

Green School-Based Early Childhood Education: A Case Study at Kindergarten in Palembang

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Abstract

This study investigates the implementation of green school-based learning in early childhood education at a kindergarten in Palembang, focusing on identifying its supportive and inhibitive factors and exploring solutions to these challenges. Using a qualitative case study approach, data were collected through interviews, observations, and documentation. The findings reveal that gardening, waste management, and plant cultivation significantly enhance children's environmental awareness and responsibility. Key supportive factors include adequate facilities and enthusiastic participation from students and teachers. The program demonstrates the potential to foster sustainable behaviors, environmental ethics, and personal responsibility among young learners. This research emphasizes the importance of integrating nature-based learning into early childhood curricula to cultivate eco-conscious attitudes and sustainable practices from a young age.

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INTRODUCTION

Research consistently emphasizes the importance of introducing children to nature early on. Early exposure to nature fosters environmental awareness, promotes sustainable behaviors, and supports overall child development ([Intishar et al., 2020](#); [Lamanauskas, 2023](#)). Nature-based education programs have increased children's knowledge of environmental issues, improved environmental ethics, and enhanced their desire to protect nature ([Mohamed et al., 2022](#)).

One approach that is now gaining attention is the implementation of nature-based learning, such as 'Green School' activities. This approach integrates environment-based education and character building by involving children directly in interactions with nature. Green School is not just about a physically green environment but also includes programs designed to increase children's environmental awareness and involvement in preserving the environment. Through activities such as farming, children are taught to understand the importance of protecting the environment, learn through direct experience, and develop a sense of responsibility towards nature.

A case study at Palembang Nature Kindergarten provides a concrete illustration of how Green School is implemented. The school's 'Greenlab' program involves children planting and caring for plants, such as kale vegetables, which are then harvested and processed into healthy food such as kale pizza. This activity provides a fun learning experience and strengthens young children's social skills, teamwork, and environmental awareness.

Various previous studies support that nature-based learning significantly contributes to children's character-building. Mukaromah emphasizes that this approach is effective in building environmental awareness in early childhood ([Mukaromah, 2020](#)). Zahroh found that the Green School program helped develop overall character education ([Zahroh, 2021](#)). However, this study will focus on implementing Green School learning at the ECD level, highlighting how this approach can foster early environmental awareness and support preserving the school environment.

In another study, Oktamarina in 2021 conducted research on improving the character of environmental care from an early age through green school activities ([Oktamarina, 2021](#)). The study states that green school-based childhood learning is an educational activity to maintain, maintain, build, and realize the preservation of the school environment. The fundamental difference between previous research and this research is the focus of the research studied. Previous research focused on nature-based learning in shaping early childhood character, while this activity focuses on nature in shaping early childhood character. This study focuses on the implementation of Green School-based early childhood learning.

While previous studies have examined the role of green school programs in fostering environmental awareness, limited research focuses on their implementation in urban early childhood education settings in Indonesia. This study addresses this gap by exploring the practical applications and outcomes of green school-based learning at Alam Kindergarten in Palembang.

This research aims to analyze the implementation of Green School-based learning in early childhood, particularly in Palembang nature kindergarten. The researcher hopes that the findings can provide insights for ECD educators on the importance of nature-based learning in instilling environmental awareness while shaping the character of children responsible for the

environment. Thus, the results of this study are expected to be a reference for curriculum development and ECD learning practices in Indonesia.

METHOD

This research is descriptive qualitative, a type of case study research. The qualitative descriptive method produces findings that cannot be achieved using statistical procedures or other ways of quantification (measurement). The data sources of this research include informants involving the Head of the Palembang Nature Kindergarten, two classroom teachers, and three parents. The participants were selected through a purposive sampling technique.

To complement other data needs, researchers collected research journals that had been conducted previously that were relevant to the issue of green school-based early childhood education. Data collection was conducted from September 2023 to January 2024. The data collection techniques chosen were observation, interviews, and documentation. Then, the research data will be analyzed using techniques adapted to the Miles, Huberman, and Saldana model, namely data reduction, data presentation, and conclusions. To obtain data validity, researchers used triangulation techniques, namely types of source triangulation and technical triangulation.

