareness and to internalize it in students' daily life activities. This is also supported by the fact that schools do not provide separate bins for different types of waste. The lack of learning that utilizes used items as educational toys has not been able to reduce the amount of waste in schools, allowing them to be recycled into items with value.

Based on the evaluation results of the community service activities carried out previously, namely that 92% of students have been able to sort and dispose of waste according to the type of waste, but in terms of instilling environmental awareness in students comprehensively there is still a problem, namely how to provide skills to students to be able to utilize the waste according to its type into items that have economic value. Instilling environmental literacy and environmental awareness in children does not only stop at understanding and practicing students in recognizing, distinguishing, and disposing of waste in its place according to the types of waste, but more than that, namely by providing students with skills on how the waste can be recycled into valuable items. This partnership community service activity aims to help solve the problems faced by partners in terms of fostering an environmental awareness in students, namely, providing skills to students to process waste into items that have higher economic value and benefits. This community service program proposes solutions to the problems faced by community service partners, namely through the "Zero-Waste Lifestyle" activity. With the "Zero-

Waste Lifestyle" activity that will be carried out by the community service team, it is hoped that it can contribute to forming the character of students who care about the environment and simultaneously support the achievement of sustainable development goals through environmental awareness.

Figure 3 depicts the condition of waste that has been seen to be separated according to type, but still looks piled up and has not been optimally utilized to become more useful items and have higher economic value. From figures 1 to 4, it shows that the Mutiara Kids PAUD school does not yet have facilities to support environmental literacy, such as trash bins that differentiate organic and non-organic waste, as well as creative learning models by utilizing used goods into educational toys to reduce waste in the school environment.



Figure 1. Education regarding waste sorting for students



Figure 2. Implementation of Community Service on Waste Sortin



Figure 3. Waste that has been separated according to type of waste has not been utilized optimally.



Figure 4. Waste that has been separated according to type of waste has not been utilized optimal.

Based on the description above, the partner's problems can be divided into two: environmental and educational aspects. These problems can be seen in the following table 1:

Table 1. Problems Faced by the Community Service Partner

No	Aspect	Problem
1	Environment	Problems related to how to utilize used goods to make educational toys.
2	Education	The problem related to the learning aspect of how to cultivate an environmental awareness among students so that it becomes a habit internalized in their daily activities.

## METHOD

The activity implementation method was planned using a participatory approach, namely collaborative learning, where the learning process is carried out in a participatory manner between teachers and students, along with direct mentoring in the "Zero-Waste Lifestyle" activity.

The work procedures for this community service include:

1. Socialization of activities to be carried out in the community service program.
2. Science and technology training to be transferred to partners, namely the "Zero-Waste Lifestyle" program: joint training on separating and disposing of waste types, followed by making toys from used

items. This includes the preparation of participants, consisting of all Mutiara Kids PAUD students and all Mutiara Kids PAUD teachers. Preparation of facilitators and instructors consisting of 2 lecturers and 3 students.

3. Implementation of training results: implementation of "Zero-Waste Lifestyle" activities.
4. Monitoring and evaluation of the results of the community service implemented for partners: monitoring and evaluation of "Zero-Waste Lifestyle" activities. This stage will be conducted during the activity.
5. Monitoring the sustainability of the program: mentoring activities to ensure



the ongoing implementation of waste disposal activities according to waste types, and making toys from used items through the "Zero-Waste Lifestyle" for

students and teachers. This activity will be reviewed periodically several times over the course of one year.

Problem-solving methods in implementing community service activities can be seen in Table 2

Table 2. Problem-Solving Methods

No	Solutions	Activity Plan	Activities	Partner Participation
1	Practically making educational toys from used items in P5 learning	Making toys from used goods	Practice, mentoring, monitoring and product evaluation	Providing used goods
2	Creating a joint simulation activity to separate and dispose of waste according to the type of waste.	Introducing from an early age about separating and disposing of waste according to the type of waste	Tutorials, discussions and practice	Providing representative trash bins to make trash money according to the type of trash

The "Zero Waste Lifestyle" program was implemented through: 1) introducing and socializing the "Zero Waste" concept as an alternative effort to foster and cultivate an environmental awareness among students; 2) collaborative learning activities to make educational toys from used materials within the Strengthening Project of Pancasila Student Profile (P5); and 3) fostering a love of the environment in all student activities at school by providing separate trash bins for each type of waste.

