

BUILDING ENVIRONMENTAL AWARENESS IN EARLY CHILDHOOD: LESSONS FROM SUSTAINABLE SCHOOL PRACTICES IN INDONESIA

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ABSTRACT

Pollution and climate change are mostly caused by human activities that do not consider the environment or implement sustainable approaches. Thus, being conscious of the environment is an important part of teaching children the way to act in a manner that is good for the environment from an early age. This study attempts to assess the extent of environmental knowledge, attitudes, and behaviors among students in primary schools in SDN Pati Kidul 01, Indonesia, which implemented the Adiwiyata School Program. This study utilized a mixed-method approach including an exploratory sequential design, incorporating field observations, questionnaires, and documentation of school activities. The findings demonstrate that Adiwiyata programs such as "Healthy Classroom, Healthy Student", "Green School", and "Friday Cleanup Day" play significant roles in fostering students' environmental awareness through habituation of caring attitudes, actual actions, and environmental issue knowledge. Even while the majority of students exhibited strong pro-environmental behavior, there were still some small conceptual gaps in their knowledge of environmental issues. These findings show that incorporating ecological education into the regular school day successfully fosters a sense of environmental responsibility, establishing the Adiwiyata Program as a strategic plan for producing a future generation that is environmentally conscious.

Keywords: *adiwiyata school; early childhood; ecological character; environmental awareness; environmental education*

INTRODUCTION

For several decades, environmental issues have dominated international discourse and become an important global issue (Franzen & Bahr, 2024; Putra et al., 2024). Excessive exploitation of natural resources



(Lisdiono, 2023), climate change (IPCC, 2023), and environmental degradation brought on by human activity resulting in ecological deterioration (Adelakun, L.L., & Jimoh, 2024) are some of the challenges that humans face. The conversion of forest area, rising carbon emissions (Kabir et al., 2023), and overuse of mining resources (Xiong, Guo, Nor, Song, & Dai, 2023) are some of the physical effects of the expanding human population on the environment. Furthermore, the ongoing population growth may be a factor in the degradation of clean water quality (du Plessis, 2022), land degradation (Adla, Dejan, Neira, & Dragana, 2022), and global warming (Sunil et al., 2023). Humans can be regarded as the principal contributors to environmental degradation (Sundas, Contreras, Mujahid, Beneyto, & Vehi, 2024).

One of the primary environmental issues Indonesia is facing is waste management (Sari et al., 2022). Global waste accumulation shows steady annual increase, posing a growing environmental risk (Herdiansyah, Saiya, Afkarina, & Indra, 2021). Waste management becomes a top priority, requiring immediate and efficient plans

for putting them into action (Simamora & Junuudhizbulloh, 2023). Individual conduct is a key factor in shaping the quality of the environment (Li, Zhao, Ma, Shao, & Zhang, 2019). Irresponsible environmental conduct may negatively impact the environment and have other bad effects, which shows a lack of awareness about the environment (Shien, Liu, & Li, 2022; Si, Jiang, & Meng, 2022).

Failure to address environmental issues appropriately will result in significant ecological damage in the future. Promoting environmental awareness among individuals is an essential key to attaining environmental sustainability and societal advancement (Elegbede, Sanni, & Iduseri, 2020). By encouraging environmental education from a young age, schools can raise awareness of environmental issues (Husin, Nengsih, & Helmi, 2025). Environmental awareness must be instilled in everyone from an early age through Environmental Education, which includes environmental issue awareness and conservation initiatives (Ramadhan, Sukma, & Indriyani, 2019). Early environmental habit formation can lead to major changes in later generations and



