



Green Generation: Building Environmentally Caring Characters Early Childhood Through Green School Programs

Fatnia Amanda^{1✉}, Sudaryanti²

Early Childhood Education Study Program, Faculty of Education, Yogyakarta State University^(1,2)

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✉ Corresponding author:

[\[fatniaamanda.2023@student.uny.ac.id\]](mailto:fatniaamanda.2023@student.uny.ac.id)

Article Info

Abstract

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Environmental awareness in childhood is a fundamental aspect in developing awareness, responsibility, and sustainable habits towards environmental conservation from an early age. This study aims to test the effectiveness of the Green School program on the environmental awareness of children aged 5–6 years. This study used an ex post facto quantitative design with a sample of 142 children from kindergartens in Blang Mangat District, selected through a purposive sampling technique. The research instrument was validated through content validity and showed a high reliability coefficient of 0.892. Data were analyzed using an independent sample t-test to compare children's environmental awareness based on the duration of the Green School program. The analysis showed a significant difference in environmental awareness between children who participated in the Green School program for 5 years and 3 years ($t(142) = 5.57$; $p < 0.001$; Cohen's $d = 0.932$). These findings indicate that the Green School program effectively contributes to strengthening the environmental awareness of early childhood children and has important implications for the development of policies and practices for early childhood education oriented towards environmental sustainability.

1. INTRODUCTION

Education is an effort to develop abilities and potential as well as important assets in shaping the quality of the future generation of Indonesia. The educational pathway consists of formal, non-formal, and informal education. Early childhood education is a development effort aimed at children from birth to the age of six years which is carried out through the provision of educational stimulation to help physical and spiritual growth and development so that children have readiness to enter further education. (Depdiknas, 2003) The meaning of education is interpreted as a conscious and planned effort to create a learning atmosphere and learning process, so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble character and skills needed by themselves, society, nation and state.

Early childhood development is the first, most important, and most significant development in a child's life. During this period, children are taught to stimulate their growth and development, or what we know as the child's developmental aspects. Child development aspects are divided into several areas, namely religious and moral values, socio-emotional values, cognitive values, language values, physical motor skills, and finally, artistic values, as Khaironi (Masykuroh & Fajriah, 2023) points out. By stimulating these six developmental aspects, it is hoped

that children can grow and develop optimally, improve their life skills, and be able to adapt to the community in the future. Furthermore, there is also the most important education in the child's learning process for future provisions, namely character education.

This approach emphasizes that character formation is an integral part of the educational process, focusing not only on mastering academic knowledge but also on developing a child's moral, ethical, and personality aspects (Karim Parapat, 2023). Character education, instilled in children from an early age, is not solely provided by teachers in educational institutions; parents, as primary role models for their children, must also provide positive character examples. This habituation and role modelling form the foundation for subsequent positive personal development (Devianti et al., 2020). In the Early Childhood Character Education guidelines issued by the Ministry of Education and Culture (Kemendikbud, 2017), it is explained that in early childhood education, character values that are considered very important to be introduced and internalized into their behavior include: (1) religious, (2) honest, (3) tolerance, (4) discipline, (5) hard work, (6) creative, (7) independent, (8) democratic, (9) curiosity, (10) national spirit, (11) love of the homeland, (12) respect for achievement, (13) friendly or communicative, (14) love of peace, (15) love of reading, (16) care for the environment, (17) care for society, and (18) responsibility.

Environmentally caring character refers to an integrated set of values, attitudes, and habitual behaviors that reflect an individual's awareness, responsibility, and commitment to protecting, maintaining, and sustaining the natural environment. In early childhood education, this character is not conceptualized merely as cognitive knowledge about the environment, but as a moral-social disposition that is internalized through continuous experiences, habituation, and role modeling (Ismail M. Jen, 2021). It is manifested through simple yet meaningful daily behaviors, such as disposing of waste properly, conserving water and energy, caring for plants and animals, and maintaining personal and environmental cleanliness. These behaviors represent the early formation of ecological ethics that serve as a foundation for sustainable behavior across the lifespan (Ardianti & Amalia, 2022). In line with this, Purwanti in (Damayanti, 2020) emphasized that instilling a caring character for the environment from an early age plays an important role in shaping children's attitudes, morals, and sustainable behavior, as well as fostering a sense of responsibility for environmental sustainability throughout their lives.

