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Utilizing Waste Materials as Art Learning Media in Early Childhood Education

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Abstract

This study examines the use of diverse media and gaming technologies to provide tangible learning experiences in early childhood education, focusing specifically on learning media made from residual waste. The use of residual waste as a learning medium is grounded in its accessibility in children's everyday environments and its potential to teach recycling and waste reduction. Adopting a qualitative research method with a descriptive approach, this study aims to describe the use of residual waste as a medium for early childhood art learning. The research was conducted at TK Negeri 6 Yogyakarta with 15 participants comprising the principal, teachers, and group B2 children. Data were collected through observation, documentation, and interviews, and were analyzed using the Miles and Huberman model, which involves data reduction, data display, and conclusion drawing or verification. The findings show that the use of residual waste as a learning medium is organized into three stages: implementation, planning, and evaluation. The use of residual waste has proven to be effective in art learning for young children because, through such learning media, children are free to create according to their own creativity and imagination.

Keywords: Art Learning; Learning Media; Residual Waste; Early Childhood Education; Qualitative Descriptive Research

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INTRODUCTION

Environmental pollution is a very dangerous issue at this time. One of the causes of environmental pollution is the surge in the amount of waste in the world that can pollute the soil, air, and water. Quoted from the lcdi-indonesia.id website, economic growth, changes in lifestyle, and consumption patterns of the community have resulted in mountains of waste at landfill sites. Based on waste data from six cities/districts in the project area at the end of 2021, the rate of waste accumulation ranged from 0.5 to 1.2 kg per person per day. This is almost the same as metropolitan cities in Japan, which have a waste accumulation rate of 0.92 kg per person per day, and cities in Singapore, which reach 1.2 kg per person per day. In addition, in this fast-paced and instant era, the amount of plastic waste accumulation has also increased. Based on data from the Ministry of Environment and Forestry (KLHK), plastic waste accumulation rose by 6% from 11% in 2010 to 17% in 2021. Meanwhile, the Ministry of National Development Planning (Bappenas) found that the dominant composition of waste consists of food waste (48 percent), plastic (16 percent), and garden waste (13 percent), as obtained from various surveys conducted in six cities/districts within the project area (Komunikasi LCDI, 2023).

Indonesia is the second largest contributor of plastic waste in the world after China. According to CNN Indonesia, the Ministry of Environment and Forestry (KLHK) said that the total national waste reached 68.5 million tons. Of that amount, 17 percent, or around 11.6 million tons, was contributed by plastic waste in 2021. This is due to changes in lifestyle and consumption patterns among people who want everything to be practical (Fatmawati et al., 2022). Not only plastic waste is harmful, but also paper, cardboard, fabric, eggshells, wood, plastic, seeds, and motorcycle tires (K5PBB), which are easily found around our homes and are simply thrown away without any use.

The issue of waste management remains a major challenge for Indonesia. Research conducted by Sustainable Waste Indonesia (SWI) reveals that 24 percent of waste in Indonesia is still unmanaged. This means that of the approximately 65 million tons of waste produced in Indonesia every day, around 15 million tons pollute the ecosystem and environment because they are not handled. Meanwhile, 7 percent of waste is recycled and 69 percent ends up in landfills. The report also shows that the most common type of waste produced is organic waste (60 percent), followed by plastic waste (14 percent), paper waste (9 percent), metal waste (4.3 percent), and glass, wood, and other materials (12.7 percent)

(CNN Indonesia, 2018). This is certainly very worrying because it can cause global warming and have an impact on public health. Therefore, efforts to manage and reduce waste are necessary.

The Environmental Protection and Management Law of 2009 No. 32 states that environmental protection and management are systematic and integrated efforts undertaken to preserve environmental functions and prevent pollution and/or environmental damage, including planning, utilization, control, maintenance, supervision, and law enforcement. All forms of initiatives to promote responsible behavior are important, but strong support from all parts of society, especially the government, is crucial. Government intervention is needed to bring about major changes. That is why Indonesia's National Strategic Policy on Waste Management and Reduction, as stated in Indonesian Presidential Regulation No. 97/2017, is something that should be welcomed. To make this program a success, help from the community is needed to achieve it.