RESULT

Based on data collected by researchers, some results show that the implementation of green school-based early childhood learning includes several aspects, namely protecting the school environment, maintaining the school environment, building clean and environmentally friendly schools, and realizing the preservation of the school environment. A more detailed explanation of the findings of this study is presented as follows:

1. Environmental Awareness and Responsibility

One of the efforts to realize environmental awareness and responsibility in children is to teach them to take care of the school environment. Among other things, cleaning the environment involves throwing garbage in its place or picking up garbage. The results of the interview with the principal explained related to this:

“The children were very enthusiastic when given the task of working on the worksheet the teacher gave. The tasks aim to make children accustomed to keeping the environment clean and maintaining plants at school. For example, by picking up dry leaves scattered around the plants. This activity is hoped to increase children's love for the school environment.”

Related to this, Mrs. Dona Emiliano, one of the class teachers, when interviewed on 21 February 2024, explained:

“One of the program's objectives to increase environmental awareness and responsibility in early childhood is to keep the school environment clean so that children can feel safe and comfortable while learning in the school environment. Although not directly related to children's learning outcomes, a clean school environment will allow children to learn comfortably and happily and will ultimately positively impact children's development. Usually, the tasks given tend to be simple, but they can impact changing their attitudes and understanding, such as picking up dry leaves around plants in the garden, cutting and removing damaged leaves, and so on.”

In addition to the tasks mentioned above, children are also trained to regularly water the plants in the school garden. This is an exercise to instil a responsible attitude in students towards the living things around them.

Delivered by the class teacher usually provides reinforcement such as: 'Children, if we are proud when we take care of ourselves, then we should also be proud in taking care of the plants around us because they are living things that need to eat and drink, just like humans. They need to be watered and fertilized to grow healthy.'

The schoolyard has a garden of vegetables, flowers, and other plants. Each pot and poly bag has a name and type of plant so that children can learn about various plants and herbs. Every day the children look after the garden together. The children are also taught how to trim stalks or leaves that grow to interfere with other plants or wither. They also learned to recognize the types of pests in plants and to uproot parasitic plants. 'These pests also act as barriers for plants to grow optimally. Therefore, if it is not removed while there is a pest, the plant will eventually die,' said the teacher.

The results of the interviews were reinforced by the results of field observations, which showed that children were actively involved in activities to protect the school environment, clean and dispose of garbage in its place, and care for the surrounding environment. They did not hesitate to pick up the rubbish scattered around the classroom and dispose of it in the nearest rubbish bin.

2. Building a Sustainable and Green Environment

One way to teach children about sustainability and a green environment is through a plant planting program. That is as conveyed by one of the teachers as follows:

"Children are also very enthusiastic when told to do planting activities. We usually provide seeds that are ready for planting. They plant various things, from vegetables, trees, and other types of plants. The sideyard of our school is designed to be semi-open so that children can explore various things related to nature, especially plants and herbs. As a medium for planting, pots are provided from old tyres that are no longer used. The used tyres were obtained from student parents' collection of unused materials."

Then, the results of the research and interviews were strengthened by field observations showing children taking action to plant seeds around the yard. Each plant is named after the name of the learner. Each child must take care of the planted seeds until they grow up. The teacher hopes that by teaching them to take care of plants, namely watering them every day and fertilizing them regularly and repeatedly, a habit will slowly form in the children. Here is what one of the other teachers said:

"In addition to being involved in plant growing activities, they are required to water the plants every morning before entering class. Each child can use any tool to fetch water. Then, each pours it over the plant parts and soil. It is always done together every day", thus she said.

Equally important is the maintenance of the school's green zone. The school's appearance is ecologically organised to create a safe and supportive learning environment for all students and teachers. Greenery is planted in almost every corner of the school. The plants are usually flowers. The media used is also relatively simple, such as by utilising used bottles and plastic cups. The media was also obtained from collecting unused materials at home involving students and parents.

The arrangement of the school with a variety of green plants also adds to the beautiful and calm impression. To maintain each green corner, the teacher always reminds the children to take care of the ornamental plants around the classroom and not to damage them.

3. Positive Impact on Learning and Health

What is equally important to cultivate in this kindergarten is the implementation of a healthy lifestyle from an early age in children. One form of this is by not allowing children to bring food wrapped in plastic to school. This is not only to avoid the accumulation of plastic waste, but also to campaign for a healthier way of life in children.

Parents only bring food from home that is placed in an environmentally friendly food box. Parents can use banana leaves or other types of leaves if they cannot afford the relatively expensive eco-friendly food containers. It was revealed from an interview with one of the student guardians on 25 June 2024 as follows:

“To support the school program, I usually provide my children with food that I cook at home. But I don't wrap them in plastic wrap but in eco-friendly food storage. Food utensils are also brought from home to be washed by the children at school. That way, our children can play a role in reducing plastic waste and can support the creation of a clean and environmentally friendly school.”

