



# Character education for environmental awareness through introducing zero waste management to young children

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## ABSTRACT

**Background:** The widespread waste phenomenon in Indonesia has caused other environmental damage, such as contaminated clean water sources, flooding that damages buildings and infrastructure, and even claims lives. This is due to a lack of public awareness of the environment and suboptimal waste management. The aims of this research is to provide education and understanding of environmental care character in children by introducing zero waste management. **Methods:** The qualitative research used a case study method at ABA Kindergarten Ambarawa. The subjects were the 1 class teacher and 15 students in class A. data were collected through observation, interviews, and documentation. Data analysis was carried out through data reduction, presentation, and verification. **Findings:** Educators can develop a caring character for the environment by introducing zero waste management to early childhood. Educational activities have been implemented to instill a caring character for the environment, including introducing young children to various types of waste, instilling the habit of disposing of waste properly, introducing and teaching the management of organic waste into compost, and utilizing recycled plastic waste as a learning medium and creative work for young children. These activities are expected to instill and foster a habit of caring for the environment. By becoming accustomed to healthy and clean living from a young age, children will maintain a healthy environment. **Conclusion:** Environmentally conscious behavior can begin with the instilling of healthy lifestyle habits in young children. Introducing waste management through recycling and composting. **Novelty/Originality of this article:** The research discusses three things in waste management, namely habituation, recycling and composting. Few studies discuss these three things in one article.

**KEYWORDS:** education; environmental awareness; zero waste.

## 1. Introduction

News related to environmental issues that are currently rampant are related to the explosion of waste in Indonesia (National Research and Innovation Agency, 2024). The Special Region of Yogyakarta is one of the areas experiencing a waste crisis, with illegal dumping of around 200 truckloads of waste near a popular beach in Yogyakarta, which is severely damaging the beach's sustainability and reducing its appeal to visitors (Hutton, 2025). Bali is also one of the regions experiencing problems related to rampant plastic waste in coastal areas, which is damaging the image of their beautiful beaches. The proliferation of waste around the beaches has caused a decline in the image of clean beaches and damaged the marine ecosystem (Chong, 2025). In addition, Jakarta is experiencing a prolonged waste crisis, where every year it will inevitably experience various

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environmental problems caused by waste, such as flooding. This is because the amount of waste produced reaches almost 8,000 tons per day (Tamba et al., 2025). The shocking fact that waste is overflowing in several major cities in Indonesia can cause environmental damage.

Various problems arising from this overflow of waste are related to water pollution, which can disrupt human health. This occurs because waste blocks river flows and pollutes clean water. This causes various health problems due to the lack of clean water sources for consumption (Sari et al., 2022). The overflow of waste in the Ciliwung River causes flooding in the Jakarta area. The capital city has long suffered from waste problems, resulting in frequent flooding every year, especially during the rainy season. This is because waste clogs the river flow (Zaki, 2025). The flooding that occurred in Bali was caused by waste clogging the drainage system, damaging bridge and building infrastructure and claiming 18 lives (Riezko, 2025). Various problems have arisen due to suboptimal waste management and a lack of public awareness regarding environmental issues.

Looking at the various phenomena occurring today, related to environmental awareness issues in the surrounding area. When many people, from children to adults, are indifferent to the environment, it will damage our environment (Saribaş & Çetinkaya, 2024). Efforts need to be made to provide environmental awareness education from an early age with the aim of developing individuals with better character who are accustomed to living cleanly and protecting their environment (Spínola, 2023). Training and providing an understanding of environmental awareness habits is one of the easiest solutions. This can be done from an early age by instilling character and the concept of caring for the environment in young children (Mousavi et al., 2024). Caring for the environment in children will have a positive impact on environmental sustainability and sensitivity. One way to instill a character of caring for the environment is by accustoming children to disposing of trash in its proper place (Sufia & Arisona, 2021). The small habits that they maintain will have a significant impact on the surrounding environment.