Developments in early childhood learning approaches emphasize the importance of concrete, play-based, and exploration-based learning experiences. Learning activities that give children the opportunity to manipulate real materials increase children's engagement, cognitive development, and social-emotional skills. Previous research shows that play-based learning and constructivist learning environments are effective in promoting engagement and holistic development in early childhood (Bubikova-moan et al., 2019). On the other hand, environmental and character education issues encourage the use of environmentally friendly local resources as learning media. Waste materials (e.g., cardboard, plastic, natural fibers, wood chips, corn cobs) are easily found in children's environments and can be processed into inexpensive, safe, and contextual learning media. Empirical studies in Indonesia have observed the use of various types of waste as learning media in early childhood education and reported increases in creativity, fine motor skills, and environmental awareness in children (Hamama et al., 2025; Irvan et al., 2024; Royani & Tjahyaningsih, 2025).

Schools and teachers as educational institutions certainly play an important role in disseminating knowledge to ensure the success of the Indonesia Zero Waste 2025 program. One of the efforts that schools, especially teachers, can make to support this government program is to use waste or unused trash as teaching materials. Waste Materials can be used to make interesting items such as key chains, photo frames, pencil holders and book

holders, necklaces, bracelets, rings, wall decorations, brooches, and so on. This allows household waste to be used as a medium for learning art, where children can freely create and use their imagination. In addition to practical and environmental aspects, the use of waste as an art medium is also in line with the objectives of art education in early childhood education: to stimulate imagination, creative expression, and manipulative skills through arts and crafts activities. Descriptive qualitative research in the context of early childhood education shows that waste-based media can provide space for children to experiment freely, develop original ideas, and understand the principles of recycling and waste reduction from an early age (Santika et al., 2024).

Artistic activities are activities that will never be separated from early childhood activities. Early childhood learns through art. Something created by humans that is used to express inner experiences, which are then presented beautifully so that they can stimulate inner experiences in other humans who appreciate them, can be called art. Art is beneficial for the growth and development of early childhood, helping aesthetic development, helping to improve life, accelerating physical, mental, and aesthetic growth, stimulating creative imagination, providing inspiration for problem solving and personality development (Guslinda & Kurnia, 2018). Through dance, music, performing arts, or visual arts activities, art education allows children or students to give birth to their imagination, pour out their emotions, or express themselves in an aesthetic atmosphere (Sari & Wirman, 2020).

Early childhood art serves as a means for children to communicate their feelings, ideas, thoughts, and concepts. Their creations serve as a means of communication and a tool for imaginative play and expression of ideas. Through continuous activities and stimulation, such as printing activities, these children can learn and improve their artistic abilities (Citrowati & Mayar, 2019). Creating art is often associated with learning about art because learning about art can trigger the development of the creator's original ideas (Winnuly & Pamungkas, 2022). Therefore, appropriate learning media are needed to help develop art in early childhood.

Learning media is an important element in the teaching and learning process. The use of learning media can further increase the effectiveness of the teaching and learning process. Learning media is a tool used in educational activities to convey information to students with the hope of stimulating their interest in the content of the learning material (Rusydiyah, 2020). Every preschool child has unique experiences based on the situations

they encounter. These differences can be overcome through learning media. If it is not possible to bring young children to the object being studied directly, the object is instead introduced to them (Dewi, 2017). Real objects are preferred for early childhood learning media because they can be held, seen, touched, heard, and even smelled. These attributes are necessary for early childhood learning media. Early childhood learning materials play an important role in the development of young children because they help them move to the concrete thinking stage (Fidesrinur et al., 2022). In line with this, in order to make learning more interesting and enjoyable, every teacher must be able to use various media and materials available in the classroom and in the children nearest environment.

Teachers are expected to create interesting lessons that will attract students' attention and ensure that the lessons are well received and not repetitive. Residual waste is one of the items that should be utilized because, in addition to being a material that is close to children, the use of residual waste can also help reduce environmental pollution. Nurhafizah, (2018) states that "residual materials" are materials that come from unused products and can be recycled into new products. Examples of such materials include used paper, used magazines, newspapers, cardboard, scrap fabric, used plastic, cans, styrofoam, foam, rope, bottle caps, straws, ice cream spoons, plastic bottles, fruit baskets, and scrap rubber. Children's sensitivity, talent, and creativity can be developed by bringing them from abstract experiences to real experiences using unused materials as a medium for early childhood learning.