Children are also always taught to be disciplined in washing their hands thoroughly after every activity and before eating. It is to maintain a clean and healthy lifestyle from an early age. The teachers believe that maintaining cleanliness can support the maintenance of health. Moreover, by maintaining health, children can learn well and calmly. According to teachers, maintaining cleanliness has a wide range of positive impacts, from the health and comfort of children, teachers, and staff to improving academic performance.

4. Implementing Green Lab

Based on the results of observations and interviews on 7 September 2023, a special program called 'Green Lab' was implemented. Green Lab is a program supported by special facilities for growing various vegetables. The facility is intended to cultivate certain plants according to the theme of the material taught at school. Sometimes, children are taught to cultivate kale, cucumber, etc.

Through the use of the green lab, children are asked to learn to work together in teams. The challenge is from planting seeds, nurturing, to harvesting the crops. Each team must be able to complete the challenge well. The success of the team is seen by how well the process is followed until the final result is obtained, namely harvesting.

Based on continuous observation, we found that the success of the program varied. Each team performed differently.

The highlight was during the harvesting period. Some children managed to harvest the kale vegetables that they planted themselves. Then, the harvested kale vegetables were processed together into various unique food preparations. One of them is kale pizza. The children finally enjoyed the kale pizza made by the children and the teacher together.

According to an interview with one of the teachers, this green lab activity can introduce children to the various flavors of the plants they grow. The children also find it fun and exciting when they can harvest the vegetables they have grown in their garden. The teacher can also tell the children about

the benefits of kale and answer any questions the children may have about the vegetable.

Based on the results of interviews with teachers, one inhibiting factor from implementing green school activities is that some children tend to be more spoiled or have tantrums during the activity. In addition, there are also conditions where children find it difficult to concentrate because green lab activities usually take place outside the building.

In addition, the use of part of the yard around the school building for the green lab and vegetable garden has reduced the outdoor play area. Previously, the area was part of the schoolyard used for playing outside the classroom. The weather is also sometimes changeable, which often causes plant growth to fail. As a result, it takes time for children to repeat the process from the beginning and replant damaged or rotten plants.

Nevertheless, the principal expressed optimism that the green school program positively impacts children's character-building from an early age. She also hopes that this activity can be continued despite some shortcomings. Here is what she said:

"The nature school curriculum is good and useful. We hope that the implementation of this green school can be sustainably run to instill the character of environmental love in children from an early age. In addition, the benefits that can be felt are the realization of more independent children and life skills from an early age, so that they can survive in the future and help preserve nature."

DISCUSSION

1) Enhancing environmental awareness

The kindergarten "green school" program emphasizes fostering environmental awareness and responsibility in children through practical, hands-on activities. This is relevant to what Casmana et al. identified in their 2022 research, which mentioned green school practices in a village in West Java ([Casmana et al., 2023](#)).

The study emphasizes teaching children the importance of caring for their immediate environment. Tasks like picking up garbage, cleaning dry leaves, and watering plants are integral to helping children develop a sense of duty toward their environment. On the other hand, activities such as picking up garbage, watering plants, and maintaining greenery are employed as practical lessons in responsibility and stewardship. As Ruck et al. said, conservation activities on school grounds can enable forms of collective thinking with the more-than-human world that transcend a narrow 'stewardship' perspective ([Ruck & Mannion, 2021](#)).

Regarding this, Sena et al. reported an environmental field day organized for middle school students from an urban school in Kentucky. The students participated in three activities: extracting insects from leaf packs, assessing water quality, and planting trees. Following these activities, they completed a short survey created and administered by their teachers. As a result, students rated the tree planting activity higher than the other two activities, indicating that this activity was more accessible and engaging ([Sena et al., 2023](#)).

Several other studies have shown that school gardens, planting activities, and interaction with natural elements positively correlate with children's preservation attitudes and eco-friendly actions ([Liu & Chen, 2021](#)).

It has even been suggested that empathy for nature positively correlates with pro-environmental attitudes in preschoolers ([Li et al., 2023](#)).

Childhood outdoor experiences and school exposure to green spaces enhance children's attitudes toward environmental preservation and promote eco-friendly actions. Outdoor environmental education programs incorporating contact with nature have positively influenced students' well-being, sense of connectedness to nature, and pro-social behaviors ([Pirchio et al., 2021](#)).

Environmental awareness and action contribute to students' educational and personal development. Caring for the environment, such as picking up dry leaves and watering plants, can instill habits of care and responsibility ([Medina, 2023](#)).