Character education in children greatly influences the habits they practice. In relation to the various issues above, it is necessary to have a character that cares for the environment, namely being religious in attitude and behavior in protecting the environment, honesty in behavior, tolerance in attitude and action, discipline in obeying rules, hard work, creativity in producing new innovations, independence in completing work, democracy in thinking and acting, a high level of curiosity, a spirit of nationalism, love for the homeland, and social awareness in protecting the surrounding environment so that it remains preserved and sustainable. Environmental awareness is an attitude or action to prevent damage to the surrounding environment and an effort to repair existing damage (Monachesi, 2023). Environmental awareness can be introduced by maintaining personal hygiene and the surrounding environment through the habit of living cleanly in everyday life (Karpouzis et al., 2025). Environmental care activities that can be done, apart from disposing of waste in its proper place, include maintaining personal hygiene (Tulung & Manoppo, 2022). Personal hygiene is practiced by teaching children to wash their hands before eating and after finishing activities. Environmental care character education can be taught by educators by introducing various types of waste to children (You et al., 2023).

Introducing various types of waste to children can be done through hands-on activities guided by educators. They are first introduced to organic and non-organic waste. Organic waste that can be decomposed includes leaves and food scraps. Non-organic waste, which is not easily decomposed, includes plastic waste and snack packaging (Bogusz et al., 2023). This introduction can increase their knowledge about the types of waste so that they can sort waste based on type (Lumenda & Cudera, 2025). Encourage children not only to learn about waste but also give them a simple understanding of the dangers of excessive waste (Dina et al., 2023).

The introduction of waste types is carried out to minimize the use of excess waste, often referred to as zero waste. Zero waste is a new step in waste management that has reached excess capacity (Sahin et al., 2022). Zero waste is also often known as recycling waste to prevent and reduce waste capacity (Bogusz et al., 2021). The principle of zero waste-based

waste management that is often introduced to children is 3R (Reduce, Reuse, and Recycle) (Wardi et al., 2024). Educators often teach children to reduce the use of goods, reuse them, and recycle waste into something useful (Sufia & Arisona, 2021).

Research has shown that educators have introduced the concept of zero waste to students (Bulut, 2020). Zamzam et al. (2023) explains that introducing the concept of zero waste can improve children's environmental awareness, making them more concerned about the waste around them, as demonstrated by their behavior of disposing of waste in its proper place. Tiara et al. (2023) explains that environmental awareness in early childhood can be improved by introducing various types of waste found in the environment. Activities carried out include introducing types of waste and how to sort waste according to type. The application of the zero waste concept has an effective impact on shaping cognitive awareness and fostering a sense of responsibility in children. Responsibility for themselves and their environment is carried out by maintaining cleanliness. In addition, it also forms the habit of reducing waste by accustoming children to bring lunch from home and forming good habits in protecting the environment by sorting waste around them.

Research conducted by Anindita & Wulandari (2023) explains that introducing the concept of zero waste and caring for the environment can be done through illustrated books that encourage children's awareness of healthy living. Illustrated books also help shape children's environmental awareness, as they encourage a spirit of learning and curiosity about the natural world. Illustrated media provide enjoyable and easy-to-understand information so that children will understand the consequences of waste, learn how to manage waste, and learn about activities related to waste. Research conducted by Rudiyanto explains that introducing types of waste can be done using the 3R principle (Reduce, Reuse, and Recycle), which can foster awareness of caring for the environment around the school. Applying the 3R principle helps introduce waste to children in a simple and easy-to-understand way. Activities that are easy to understand will help shape awareness in children to be more caring and maintain personal hygiene and cleanliness in the school environment (Rudiyanto et al., 2021).

The above explanations show that character education on environmental awareness can be carried out for early childhood through the introduction of zero waste. Introducing simple concepts that are easy to understand and direct practice can increase environmental awareness in children. This study focuses on educating children to care for and be aware of the environment through the introduction of zero waste management. This study also hopes to emphasize that instilling environmental awareness and caring character in individuals from an early age through the introduction of zero waste management will contribute to reducing the overflowing waste problem.