The Strengthening Project of Pancasila Student Profile (P5) is part of the independent curriculum structure, separate from intracurricular learning. P5 is an effort to create Pancasila Students who are able to behave in accordance with Pancasila values. P5 can be implemented by

providing direct experiential learning in accordance with the characteristics of the surrounding environment. The Pancasila Student Profile in Indonesian education is described in six dimensions: (1) faith and devotion to God Almighty, and noble character; (2) independence; (3) cooperation; (4) global diversity; (5) critical thinking; and (6) creativity [7]. The Pancasila Student Profile can serve as a guide for all stakeholders, especially teachers and students, in carrying out the learning process.

The community service team's program to cultivate environmental awareness through the "Zero Waste Lifestyle" in P5 learning requires the participation of the entire school community to play an active role in implementing "Zero Waste Lifestyle" activities. Teachers and all school staff

play a strategic role in cultivating environmental awareness by serving as role models for students in disposing of waste appropriately and by type, and by fostering creativity and skills to repurpose existing waste into useful and economically valuable items. In the educational environment, students are required not only to be academically intelligent but also to excel in co-curricular activities. The educational environment serves as a learning platform for students to become individuals who care about environmental sustainability.

The problems that will be solved in this community service program are as follows:

1. The environmental aspect: how to utilize waste and used materials at school to create educational toys.
  - Causal Factor: Diversity in social status or lifestyles leads to differing perspectives on environmental issues.
  - Problem Solution: Practice making educational toys from used materials.
  - Activity Target: Creating an activity to make toys from used materials.
  - Measurement Criteria: Students can make toys from used materials.
2. The learning aspect: how to cultivate an environmental awareness in students so

that it becomes a habit internalized in daily activities.

- Causal Factor: The lack of trash bins that separate waste by type has resulted in a culture and habit of disposing of waste according to type. This situation is understandable because the focus of teachers' education is more oriented toward academic intelligence development in early childhood, while parents are mostly housewives or work in the formal sector. Therefore, attention to disposing of waste according to type is less than optimal.
- Problem Solution: Providing representative trash bins for sorting waste types and conducting joint simulation activities to separate and dispose of waste according to type.
- Activity Target: It is hoped that a culture and habit of disposing of waste according to type will be created in every daily school activity.
- Measurement Criteria: Students and the entire school community will have the habit and culture of disposing of waste according to type

Table 3. Problems and solutions offered by the “Zero-Waste Lifestyle” program”

Problem Aspects	Partner Problems	Solutions Offered with the “Zero-Waste LifeStyle” program
Environmental aspects of utilizing used goods to become educational toys	There are no activities at school that provide training in making educational toys from used goods.	create activities to make educational toys from used items in learning n P5
Learning aspects cultivate an environmental awareness in students	There are no trash bins that separate waste according to type, so the culture and habit of disposing of waste according to type have not yet been created among all residents	Representative trash bins are provided for disposing of waste according to type, and joint simulation activities are conducted to separate and dispose of waste according to type.

## RESULTS AND DISCUSSION

### A. Activity Implementation

The environmental literacy community service activity for early childhood at Mutiara Kids PAUD, Traji Village, Temanggung Regency, through the "Zero-Waste Lifestyle" program, was held on:

Day/Date : Sunday, May 18, 2025

Time : 8:00 a.m. until finished.