The development of environmentally caring character during early childhood plays a crucial role in children's holistic development, encompassing moral, social-emotional, cognitive, and behavioral domains. Early internalization of environmental values contributes to the development of responsibility, independence, empathy, self-regulation, and problem-solving skills (Nabila et al., 2023). Children who are consistently engaged in environmentally responsible practices tend to demonstrate higher levels of pro-social behavior, autonomy in daily tasks, and sensitivity toward their surroundings. Furthermore, environmental character education equips children with essential life skills that support their readiness to participate actively in society and respond adaptively to future global challenges, particularly those related to sustainability and environmental degradation (Iswantiningtyas et al., 2024).

Despite its recognized importance, empirical evidence indicates that environmentally caring character among young children remains relatively underdeveloped. Several studies report that children frequently exhibit environmentally irresponsible behaviors, including littering, excessive use of water, neglect of plants and animals, and low awareness of cleanliness and sustainability practices (Kholida Munasti, 2020). These conditions suggest that environmental values have not yet been effectively internalized in children's daily lives (Kota et al., 2021). These conditions indicate a substantial gap between the expected outcomes of environmental character education and its actual implementation in early childhood settings. Such challenges are exacerbated by structural and contextual factors, including limited availability of environmental learning facilities, insufficient teacher competence in implementing active, contextual, and experiential learning strategies, as well as weak parental involvement in reinforcing environmental values at home (Direktorat Pembinaan PAUD, 2015). From an ecological perspective, Bronfenbrenner's theory emphasizes that children's character development is influenced by interactions across multiple environments school, family, and community indicating that the lack of synergy among these systems hinders optimal character formation (Mulyasa E, 2013). These persistent issues highlight the urgent need for educational approaches that systematically and sustainably cultivate environmental care from an early age (Bronfenbrenner Urie, 1979).

One educational approach that has gained increasing attention in addressing these challenges is the Green School program. The Green School concept is designed to integrate environmental values into school culture, curriculum implementation, daily routines, and the physical learning environment. Rather than positioning environmental education as a separate subject, Green School embeds sustainability principles into children's everyday experiences, enabling them to learn through direct interaction with their surroundings. Previous studies indicate that Green School initiatives can positively influence children's environmental attitudes and behaviors through consistent habituation and experiential learning activities such as gardening, waste management, recycling, composting, and nature-based exploration (Oktamarina, 2021). However, the effectiveness of such programs is highly dependent on the consistency of implementation, the quality of teacher facilitation, and the active involvement of parents and the broader school community.

Green School is defined as an educational program that emphasizes the creation of a safe, healthy, environmentally friendly, and sustainable school ecosystem while systematically integrating environmental education into the curriculum and daily practices (Menteri Negara Lingkungan Hidup, 2009). One of its key advantages lies in its experiential learning orientation, which allows children to construct knowledge and values through real-life environmental practices. This approach aligns with constructivist learning theory, where children actively build understanding through meaningful interactions with their environment. Through Green School programs, children are encouraged to develop independence, responsibility, and environmental ethics organically, without coercion, as these values emerge naturally from repeated engagement in authentic environmental activities (Mulyasa, 2020).

Nevertheless, a critical review of existing literature reveals several research gaps. Environmental problems have become increasingly complex and urgent to address from early childhood; however, in practice, many children still demonstrate apathetic attitudes toward the environment. This apathy is reflected in behaviors such as littering, damaging plants, exploiting animals, and neglecting environmental cleanliness (Kholida Munasti, 2020). Such indifferent attitudes are not only found among children but also among adults, indicating that the lack of habituation and environmental education from an early age remains a major contributing factor (Kota et al., 2021). In addition, parental involvement in environmental character education is often limited, despite the need for strong synergy between family and school environments to optimally support children's development (Bronfenbrenner Urie, 1979).