## **2. Methods**

### *2.1 Methods and data collection procedures*

The research was conducted using a qualitative approach with a case study method at ABA Ambarawa Kindergarten. The research was conducted over three days from October 14 to 16, 2025. The research involved one classroom teacher and all 15 students in class A as data sources. Data was collected through observation. Observations were made by observing the learning activities related to the introduction of zero waste management for early childhood conducted by educators. These activities ranged from an introduction to several practices related to zero waste management. Data was collected through interviews with teachers in class A regarding the learning practices that had been implemented, what had been taught related to the process of introduction to zero waste management for early childhood. Data collection activities were carried out through documentation during the activities to support the credibility of the research.

## 2.2 Data analysis and conclusion drawing

The data analysis process was carried out by reducing the data obtained by recording everything that happened when the learning related to the introduction to zero waste management was implemented. Raw data was obtained, followed by the presentation of data in the form of a descriptive narrative about important points in line with the research theme of character education that cares for the environment through the introduction of zero waste management to early childhood. The data presented will be verified or conclusions will be drawn from the research that has been carried out.

## 3. Results and Discussion

### 3.1 Introducing zero waste types of waste to children

Environmental awareness character education is carried out by first introducing the concept of waste to early childhood. This activity is conducted to facilitate educators in implementing environmental awareness character education, which is done by stimulating children's curiosity and applying communicative and friendly learning methods. Friendly and communicative learning activities help educators teach environmental awareness through two-way learning, making the lessons more interesting and less boring. Two-way or friendly communication with early childhood educators gives children the opportunity to ask questions and answer questions related to the types of waste explained by the educators. The introduction is carried out to provide a realistic picture of the types of waste that exist around children. This introduction is carried out by inviting children to touch, see, and look for the types of waste that have been introduced by the educator. Hands-on learning activities conducted outside the classroom provide a fun learning experience for early childhood. Introduce children to simple types of waste that are often found in the school environment and at home. Educators provide an overview of two types of waste, namely organic and inorganic. Educators provide clear and simple explanations related to organic waste, which is done through a question and answer process during the learning process: "Organic waste is waste that comes from nature, for example? Yes, leaves, twigs, banana peels, fruit peels and seeds. Inorganic waste is waste made by humans, for example? Beverage bottles, plastic waste, snack wrappers." The learning activity conducted using the question and answer method will encourage children to communicate in answering and asking questions related to the waste introduction activity that has been carried out. This activity indirectly helps instill an environmentally conscious character in a communicative way, thereby sparking children's curiosity to ask questions and learn more about the types of zero waste that have been introduced. Learning about the types of zero waste will make it easier for children to put waste in the appropriate place.

Introducing zero waste types of waste in a simple way to young children can have a positive impact on increasing their knowledge of their surroundings. Children who are open-minded and learn about new things will develop a strong curiosity to learn about other types of waste (Kalle et al., 2022). This introduction is carried out by inviting children to touch, see, and look for the types of waste that have been introduced by the educator. Direct learning activities conducted outside the classroom provide a fun learning experience for early childhood (Kuo et al., 2019). This introduction is used as a basis for children's knowledge about the waste around them. This activity is carried out by inviting children to interact directly in recognizing and sorting waste according to its type. Real experiences will increase children's curiosity about waste (Priyanti & Jhoni Warmansyah, 2021). Basic knowledge is important so that children can easily follow the learning activities that will be carried out. This introduction to types of waste helps to raise awareness of the surrounding environment. This activity of recognizing types of waste also develops children's ability to express their opinions by asking spontaneous questions that arise in their minds related to waste. This activity also has a positive impact in training children's courage in answering every question asked related to types of waste. Children who are familiar with the waste

around them become more concerned about the surrounding environment (Faridy & Rohendi, 2021).