Participants : 40 Kindergarten B students at Mutiara Kids PAUD

The community service activity to improve environmental literacy in early childhood, held at Mutiara Kids PAUD, Traji Village, Temanggung Regency, was conducted by the community service team from Universitas Negeri Semarang. It began with a presentation on environmental awareness, specifically about waste and its types, presented by the community service team. The students then practiced sorting and disposing of waste according to its type, accompanied by the Universitas Negeri Semarang community service team and teachers from Mutiara Kids PAUD, Temanggung. This was followed by practical

lessons on utilizing waste to create valuable products and items with economic value.

Some documentation of the community service activities can be seen in Figures 5, 6, and 7 below.:



Figure 5. Zero Waste Socialization Activities



Figure 6. Zero Waste Socialization Activities





Figure7. Process of Utilizing Used Goods

## B. Environmental Literacy

### 1. Understanding Environmental Literacy

Environmental literacy is a conscious attitude toward maintaining environmental balance. This awareness is also defined as environmental literacy, which not only encompasses environmental knowledge but also responsiveness and the ability to provide solutions to environmental issues. Students, as part of society, prepared to become the next generation and agents of change within society, need to be equipped with environmental literacy skills. The Environment Education and Training Partnership (EETAP) emphasizes that a person is environmentally literate if they know what they are doing for the environment.

Environmental literacy is defined as environmental awareness that encompasses knowledge, skills, and motivation for preventing and addressing environmental problems and their relationship to social systems. Environmental literacy needs to be taught to students to prepare them to understand and address problems that occur in their environment. Students who are environmentally literate will act responsibly towards the environment through knowledge, skills, and awareness of environmental issues.

This issue was reiterated at a workshop on October 12, 2020, where representatives from the

Climate Literacy Network gathered to discuss Climate Change Education: Science, Solutions, Inspiration, and Empowerment. The workshop provided an introduction and awareness of climate science, common misconceptions about climate change, and educational materials educators can use to integrate climate education into curricula and professional development programs. It also emphasized the importance of integrating climate solutions into education. This recommendation emphasized the crucial role of early childhood education in providing the correct knowledge and perspective on climate change and how educational institutions can contribute to protecting and nurturing the environment by integrating climate solutions into education and learning. This means that education must include components of student competency or character in protecting and preserving their environment and maintaining global climate stability. This means that environmental literacy encompasses a character component in education for students, enabling them to properly care for the environment, not only by exploiting or consuming nature but also by developing the understanding and ability to understand and address environmental problems arising from actions and behaviors in utilizing the natural environment, forests, or other natural resources around them.

### 2. Environmental Literacy Indicators

A person's environmental literacy skills can be measured based on the components of environmental literacy. According to the NAAEE, a person's environmental literacy status can be measured based on the criteria of the components of environmental literacy, namely: knowledge, cognitive skills, attitude, and environmentally responsible behavior. These four

components can be measured using several indicators, namely: (1) ecological knowledge, (2) verbal commitment, (3) actual commitment or environmental behavior, (4) environmental sensitivity, (5) environmental feelings, (6) environmental problem identification skills, (7) environmental problem analysis, and (8) action planning. These indicators can illustrate the extent to which a person possesses environmental literacy skills.

### 3. Zero Waste Style

Zero waste is a process from the start of production to the end of production that minimizes waste generation. The zero-waste concept applies the 3R principle (Reduce, Reuse, Recycle). The concept of zero waste is an integrated approach and application of urban waste management systems and technologies at both individual and regional levels, with the goal of reducing waste volume to a minimum (Suryanto & Susilowate, 2005).

Zero Waste, or "Eliminating Waste," is a holistic solution to sustainably manage waste and resources within a city (Zaman & Lehmann, 2011). Zero Waste is one of the most visionary concepts for addressing waste issues. Several major cities worldwide, such as Adelaide, San Francisco, and Stockholm, have declared themselves Zero Waste cities and are striving to achieve their targets and become the first cities to implement Zero Waste. However, equally important is how to implement the Zero Waste concept within a city and how to measure its performance based on the Zero Waste concept (Zaman & Lehmann, 2011). Zero Waste is a concept and approach that aims to reduce or even eliminate waste production through changes in lifestyle, consumption behavior, and production practices (Taufiqurrahman, 2024). The primary

goal of Zero Waste is to avoid waste being disposed of in landfills (Saputro, 2020), such as landfills or incinerators, and instead promote reuse, recycling, composting, and other sustainable solutions.