Most studies on Green School programs predominantly focus on environmental awareness or attitude outcomes, while giving limited attention to other important developmental aspects, particularly children's independence as a character trait closely linked to environmental responsibility (Aulia et al., 2021). Additionally, few studies have comprehensively examined the role of supporting factors such as the adequacy of learning facilities, teacher competence in environmental pedagogy, and parental involvement in determining the effectiveness of Green School implementation. Moreover, comparative and context-specific empirical studies in early childhood education settings especially in local and rural contexts such as Blang Mangat District remain scarce. This limitation restricts the generalizability and contextual relevance of existing findings (Febiyana et al., 2024; Iswantiningtyas et al., 2024).

Unlike previous studies that predominantly examined environmental attitudes, this study offers a novel contribution by integrating children's independence as a key outcome and empirically examining the mediating roles of learning facilities, teacher practices, and parental involvement within a local early childhood education context. Therefore, the novelty of this research lies in its integrative and context-specific approach to examining the Green School program as a strategy for developing environmentally caring character in early childhood. This study not only analyzes environmental care outcomes but also simultaneously investigates children's independence and the contribution of key supporting factors, including school facilities, educator competence, and parental involvement (Tümer & Kaya, 2023). By providing empirical evidence from a local early childhood education context, this research extends existing theoretical frameworks and offers practical insights for the implementation of environmentally oriented character education.

Based on these considerations, this study aims to investigate the effectiveness of the Green School program in developing environmentally caring character in early childhood. Specifically, it seeks to analyze the influence of Green School implementation on children's environmental care character, while examining the mediating roles of learning facilities, teacher practices, and parental involvement. The findings of this study are expected to contribute to the development of evidence-based strategies for early childhood education institutions in fostering a generation that is environmentally responsible, independent, and oriented toward sustainable living from an early age.

This study aims to explore the implementation of the Green School Program in fostering environmentally caring character among early childhood learners. Early childhood is a critical and foundational phase in human growth and development, as children's potential develops rapidly during this period (Nurhayati, 2020). Considering the various issues and empirical evidence highlighted above, examining the effectiveness of the Green School Program is crucial to determine the extent to which the program, which has been implemented for 3 to 5 years, has successfully achieved its objectives in enhancing children's environmental awareness, responsibility, and environmentally responsible behaviors. This study is expected to provide a comprehensive overview and serve as a basis for evaluation and improvement of early childhood education policies and practices in the Blang Mangat area as well as in other regions facing similar environmental education challenges.

2. METHODS

This study uses a quantitative approach with the ex-post facto method. The ex-post facto method is used to analyze the causal relationship between variables based on events that have occurred, without manipulation of the independent variable. This approach was chosen because the green school program has been implemented in several early childhood education institutions for years, so researchers cannot manipulate the independent

variable. Through this approach, researchers aim to objectively test the effect of the green school program on environmental awareness of children aged 5-6 years based on conditions in the field. The data collected in this study are quantitative data, obtained from questionnaires filled out by kindergarten teachers in Blang Mangat District, Lhokseumawe City (Creswell, 2012). The data consists of one main variable: (1) children's environmental awareness. The sampling technique uses purposive sampling with the following criteria (Sugiyono, 2012): 1) children enrolled in kindergarten institutions that have implemented the green school program. 2) children have participated in the green school program for at least 3 years and 5 years. 3) Children aged 5-6 years at the time of entering kindergarten. The sample was divided into two groups based on the length of participation in the green school program (3 years and 5 years). These variables were measured using a standardized instrument developed in accordance with the characteristics of early childhood development.