Fig. 1. Understanding types of waste

Activities carried out by touching and recognizing types of waste will provide valuable learning experiences for early childhood. Recognition is carried out by providing a real picture of the types of waste around children. Meaningful learning experiences leave a lasting impression that will become a memory that is difficult for children to forget. Meaningful learning makes it easier for educators to teach and introduce good habits related to waste. Meaningful activities are easier to implement in everyday life. This will greatly help in applying healthy habits related to waste (Zamzam et al., 2023). Activities to learn about types of waste also develop children's ability to express their opinions by asking spontaneous questions that come to mind related to waste. These activities also have a positive impact in training children's courage in answering every question asked about types of waste. Children who are familiar with the waste around them become more concerned about the environment (Kuo et al., 2019). Learning about types of waste is the foundation for shaping an environmentally conscious character in early childhood. This is because they gain an understanding of the concept of identifying types of waste in their environment. This makes it easier to carry out follow-up activities in the process of learning about zero waste management.

### *3.2 Habit of disposing waste according to type*

Follow-up activities that educators can do after introducing the types of waste are to conduct hands-on activities and encourage children to dispose of waste in the appropriate bins according to type. Hands-on activities are useful for instilling environmental awareness in early childhood. This activity helps shape a disciplined character that cares for the environment by following the learning activities carried out by disposing of waste as demonstrated. Another character trait that cares for the environment is related to independence in completing the practical task of disposing of waste as instructed. A democratic character that cares for the environment is where children voluntarily work and follow the learning activities of disposing of waste in its proper place. Another environmental character trait is related to love for the country, where keeping the surroundings clean shows a great love for the country for the common good. Educators will first set an example by disposing of plastic waste in the trash bin on the left and leaf or organic waste on the right. Hands-on practice will make it easier for educators to explain to early childhood. The process of real and direct learning will be more easily absorbed by early childhood.

The habit of disposing of waste is part of educating children's character to care for the environment. The habits that exist in children show that learning has been successful

because children are consciously and accustomed to doing the activities that have been exemplified during learning and then practiced in their daily lives. The habit of disposing of waste in its proper place will lead to good habits in caring for the environment. Caring for the environment reflects children who love a healthy and clean life. Children who are accustomed to disposing of waste in its proper place will unconsciously always dispose of waste in its proper place (Karacaoğlu, 2024). Early childhood who are accustomed to clean behavior will have high sensitivity to the surrounding environment. The habit of disposing of waste in its proper place shapes children's character to be disciplined in following rules. Children who have developed a disciplined character will consciously obey the rules by disposing of waste in its proper place. The habit of disposing of trash according to its type in the designated place has been proven to increase environmental awareness in children.



Fig. 2. Understanding types of waste

The habit of disposing of trash in its proper place shapes children's character to be disciplined in following rules. Children who have developed a disciplined character will consciously obey the rules by disposing of trash in its proper place (Sufia & Arisona, 2021). Another character trait that is formed from the habit of disposing of waste in its proper place is that children become independent individuals in caring for the environment around them. This is demonstrated by them disposing of litter around them. They will pick up any litter they see and put it in the trash can. They will get used to disposing of waste in its proper place and always maintaining cleanliness around them. Awareness of protecting the environment is evidence of an increase in children's concern for their surroundings. They will encourage their friends to maintain cleanliness and get used to living cleanly (Devi et al., 2025). This is demonstrated by them picking up litter around them. They will pick up any trash they see and put it in the trash can. They feel comfortable when they see a clean environment and feel uncomfortable when they see a dirty environment (Rudiyanto et al., 2021). This habit will greatly help educators instill environmental awareness in early childhood education.