Based on initial observations and reflections conducted at a kindergarten, it was found that in teaching children's art development, teachers encouraged children to create various works using household waste materials such as plastic bottles, paper, fruit wrappers, bottle caps, ice cream sticks, and straws. Based on the results of the initial observations and background information, the researcher was interested in conducting further research to find out the planning, implementation, and evaluation carried out by educators in relation to the development of the arts. Although several studies have documented the practice of waste utilization in early childhood education, further research is needed to describe in detail the stages of planning, implementation, and evaluation of waste use as a medium for arts education in the context of specific formal institutions. Using a descriptive qualitative approach, this study aims to describe the implementation process (planning–implementation–evaluation) at State Kindergarten 6 in Yogyakarta. The results are expected to provide practical recommendations for early childhood education

teachers to develop sustainable and contextual art media. Therefore, the researcher chose the title "Utilizing Waste Materials as Art Learning Media in Early Childhood Education."

METHODS

This research is qualitative in nature with a descriptive approach. Descriptive research is defined as a form of research conducted to describe phenomena that occur, both natural and man-made (Winarni, 2018). The purpose of this research is to describe the use of waste as a learning medium for early childhood art. The design used was a single case study, which allowed for an in-depth exploration of the planning and implementation of learning at State Kindergarten 6 in Yogyakarta. Informants were selected using purposive sampling according to the needs of qualitative research, consisting of one principal, one teacher, and fifteen children from group B2 as subjects directly involved in waste-based art learning activities. The data collection techniques used were observation, interviews, and documentation. The data collection instruments in this study were the researchers themselves, with the help of interview guidelines and observation sheets. The data analysis technique used in this study was the Miles and Huberman model, which began with data reduction, data display, and finally conclusion drawing or verification (Sugiyono, 2018).

RESULTS

Result 1 Brief description of the research location

State Kindergarten 6 Yogyakarta is a kindergarten that was recently inaugurated by the Mayor of Yogyakarta, Drs. H. Haryadi Suyuti, on July 13, 2020. This was confirmed by the Yogyakarta Mayor's Decree Number 342 of 2020 concerning the Establishment of State Kindergarten 6 Yogyakarta, which was issued on June 25, 2020.

Before becoming State Kindergarten 6 Yogyakarta, this kindergarten was called Taman Kanak -Kanak Dharma Rini, better known as TK Teladan SPG Negeri 2, established in 1951 on a 1,167 m^2 plot of land with a building area of 428 m^2, and began operations on January 2, 1951, located at Jalan Kusbini No. 31, Klitren Village, Gondokusuman District, Yogyakarta City. Initially, this kindergarten was a pilot kindergarten as well as a teaching practice facility for students of SPG Negeri 2 Yogyakarta,

under the name TK Latihan SPG N 2 Pengok. In 1991, with the end of SPG N 2, the name of this kindergarten was changed to Taman Kanak-kanak Dharma Rini under the Dharma Wanita Foundation of the DIY Provincial Education and Culture Office. During its operation, Dharma Rini Kindergarten has achieved numerous accomplishments. It has won many championships, such as the City-level UKS Championship, and its students have excelled in competitions like drum corps, song and dance, dance, folding, and other creative contests.

State Kindergarten 6 Yogyakarta has a fairly large yard with shade trees and is equipped with various playground equipment such as swings, slides, balance beams, climbing frames, globes, seesaws, balance beams, seesaws, and a swimming pool. State Kindergarten 6 Yogyakarta has facilities including an office for the principal, 4 classrooms, a staff room, a health room, a library, a playroom, a prayer room, an auditorium, a kitchen, and 5 bathrooms. The surrounding environment is quite supportive despite being located within the city. Its geographical location south of JL. Kusbini is the main road leading to Jalan Solo and is close to the PT KAI Yasa Hall.

Result 2 Planning Stage

Based on observations, interviews, and documentation review, it was found that the planning of creative arts learning using leftover materials at TK Negeri 6 Yogyakarta has been systematically structured in the institution's curriculum. All activity plans have been listed in the curriculum document based on the Independent Curriculum, which is currently being implemented because Yogyakarta State Kindergarten 6 is one of the educational units implementing the School Mover Program. The results of the document analysis indicate that the use of leftover materials is designed not only as a supporting medium for fine arts learning, but also as a strategy to instill the value of environmental sustainability from an early age.