Some of the key principles of the Zero Waste philosophy include: Avoiding Single-Use Items, Reducing and Recycling, Composition, Mindful Purchasing, Creative Recycling, a Full Lifecycle Approach, and Public Education and Awareness (Ariani & Nurjannah, 2022). Zero Waste does not necessarily involve completely eliminating all waste, but rather changing the way we think about waste and taking concrete steps to reduce it as much as possible (Haliya et al., 2020). This involves changing culture, lifestyles, and supporting sustainable solutions in waste management. Zero Waste practices are crucial in efforts to protect the environment, mitigate the impact of climate change, and conserve natural resources (Purba & Yunita, 2017).

Zero Waste Lifestyle in Indonesian can be interpreted as a lifestyle with minimal/zero waste. This concept and lifestyle strive to reduce or even eliminate the production of non-biodegradable or non-recyclable waste. This way, we can minimize the accumulation of waste in the surrounding environment to maintain cleanliness, health, and the beauty of nature. The Zero Waste lifestyle embraces five principles: the 5 Rs (Refuse, Reduce, Reuse, Recycle, Rot).

Applying a zero-waste lifestyle in everyday life can be achieved through simple steps, such as reducing plastic use when shopping by opting for eco-friendly shopping bags. Recycling unused items into useful items. Using more environmentally friendly materials or goods to minimize harmful effects on the environment. Avoiding a consumerist lifestyle by minimizing unnecessary purchases, prioritizing needs over

wants. Separating organic waste from non-organic waste and hazardous waste to facilitate their utilization and disposal.

#### 4. Monitoring dan Evaluasi

Monitoring and Evaluation (Monev) is a crucial part of the implementation process of community service, particularly to ensure that the objectives of the Zero-Waste Lifestyle program are achieved effectively and efficiently. During this stage, the community service team is present at the activity location to observe the implementation of the zero-waste principles that have been socialized to students, such as waste sorting, the use of recycled materials, and the reduction of plastic waste in daily activities. Evaluation activities for the implementation of service activities are also conducted, including evaluating the implementation of each service program, up to a comprehensive evaluation of the implementation of service activities (Fachrurrozie et al., 2024).

#### 5. Sustainability Monitoring

This stage is crucial after the Zero-Waste Lifestyle program is implemented. The main focus is on providing ongoing support to ensure that the behavior of disposing of waste according to type and utilizing used goods truly becomes a sustainable habit, not just a temporary activity. One activity that can be carried out for periodic monitoring is through regular school visits, so that both schools and students can continue to implement the waste sorting program.

## CONCLUSION

Through a community service activity titled "Cultivating Environmental Awareness in Students from an Early Age Through a Zero Waste Lifestyle," it can be concluded that the development of environmental awareness needs to begin at an early age and be integrated into daily educational activities. Implementing a zero-waste lifestyle in the school environment is an effective approach to raising students' awareness of the importance of preserving the environment. This activity not only provides a theoretical understanding of waste management and its impact on the environment but also teaches hands-on practices such as sorting waste, reducing the use of single-use plastics, and reusing reusable items.

The results of the activity demonstrate positive changes in students' attitudes and behaviors, as they begin to demonstrate responsibility for the waste they produce and become agents of small change in their communities. More than just a habit, implementing a zero-waste lifestyle serves as a means to build students' character, which includes discipline, independence, caring, and responsibility. Therefore, programs like this are highly relevant for continued development and implementation, both in schools and at home, to support the formation of an environmental awareness generation prepared to face the challenges of the future ecological crisis. In order to obtain optimal results, the community service team is committed to continuing to carry out ongoing monitoring to ensure that students' awareness of sorting waste and reprocessing it into useful items can continue to be maintained.

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