### *3.3 Introduction to making natural compost*

Activities carried out to introduce zero waste management to early childhood involve introducing and encouraging children to process organic waste into compost. This activity is carried out by first explaining to children how compost can be used to fertilize plants. Encourage children to participate in all processes involved in processing organic waste into compost. Give children the opportunity to process compost. The activity of introducing zero waste management to children helps shape an environmentally conscious character in early childhood. An environmentally conscious character is formed through tolerance when learning to process organic waste into fertilizer. This tolerance is practiced by respecting each other and taking turns in making compost. This activity also helps improve children's

social and emotional skills in managing emotions and being patient when there are differences or minor arguments. The environmentally conscious character that emerges when processing compost is discipline, as children will follow the rules given by educators regarding the procedures they must follow in composting activities.

Another environmentally conscious character that emerges when processing compost is hard work, as children will cooperate and work hard to follow the learning process to the fullest in order to process organic waste into compost. The environmentally conscious character that emerges when processing compost is independence. The activity of learning how to process organic waste into compost is carried out independently by mixing the organic waste in a designated area so that it is evenly mixed to become fertilizer. The environmentally conscious character that emerges when processing compost is democracy, in that children will often ask educators about how organic waste is processed into fertilizer. The environmentally conscious character that emerges when processing compost is curiosity, which is characterized by them continuing to ask questions about how organic waste is processed into compost. Then, they ask how it is done and what the fertilizer is used for. Activities that they have never encountered before will increase their curiosity, causing them to become more enthusiastic and focused on paying attention to how organic waste is processed into compost. When children are more focused on participating in activities, it is easier for them to accept information related to the process of managing organic waste into compost.

Introducing the process of producing compost will broaden children's knowledge about organic waste management. The new insights and knowledge they gain will spark their curiosity, prompting them to ask questions about how organic waste is processed into compost. They will want to know how it is done and what the compost is used for. Activities that they have never encountered before will increase their curiosity, causing them to become more enthusiastic and focused on the learning activities that are taking place. Children's developing insights will help improve their critical thinking skills and add to their knowledge at an early age (Balwan et al., 2022).



Fig. 3. Composting process

Introduction to the process of converting organic waste into compost. This activity is carried out to help develop a caring attitude towards the environment in children. Making compost is a new experience for them. Meaningful learning experiences leave a lasting impression and become memories that are difficult for children to forget. Meaningful learning makes it easier for educators to teach and introduce good habits related to waste. Meaningful activities are easier to implement in everyday life. This will greatly help in implementing healthy habits from waste (Halida et al., 2024). This will increase their interest in learning about other organic waste, and they will become more curious about what waste management can be done. The activity of processing compost fertilizer arouses curiosity in children, so that they will be more interested in participating in learning

activities by processing waste. The composting activity is used to plant their crops and care for the plants they have planted. This activity helps increase children's awareness of the natural environment (Palacios, 2023).

Activities that involve children in the composting process will be a meaningful experience for them. Children will work together and work hard to follow the learning process to the fullest to process organic waste into compost. The character trait of caring for the environment that emerges when processing compost is independence. The activity of learning how to process organic waste into compost is carried out independently by mixing the organic waste in a designated area so that it is evenly mixed to become fertilizer. This activity will help children plant and care for their own plants using the compost they produce (McLarnon, 2025). The more children plant, the more green plants there will be. The activity of introducing the processing of organic waste into compost helps educate children to care for the environment around them.

### *3.4 Recycling inorganic waste into learning media*

Inorganic waste or waste that is difficult to decompose can be managed by recycling it. This activity is carried out by creating something new from inorganic waste or plastic waste, cardboard into fun learning media. Plastic waste is utilized by creating various kinds of play media, such as making plastic bottle piggy banks, creating works of art from paper pulp, making fish aquariums, and recycled bottle bubble games. This activity increases children's interest in creating works according to their creativity. Recycling waste into various works and media is one way to instill environmental awareness in early childhood education. Fun activities will broaden their knowledge in creating works from waste. They are able to turn waste that was originally worthless into beautiful works of art. This activity trains children's ability to manage waste to become a work of art. The creations they apply are in accordance with the imagination of each child. This activity also trains children's independence in completing works or tasks given to them in processing plastic waste into a medium. They will think about how to process plastic waste into a medium. This activity also trains children's ability to work hard in completing the tasks given to them by educators. It trains their patience in following each process of media creation until they produce their own teaching media. This activity also increases and stimulates children's curiosity about what other media they can create and process into beautiful works of art. The activity of processing plastic waste into media opens up new perspectives for children and educators in managing plastic waste around them.