The research instrument used in this study was a closed questionnaire consisting of statements related to children's environmental awareness. Each item was rated on a four-point Likert scale, with the following response options: strongly agree (4), agree (3), disagree (2), and strongly disagree (1) (Sugiyono, 2018). The questionnaire was structured based on aspects relevant to the observed variables and had been tested for validity and reliability before data collection. The instrument used in this study was developed based on theoretical and empirical foundations relevant to early childhood development, specifically focusing on children's environmental awareness. The instrument for measuring environmental awareness was adapted from the theoretical framework proposed by (Permendikbud tahun 2014 nomor 146), which emphasizes autonomy as a developmental task in early childhood, and was further modified by (Lidwina et al., 2015). This instrument consists of indicators that reflect important dimensions of environmental care, including the ability to Maintain environmental cleanliness, the ability to Save energy, the ability to Care for surrounding plants, the ability to Help clean the surrounding environment, the ability to Use recycled materials in art activities and the ability to Recognize the consequences of environmentally damaging behavior. These indicators are formulated to comprehensively capture the behavioral and emotional aspects of environmental care that emerge in children aged 5-6 years.

The data analysis technique used in this study is inferential statistical analysis through independent sample t-test. This analysis was conducted to determine whether there are significant differences in environmental care between children in institutions that have implemented the Green School Program for 5 years and institutions that have implemented it for 3 years. The data analysis technique used in this study is inferential statistical analysis through independent sample t-test (Priyatno Duwi, 2014). The data analysis process was carried out systematically with the following steps: (1) Data preparation, which includes checking the completeness of the data, coding questionnaire responses, and calculating the total score for each variable (environmental care) based on a Likert scale; (2) Assumption testing, including normality testing using the Kolmogorov-Smirnov Test to ensure normal data distribution ($p > 0.05$), homogeneity testing of variance using Levene's test to ensure equality of variance between the two groups ($p > 0.05$), and outlier checking using boxplots to avoid extreme data that could affect the results; (3) Implementation of independent t-tests, where data from the 5-year green school program group and the 3 year green school program group were compared for each variable, with a significance level of $\alpha = 0.05$; (4) Interpretation of results, which involved evaluating t-values, degrees of freedom (df), and p-values (Sig. 2-tailed) to determine the significance of differences, as well as calculating effect sizes using Cohen's d to measure the magnitude of practical differences between groups. This analysis was conducted using jamovi statistical software version 25, with output including tables of t-test results, means, and standard deviations for each group.

3. RESULT AND DISCUSSION

This section presents the findings from the data analysis regarding the differences in environmental caring character among early childhood children based on the duration of participation in the Green School program. The study compares two groups: children who have participated in the Green School program for 5 years and those who have participated for 3 years. The analysis was conducted using an Independent Samples T-Test to determine whether there is a significant difference between the two groups. In addition, the effect size was calculated to assess the strength of the influence of the observed difference. The complete results of the analysis are presented in Table 1.

Table 1. Independent T-test (Environmental Care)						
Independent Samples T-Test						
		Statistic	df	p	Effect Size	
Hasil	Student's t	5.57	142	<.001	Cohen's d	0.932
Note. $H_a \mu_{GS_PL_5 \text{ tahun}} \neq \mu_{GS_PL_3 \text{ tahun}}$						

This section reports the statistical findings regarding differences in environmental caring character among early childhood children based on the duration of participation in the Green School program. The dependent

variable examined in this study is explicitly defined as environmental caring character, operationalized through observable indicators such as proper waste disposal, water conservation, plant care, environmental cleanliness, and respect for living organisms. An Independent Samples T-Test was employed to compare environmental caring character scores between two groups: children who had participated in the Green School program for five years and those who had participated for three years. The analysis revealed a statistically significant difference between the two groups, with a t -value of 5.57, degrees of freedom (df) = 142, and a significance level of $p < .001$. The 5 year Green School program (GS_PL_5 Years) had an average environmental awareness score of 54.2, while the group that participated for 3 years (GS_PL_3 Years) had an average score of 45.4. Children who participated in the Green School program for five years demonstrated higher mean scores in environmental caring character compared to those who participated for three years. The magnitude of this difference was further confirmed by the effect size analysis. The Cohen's d value of 0.93 indicates a large effect, suggesting that the difference between the two groups is not only statistically significant but also practically meaningful. These results provide strong empirical evidence that longer participation in the Green School program substantially enhances the development of environmental caring character in early childhood.