increased awareness of the environment (Jürkenbeck, Spiller, & Schulze, 2021). The significance of early environmental education as a basis for developing environmental caring attitudes and behaviors has been emphasized in earlier research (Ardoin & Bowers, 2020a). Children that participate in environmentally friendly activities from a young age exhibit significantly increased environmental awareness (Hosany, Hosany, & He, 2022). The Adiwiyata Program has been shown to improve primary school students' environmental knowledge, attitudes, and behaviors if it is implemented consistently (Sunarto, 2023). Additionally, students' environmental awareness and environmental knowledge are significantly correlated, although actual habituation is required for these attitudes to become consistent behaviors (Zheng, Xu, Kong, Deng, & Lin, 2018). Through the integration of environmental values into students' everyday activities, elementary schools can strategically develop environmental caring attitudes and habits (Maghfiroh, Harmanto, Simpol, Devi, & Tarmusi, 2024). Establishing environmental care attitudes in children can be achieved through teaching students to conserve

and protect the school environment (Ardoin & Bowers, 2020b). The Adiwiyata Program represents a comprehensive initiative aimed at fostering ecological literacy within society from an early age (Mutia, Irawan, Sumarmi, Meilitasari, & Prasad, 2025). Students are supposed to incorporate environmental awareness into their everyday life by cultivating it in the classroom (Wibowo, Sumarmi, Utaya, Bachri, & Kodama, 2023).

A preliminary study at SDN Pati Kidul 01 in Pati Regency indicated that, despite the regular implementation of the Adiwiyata program, a gap exists between students' comprehension of environmental issues and their actual engagement in environmentally sustainable practices in daily life. The research location, SDN Pati Kidul 01, possesses distinctive attributes as an educational institution that actively engages in the Adiwiyata program and integrates environmental practices into daily learning activities. The school's environments are important because they give us an actual representation of how student's awareness of the environment changes over time. This is connected to the fact that SDN Pati Kidul 01 often has problems with trash accumulation. Some



children were particularly aware of the environment, while others didn't fully understand why the activities were important. The theoretical foundation of this study is predicated on an environmental education paradigm that highlights schools as critical environments for cultivating environmentally friendly habits and sustainability principles (McGinn, 2014). Moreover, the pro-environmental behavior framework indicates that environmental awareness is a key cognitive factor affecting students' daily behaviors (Wibowo, Sumarmi, Putra, & Yunia, 2025). Therefore, the selection of the school context as the research location has strong scientific justification. The purpose of this study was to acquire an extensive understanding of the level of environmental awareness among young children attending the Adiwiyata primary schools.

The research gap in this study focuses on efforts to promote environmental awareness in children through the application of environmental actualization in the Adiwiyata school program. Investigating initiatives to foster environmental awareness in early life is essential for cultivating a future

generation that is environmentally aware, responsible, and equipped to address environmental issues. Prior studies have shown that the Adiwiyata program incorporates environmental ideals into the curriculum through environmental actualization methods. This study also intends to ascertain the efficacy of effective programs in enhancing students' environmental knowledge, attitudes, and behaviors. This research's results can help establish more effective and efficient models for teaching children about the environment in elementary school.

MATERIALS AND METHODS

1. Research Design

The present study utilized a survey methodology under a mixed-method study design (Creswell, J. W., & Creswell, 2017). Combining qualitative and quantitative research gives the results that are both accurate and reliable (Wallwey & Kajfez, 2023). Utilizing mixed methods in research helps mitigate the limitations of both quantitative and qualitative methodologies by offering more extensive evidence to address research issues (Dawadi, Shrestha, & Giri, 2021). Combining quantitative and qualitative



methods is becoming more common in several fields (Ahmed, Pereira, & Kimberly, 2023). The research employed an exploratory sequential design. In exploratory sequential design, there are two stages: the first part is qualitative, and the second part is quantitative. The initial stage of data presentation requires interpretation derived from literary sources. In the second phase, data verification occurs through the presentation and analysis of empirical data gathered from field observations.