Recycling waste or reusing plastic waste greatly helps to reduce the amount of waste. Activities that utilize waste as media have a significant impact on the surrounding environment. Waste processing activities can reduce the quantity of waste in the surrounding area. This can be done by recycling it into various forms of media or by putting it in a waste bank to be resold. Plastic waste can be utilized in many ways, such as making pencil holders from used bottles or making yard fences from bottles filled with colorful water. This utilization greatly helps keep the surrounding environment cleaner and well-maintained (Sulistiyani, 2022). Children will become more loving and caring towards the surrounding environment. They will create something interesting and use it as teaching material instead of just throwing it away. Learning activities become more enjoyable when introduced with innovative learning media and materials that are easy to obtain. The activity of recycling waste into media increases children's intelligence in processing waste into a work of art. This activity helps increase creativity and adds to the desire to continue making something new and feeling the excitement of processing waste. The comfort and joy of the processing process maintain and instill an environmentally conscious character in early childhood (Nipriansyah et al., 2021). Children's imagination is also honed in producing works from plastic waste. They will make something interesting and use it as teaching material instead of just throwing it away. Learning activities become more enjoyable when introduced with innovative learning media and materials that are easy to obtain. Recycling waste into media increases children's intelligence in processing waste into works of art.

This activity helps increase creativity and adds to the desire to continue making something new and feel the excitement of processing waste. The comfort and joy of the processing process maintain and instill an environmentally conscious character in early childhood. Learning activities become more enjoyable for them to participate in with a variety of unique teaching media that attract the interest of early childhood in participating in learning activities (Anindita & Wulandari, 2023).

The activity of introducing plastic waste recycling into various teaching media and children's creative works. Managing plastic waste into various media helps increase creativity in early childhood. In this case, children find it easier to express their imagination, which is reflected in their works utilizing plastic waste. This activity helps children to develop the courage to produce works according to their wishes (Wahyuningsih et al., 2020). Children's imagination is also honed in producing works from plastic waste. They will make something interesting and useful as teaching materials instead of just throwing it away. Learning activities become more enjoyable when introduced with innovative learning media and materials that are easy to obtain. Recycling waste into media increases children's intelligence in processing waste into works of art. This activity helps increase creativity and adds to the desire to continue making new things and feel the excitement of processing waste. Recycling waste into media can reduce the amount of plastic waste around schools and homes. This activity helps educators increase children's awareness of the natural environment (James et al., 2022).



Fig. 4 (a) Paper pulp artwork; (b) Straw piggy bank; (c) Bottle bubbles; (d) Bottle aquarium

Recycling is a new innovation that can be used to create inexpensive, effective learning media that is popular with young children. Waste recycling activities add to the learning

media that support more meaningful and interesting learning activities. Inviting children to make teaching materials will create a fun and memorable learning experience in the lives of early childhood. Making teaching materials together with children will help them process plastic waste at home into works of art. The works created vary, ranging from bottle aquariums, pencil holders, flower pots, and bottle flowers. Recycling activities also increase creativity in early childhood to express their imagination in the form of a work of art. This activity also helps early childhood to dare to try to produce works according to their creativity and express themselves in a work of art ((Kuswati & Mulyono, 2023). Thus, recycling activities not only have an impact on the environment but also on the cognitive abilities of early childhood.