Interviews with teachers revealed that utilizing waste is part of the Pancasila Student Profile Strengthening Project (P5) for early childhood, with the overarching theme "I Love the Earth." In planning the project, teachers consciously selected activities that enabled children to engage in the exploration process, sorting, utilizing, and processing various waste materials into works of art. This approach is expected to foster creativity, environmental awareness, and problem-solving skills in children. Meanwhile, learning observations revealed that the curriculum planning has been consistently implemented, as

evidenced by the readiness of media, the development of activity steps, and the integration of the Pancasila Student Profile values into the learning process. Overall, these findings indicate that Yogyakarta State Kindergarten 6 has designed a structured, waste-based art creativity lesson plan that is relevant to the principles of the Independent Curriculum and aligned with the objectives of the "I Love the Earth" project.

Result 3 Implementation Stage

Based on the results of observation and analysis of planning documents, it is known that the implementation of creativity-based art learning using waste materials at State Kindergarten 6 Yogyakarta has been carried out in accordance with the Annual Program, Semester Program, Weekly Program Implementation Plan (RPPM), and Daily Program Implementation Plan (RPPH). Teachers consistently carried out all the steps listed in these documents, from the opening to closing activities. The implementation of learning was then divided into three main stages, namely the introduction stage, the exploration stage, and the closing stage.

In the initial stage, teachers introduce basic concepts about waste to children. Teachers explain the meaning of waste and introduce various types of waste, including organic waste, inorganic waste, hazardous and toxic waste (B3), and paper waste. At this stage, teachers also convey the negative impacts that can occur when the environment is filled with waste, such as pollution, unpleasant odors, or disruption to the beauty of children's play environments. The introduction process is carried out through questions and answer methods, interactive conversations, and singing activities to create a fun and easy-to-understand atmosphere for early childhood. Based on the observation results, the children appear to be actively involved, answering the teacher's questions and sharing their experiences about the types of waste they often encounter around their homes.

The exploration stage is the core of the learning process. The teacher first introduces the prepared waste materials, such as plastic bottles, bottle caps, used paper, straws, and ice cream sticks. The teacher explains that these materials can be recycled into interesting and useful works of art. After that, the teacher gives the children the freedom to choose the materials they want to use and encourages them to explore according to their creativity. The children look enthusiastic as they touch, choose, and try to combine various materials. This exploration process provides space for children to experiment, develop their imagination, and build confidence in creating works of art.



Figure 1 Children making creation using waste materials

Observations showed that the children were excited and enjoyed this activity. Their active involvement was influenced by the familiarity of the waste materials in their daily lives, so they felt comfortable and did not hesitate to use them as a medium for their work. The teacher accompanied the children during the process of creating their work by providing light stimulation, such as giving additional ideas without reducing the children's original creativity.

In the final stage, the teacher conducts a reflection activity with the children. The teacher reviews the children's understanding of the concept of waste, its types, and the benefits of recycling waste materials into works of art. Next, the children are given the opportunity to display the works they have created. They show their work in front of their friends and talk about their experiences during the creative process, including the difficulties they encountered and the ideas they used. This closing activity provides a platform for children to practice their communication skills, build confidence, and feel pride in the work they have produced. The teacher then gives positive reinforcement and appreciation to all children as a form of recognition for their creativity and efforts.

Result 4 Evaluation Stage

Based on observations, interviews, and documentation analysis, it was discovered that evaluation activities are a crucial component in implementing fine arts learning based on waste materials at Yogyakarta State Kindergarten 6. Evaluation is conducted continuously throughout the learning process, allowing teachers to monitor the development of children's abilities in producing works of art independently. In practice, educators assess children's abilities through various indicators, such as their ability to select materials, how to process waste materials into works of art, and their level of creativity and independence during the creative process. To ensure that each child receives appropriate learning support, teachers conduct process evaluations through direct observation. These

observations are conducted to identify children who need special assistance, for example in using tools, understanding instructions, or expressing their creative ideas. Observation findings are then recorded using various assessment instruments used by teachers, including checklists, anecdotal notes, portfolios, and documentation of children's work. The use of portfolios and anecdotal notes helps teachers gain a holistic picture of children's development, not only from the final product but also from the creative process.

The children's work is then documented, and some is given home as a form of communication between the children and their parents. This process not only strengthens the relationship between the school and parents but also provides an opportunity for parents to appreciate the development of their children's creativity at home. Based on an analysis of all evaluation data, it appears that using waste materials as a learning medium is an effective choice for developing early childhood art creativity. Teachers reported that children demonstrated high levels of enthusiasm throughout the activity, demonstrated by their dedication to selecting materials, exploring, and expressing their imaginations. These findings demonstrate that waste-based media can provide children with ample space for exploration while fostering environmentally conscious behavior.