The findings of this study demonstrate that longer participation in the Green School program significantly enhances the development of environmental caring character in early childhood. Children who were involved in the program for five years consistently exhibited stronger pro-environmental character traits compared to those with three years of participation. This result suggests that environmental character development is not an instantaneous outcome, but rather a gradual process that requires sustained exposure, repetition, and reinforcement. The Green School program is an effective effort in instilling environmental character education in early childhood. Through a series of hands-on activities, children are encouraged to learn how to dispose of trash properly, use water wisely, maintain cleanliness and environmental sustainability at school, recognize various medicinal plants, and appreciate and protect the surrounding vegetation (Riska et al., 2024).

From the perspective of habituation theory, these findings align with Thomas Lickona (2013) character education framework, which emphasizes that character is formed through continuous practice, consistent modeling, and long-term habituation. The Green School program integrates environmental values into daily routines through repetitive activities such as waste sorting, water-saving practices, maintaining environmental cleanliness, and caring for plants. Prolonged engagement in these structured activities allows children to internalize environmental values more deeply, transforming repeated behaviors into stable character traits.

In addition, the results are consistent with experiential learning theory proposed by David A. Kolb (1884), which posits that meaningful learning occurs through direct experience and reflective action. Within the Green School context, children are actively involved in hands-on environmental practices rather than passively receiving verbal instruction. Extended participation enables children to accumulate experiential knowledge, thereby strengthening both the cognitive and affective dimensions of environmental caring character. The longer children engage in experiential activities such as planting, cleaning school environments, and conserving water, the stronger their ecological understanding and sense of responsibility become.

Another important factor contributing to the effectiveness of long-term participation is teacher modeling. In early childhood education, teachers serve as primary role models whose behaviors significantly influence children's character formation. Sustained exposure to teachers who consistently demonstrate environmentally responsible behaviors such as proper waste disposal, efficient water use, and plant care reinforces observational learning and imitation (Iwasaki, 2022). Over time, this modeling process supports the transition from externally guided behaviors to internally regulated environmental character.

The observed statistical differences are closely reflected in the behavioral indicators assessed in this study. Children in the five-year participation group demonstrated greater consistency in independently disposing of waste, conserving water during daily routines, maintaining school cleanliness, and caring for plants (Tümer & Kaya, 2023). These findings indicate that longer program duration supports not only behavioral compliance but also the internalization of environmental values as part of children's character.

In terms of scholarly contribution, the novelty of this study lies in its comparative examination of Green School program duration in early childhood education, supported by a strong effect size. While previous studies have reported positive outcomes of environmental education programs, this study provides empirical evidence that program longevity significantly amplifies character development outcomes in early childhood contexts.

Despite its contributions, this study has certain limitations. Environmental caring character may also be influenced by external factors such as family practices, home environments, and community culture, which were not controlled in the present analysis. Future research is encouraged to incorporate these variables to obtain a more comprehensive understanding of environmental character development (Gary W. Evans et al., 2018).

Practically, the findings suggest that environmental education programs in early childhood settings should be designed as long-term, integrated initiatives rather than short-term or fragmented activities. Schools are encouraged to embed environmental values consistently within daily routines and pedagogical practices to ensure sustainable character development and long-lasting environmental awareness.

4. CONCLUSION

The research findings indicate that the Green School program is effective in supporting the development of environmental caring character in early childhood. Through routine activities such as disposing of waste properly, caring for plants, and practicing simple energy- and water-saving behaviors, children become more familiar with ecological values and begin to apply them in daily situations. These results show that the Green School program can be used as a relevant approach in early childhood character education, particularly in strengthening children's environmental awareness. The findings are expected to provide useful input for early childhood education institutions, parents, and policymakers in designing learning programs that integrate sustainability values from an early age. education institutions, parents, and policymakers in developing learning programs focused on sustainability values and empowerment from an early age, thus fostering a generation that is more caring, independent, and responsible toward the future of the environment and society.

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