The research findings presented above regarding environmental awareness character education through the introduction of zero waste management for early childhood education produced several findings, namely by first introducing the types of zero waste, both organic and inorganic. The introduction was carried out to provide a real picture of the types of waste around children. This introductory activity was carried out by inviting children to touch, see, and look for the types of waste that had been introduced by the educator. Direct learning activities where children interact with waste to recognize its types will make it easier for them to understand the learning material provided. Another activity involves inviting children to look for waste around them according to the types of waste that have been taught to them by educators. Direct practical learning activities conducted outside the classroom provide an enjoyable learning experience for early childhood. Meaningful learning experiences will also make it easier for them to implement or practice what has been taught by educators.

Introduce children to simple types of waste that are often found in the school environment and at home. This introduction is used as a basis for children's knowledge about the waste around them. This activity is carried out by inviting children to interact directly in recognizing and sorting waste according to its type. Real experiences will increase children's curiosity about waste (Priyanti & Jhoni Warmansyah, 2021). Basic knowledge is important so that children can easily follow the learning activities that will be carried out. Introducing types of waste helps to raise awareness of the surrounding environment. This activity of recognizing types of waste also develops children's ability to express their opinions by asking spontaneous questions that arise in their minds regarding waste. The various spontaneous questions that children ask are a sign that they are beginning to understand the process of identifying the types of waste around them. This activity also has a positive impact in training children to be brave in answering questions about types of waste. Children who are familiar with the waste around them become more concerned about the environment (Faridy & Rohendi, 2021).

Environmental awareness character education can be introduced to children by teaching them to dispose of waste in the appropriate place according to its type. Teaching children to dispose of waste according to its type in the designated place has been proven to increase environmental awareness in children. The habit of disposing of waste in its proper place shapes children's character to be disciplined in following rules. Discipline in children is an achievement of environmental awareness character education for early childhood. Children who are disciplined in disposing of waste in its proper place and disciplined in protecting the environment prove that the process of educating children to build environmental awareness through waste is successful. This is in line with the results of research by Sufia and Arisona, which found that the habit of disposing of waste and children's disciplined attitude in protecting the environment can increase their awareness of the environment around them. Children who have developed a disciplined character will consciously obey the rules by disposing of waste in its proper place (Sufia & Arisona, 2021).

Another character trait that is formed from the habit of disposing of waste in its proper place is that children become independent individuals in caring for the surrounding environment. Children are accustomed to washing their hands before eating, and when they have finished eating their lunch and there is some food waste such as fruit peels or chicken bones, they will dispose of it in the organic waste bin. Children's independent attitude in

protecting the environment by getting used to disposing of waste according to its type shows that environmental character education in children can be developed by introducing them to the types of waste and getting them used to disposing of waste in its proper place. This is also reinforced by research from Devi et al. related to developing environmental awareness in children, which can be done by accustoming children to independently dispose of waste according to its type. This is demonstrated by them disposing of litter around them. They will pick up the litter they see and put it in the trash can. They will get used to disposing of waste in its proper place and always maintaining cleanliness around them. Environmental awareness is evidence of an increase in children's concern for their surroundings. They will encourage their friends to maintain cleanliness and get used to living cleanly (Devi et al., 2025).

Character education that promotes environmental awareness in young children is carried out through introducing them to the process of converting organic waste into compost. This activity is carried out to help improve children's environmental awareness. Making compost is a new experience for them. Meaningful learning experiences leave a lasting impression and become memories that children will never forget. Meaningful learning makes it easier for educators to teach and introduce good habits related to waste. Meaningful activities are easier to implement in everyday life. This will greatly help in applying healthy habits related to waste (Halida et al., 2024).