Collado et al. expressed a slightly different opinion. Their research stated that a nature-based environmental education program increased children's environmental attitudes but not their environmental behaviors. However, the program improved children's environmental attitudes by 6-9% compared to traditional teaching methods ([Collado et al., 2020](#)). It showed that additional strategies are needed to translate these attitudes into consistent environmental behaviors.

Gardening-based learning programs increase awareness of proper nutrition and environment, higher learning outcomes, and increase student life skills. Gardens serve as valuable learning environments across different educational levels, fostering meaningful science education, especially in plant knowledge and a deeper connection to nature ([Eugenio-Gozalbo et al., 2020](#)). Experience gained in the garden encourages environmental literacy and management skills and improves awareness of the connection between plants and our clothes, food, lifestyle, and sense of well-being ([Gradinščak et al., 2021](#)).

Furthermore, the use of labeled gardens with a variety of plants not only enriches children's ecological knowledge but also strengthens their connection to nature. Gardens with labeled plants provide a tactile and visual learning experience for children to recognize plant species and their needs. These practices aim to nurture a deep-rooted love for the environment, building eco-conscious habits early on.

2) Promoting a healthier and more sustainable lifestyle

Recent research highlights the importance of promoting sustainability in early childhood education. One of the activities carried out to promote sustainability at the kindergarten is the implementation of the 3Rs (reduce, reuse, recycle). The green lab activity includes utilizing materials around the school that they think are no longer usable to be more helpful. Therefore, children learn to recognize discarded materials that are no longer used to be reused as planting media.

Cultivating environmental education in early childhood through 3R (reduce, reuse, recycle) activities can foster environmental care attitudes ([Sufia & Arisona, 2021](#)). In addition, implementing the 3R (reduce, reuse, recycle) approach in early childhood education can help build environmental literacy ([Hartanti & Wardhana, 2023](#)).

In addition to applying the 3Rs, children also learn to recognize the types of organic and non-organic waste. Teachers and parents support implementing an environmentally friendly culture by preventing the accumulation of non-organic waste, namely plastic waste. The parents

directed the children not to bring plastic-wrapped food to school, instead using eco-friendly materials.

Parents, teachers, and children's knowledge, attitudes, and practices regarding plastic use and disposal are interconnected, and parents play a key role in shaping children's environmental behavior ([Salazar et al., 2022](#)). That shows how important it is for home and school environments to work together to promote sustainable behavior in children.

3) Challenges in Implementation

One of the challenges in implementing the green school program is to ensure that the teachers remain committed to assisting children in developing the insight of loving a clean, natural, and green environment at school. Teachers are at the forefront of the green school policy to cultivate environmental awareness in early childhood education institutions.

Teachers play a crucial role by reinforcing these values, drawing comparisons between self-care and caring for plants, and encouraging empathy for living things. The teacher's strategy in instilling the character of environmental care in students not only involves implementing environmentally sound policies but also providing motivation, creating conducive learning conditions, and providing positive direction to change students' perceptions and behavior towards the environment ([Khasana et al., 2023](#)).

According to Gilal et al., the transfer of environmental responsibility from teachers to students through emotional contagion is more effective when the teacher demonstrates a strong commitment to environmental issues than when their level of concern is low ([Gilal et al., 2020](#)). Therefore, teachers must genuinely embody the values and attitudes they wish to instill in students.

One of the other challenges is the absence of a standardized curriculum in which environmental and natural awareness is applied holistically. In a study, Waluyo also recognized this, stating that early childhood education programs in Indonesia do not yet have an environmentally friendly curriculum standard for training prospective early childhood education teachers ([Waluyo & Kardoyo, 2020](#)).

CONCLUSION

This study demonstrates the successful implementation of green school-based early childhood education at Palembang Nature Kindergarten, highlighting its effectiveness in fostering environmental awareness and responsibility among young learners. By integrating hands-on activities such as gardening, waste management, and plant cultivation into the curriculum, children developed a deeper connection to their environment and an appreciation for sustainability.

Key findings reveal that supportive factors, including adequate facilities and engaged participants, play a critical role in program success. However, weather constraints and limited outdoor space require adaptive strategies. Despite these challenges, the green school program has proven beneficial in nurturing children's environmental ethics, instilling responsibility, and enhancing their overall development.

This research underscores the importance of embedding environmental education within early childhood curricula to promote sustainable behavior from a young age. Future research should explore scalable models of green

school initiatives in diverse contexts, addressing urban and resource-limited settings.

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