DISCUSSION

The results of the study show that the planning, implementation, and evaluation of creativity-based art learning using waste materials at State Kindergarten 6 in Yogyakarta have been carried out systematically in accordance with the principles of the Merdeka Curriculum and the strengthening of the Pancasila Student Profile (P5). These findings are in line with the view that well-designed learning in early childhood education must include careful planning, flexible implementation, and continuous evaluation that assesses both the process and the results of children's work (Jatmiko et al., 2020). It has been stated that early childhood teachers must be creative and strive to enhance children's creativity, as well as support children's creativity with various materials, methods, and techniques in the learning process so that the curriculum can be implemented in accordance with its objectives. It can be said that teachers have acted appropriately in terms of creativity when planning and implementing the curriculum (Dere, 2019).

One of the reasons why teacher chose to use waste materials as media in learning art for children is because waste material are materials which are very easy to find and used.

we can find it anywhere so it is a very easy to use too for kids because they can creat many things with waste materials. This is in line with Putri (2020) that objects that can be recycled into useful materials include waste or used materials. Because they are easy to obtain, they make it easy for children to apply them to a work of art and teach children to channel their ideas and thoughts. Effective learning media will make it easier for educators to provide teaching materials and learning materials for early childhood (Darihastining et al., 2021). Using waste materials to teach artistic creativity is an effective method.

The use of waste materials as a medium for art education is very appropriate because by using waste materials, children can be creative according to their wishes so that their creative skills can develop. From the results of the study, it can also be seen that when waste materials are used, children seem enthusiastic about exploring the waste materials provided by the teacher. This can help increase children's creativity, according to the results of research by (Winnuly & Pamungkas, 2022), which states that the use of waste is very effective in developing the creativity of early childhood because, apart from being economical and easily available, waste can also attract children's interest so that they become enthusiastic about learning. A similar finding was also reported in the research by Putri, (2020), which stated that the use of waste materials as media for the development of children's creativity can help increase children's creativity, enable children to become more creative, and stimulate ideas and imagination in children. Recycling waste can be turned into fun and practical items for children. Recycling waste can also be used to make various kinds of children's objects. The use of this waste can also increase children's creativity, protect the environment, and give them the experience of processing or recycling waste into items that can be used to create various imaginative and unique works of art (Fadhila & Rakimahwati, 2020).

Children can freely explore and use their imagination when creating things from waste materials. The use of waste materials as a learning medium does not require specific instructions or techniques, so children can use them independently. This is in line with the opinion of (Aguirre & López-Ruiz, 2024), who say that working with waste materials, because they are cheap and readily available, provides the perfect opportunity to engage in any artistic activity freely, without fear of making mistakes or failing. Having materials like this often helps reduce anxiety associated with artistic activities because, since they are not bound by specific technical knowledge, those who use them are more likely to tolerate potential frustration. For all these reasons, the use of waste materials as a medium allows

the creative process to transcend the academic realm and become an activity in which exploration and play play a central role.

The use of waste in learning not only aims to develop creativity, but also instills the value of environmental sustainability from an early age. This is in line with the objectives of the Pancasila Student Profile Strengthening Project with the theme "I Love the Earth." Learning that trains children to sort, process, and reuse waste materials can become the foundation of environmental literacy in early childhood. This is reinforced by Davis,(2015), who states that sustainable education needs to be instilled from an early age through real and empirical experiences involving the surrounding environment.

In addition to developing art in early childhood, the use of waste as a learning medium can also help improve fine motor skills in early childhood. This is because assembling waste into a work of art involves movements such as cutting, tearing, breaking, and sticking. These movements can help stimulate the motor development of early childhood. This is in line with the results of research by Nurani et al. (2019), which states that used materials as learning media affect the fine motor skills of early childhood.

CONCLUSION

Providing appropriate stimulation in early childhood requires the use of learning media that are both effective and contextually relevant. This study underscores that learning media made from waste materials constitute an appropriate and effective option for early childhood learning. Waste materials are economical and readily available in children's everyday environments, and their use as media for teaching art has proven to be suitable for children, helping them to develop their creativity and imagination.

Collectively, these findings highlight a dual contribution. Pedagogically, waste-based learning media offer tangible, engaging stimuli that support children's creative and imaginative development in art learning. Practically, the use of waste as learning media reinforces early awareness of recycling and waste reduction, thereby contributing to the realization of the Indonesian government's 2025 zero waste program.

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