Introducing composting activities to early childhood will attract children's attention and interest in learning. This will increase their interest in learning about other organic waste, and they will become more curious about what other waste management activities can be done. Composting activities spark curiosity in children, making them more interested in participating in learning activities involving waste management. A high level of curiosity makes it easier for children to absorb and participate in learning activities, which become more enjoyable and easier for them to understand. Activities that they have never encountered before will increase their curiosity, causing them to become more enthusiastic and focused on paying attention to how organic waste is processed into compost. When children are more focused on participating in activities, it becomes easier for them to accept information related to the process of managing organic waste into compost. The compost-making activity is used to plant their plants and care for the plants they have planted (Palacios, 2023). This activity helps increase children's awareness of the natural environment.

Environmental character education for early childhood can be implemented by encouraging children to recycle plastic waste around them. The recycling process can be carried out by introducing plastic waste management into various teaching materials and creating works according to children's creativity. Processing plastic waste into various media helps foster creativity in early childhood. In this case, children more easily express their imagination, which is expressed in works utilizing plastic waste. This activity helps children develop the courage to produce works according to their desires (Wahyuningsih et al., 2020). Children's imaginative abilities are also honed when producing works from plastic waste. They will create something interesting and can be used as teaching materials rather than simply throwing it away. Learning activities become more enjoyable when introduced to innovative learning media and the materials used are easily accessible. The activity of recycling waste into media increases children's intelligence in transforming waste into works of art. This activity helps foster creativity and increases the desire to continue creating something new and experience the pleasant sensation of processing waste. The comfort and pleasure of the processing process maintain and instill an environmentally conscious character in early childhood. Learning activities become more enjoyable with a variety of unique and engaging teaching media that engage young children (Anindita & Wulandari, 2023).

Recycling waste into media can reduce the amount of plastic waste around schools and at home. Inviting children to create teaching materials creates a fun and memorable learning experience for young children. Creating teaching materials with children helps children process plastic waste around the house into creative works. These creations range

from bottle aquariums and pencil cases to flower pots and bottle flowers. Recycling activities also enhance creativity in young children, allowing them to unleash their imaginations through creative works. These activities also encourage young children to dare to create works according to their creativity and express themselves through them. These fun activities broaden their horizons in creating works of art from waste. They are able to transform a work of art from previously worthless waste into a beautiful work. This activity trains children's ability to manage waste into a work of art. The creations they implement are based on their individual imaginations. This activity also trains children's independence in completing assigned projects or assignments involving processing plastic waste into a medium. They will brainstorm ways to process plastic waste into a medium. This activity helps educators foster children's awareness of the environment (James et al., 2022).

#### **4. Conclusions**

Character education of caring for the surrounding environment can be carried out by educators through the introduction of zero waste management to early childhood. Educational activities have been carried out to instill a character of caring for the environment, namely by introducing the types of waste to early childhood from organic and inorganic waste, providing the habit of disposing of waste in its place through direct practice in activities, introducing and teaching the management of organic waste into compost by involving children directly in the learning process and the use of recycled plastic waste as a learning medium and creative work of early childhood that encourages children to care for the environment. The activities that have been carried out have produced several characters of caring for the environment from discipline, hard work, love of the homeland, creativity, independence and train curiosity in children to know more about managing zero waste. The activities that have been carried out are expected to be able to instill and become a habit of loving the surrounding environment. Starting from a young age, they are accustomed to living healthily and cleanly, so they will keep the environment well maintained.

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#### **Author Contribution**

The author was responsible for developing the study concept, designing the methodology, analyzing and interpreting the data, drafting and revising the manuscript, ensuring intellectual content accuracy, and approving the final version for publication.

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Not available.

#### **Informed Consent Statement**

Written informed consent was obtained from the parents or legal guardians of all children included in the figures for participation and publication of identifiable images in this study.

#### **Data Availability Statement**

Not available.

## Conflicts of Interest

The author declares no conflict of interest.

## Declaration of Generative AI Use

During the preparation of this work, the author used OpenAI's ChatGPT and Grammarly to assist in improving grammar, clarity, and academic tone of the manuscript. After using this tool, the author reviewed and edited the content as needed and took full responsibility for the content of the publication.

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