2. Research Sample

The frequency of environmental problems in Pati Regency was taken into consideration when choosing the research location. Previous studies have demonstrated that flooding and related environmental issues are common in Pati Regency. According to preliminary findings, waste accumulation is a continuous environmental problem at SDN Pati Kidul 01. Additionally, the primary focus of this study was Adiwiyata schools. Furthermore, SDN Pati Kidul 01 was chosen as the main case study for this study, which was especially focused on Adiwiyata schools. The Ministry of Environment and Forestry of the Republic of Indonesia

has validated this school as an officially recognized Adiwiyata School in the Elementary Education category. Eighty fifth-grade kids, split into four classrooms (5A, 5B, 5C, and 5D), represented the study population. A sample of 57 students was chosen using a purposive sampling technique. An average learning outcome score of greater than 75 was used as the basis for the selection criteria since this group of students demonstrated consistent learning engagement. There were 20 students in one class, 15 in another, and 11 in two classes, for a total sample size of 57 students from four classes. Students' environmental knowledge, which affects environmental awareness, demonstrates the relationship between learning outcomes and environmental awareness. High environmental awareness will accompany high environmental understanding among students. Conversely, low environmental awareness will follow low environmental knowledge among students.

3. Data Collection and Analysis Techniques

Both qualitative and quantitative data were processed using Miles and



Huberman's interactive analysis approach (Miles, 2014). Data collecting, data reduction and presentation, verification, and conclusion drawing are the steps in an interactive method to data analysis. Interviews and observations of the Adiwiyata program were used to gather qualitative data. The principal and four fifth-grade teachers participated in the interview. The purpose of the interviews was to ascertain how the Adiwiyata program was being implemented at the school. In order to confirm the curriculum used at the Adiwiyata school, examinations were also conducted. Environmental awareness tools and questionnaires were used to gather quantitative research data. Respondents were measured using a Likert scale. Before being given to students, the questionnaire performed reliability testing and validation. Cronbach's alpha coefficient testing was used to evaluate reliability, while Pearson correlation analysis was used to evaluate validity (Sugiyono, 2019). A

multidisciplinary expert panel comprising five academics: one professor with forty years of experience in environmental science and education, one Ph.D. holder with five years of experience in environmental education, two master's degree holders with nine years of experience in geography and environmental education, and one master's degree holder with five years of experience in elementary education, verified the validity and reliability of the instrument. The instrument passes acceptable validity and reliability standards while the coefficient of correlation is 0.8 (Cheung, Cooper-Thomas, Lau, & Wang, 2024). Calculations based on percentages were used for assessing the level of environmental awareness (Sekaran & Bougie, 2013). The criteria of environmental awareness are shown in **Table 1**, and the data instrument indicators are shown in **Table 2** and **Table 3**.

Table 1. Criteria of environmental awareness

Score	Percentage	Description
7-12,25	25,00% - 43,75%	Very Low
12,26-17,5	43,79% - 62,50 %	Low
17,51-22,75	62,54% - 81,25%	High
22,76-28	81,29% - 100%	Very High

Source: Researcher Analysis, 2025



Table 2. Qualitative Instruments

Indicator	Questions
Adiwiyata program strategy	Q1. What is the school's strategy for integrating environmental stewardship into students' daily activities, and to what extent has the program been implemented consistently? Q2. When was the Adiwiyata program implemented at SDN Pati Kidul 01? Q3. What is the purpose of implementing the Adiwiyata program for students? Q4. How are teachers involved in planning and implementing environmental activities at school?
School Community Participation	Q5. What is the role of students in various environmental activities carried out at school? Q6. How is the participation of all school members including the principal, teachers, students, and educational staff in maintaining the sustainability of the Adiwiyata Program?

Source: Researcher Analysis, 2025

Table 3. Quantitative Instruments

Indicator	Statements
Environmental Issues Knowledge	I know that the use of fossil fuels exacerbates global warming. I understand the difference between organic and inorganic waste. I understand the negative impact of plastic waste on the ocean and marine life. I understand the importance of recycling as a waste reduction measure. I know that deforestation affects the global climate balance. I understand the link between air pollution and respiratory diseases. I know that an energy-efficient lifestyle can reduce my carbon footprint. I know that the use of fossil fuels exacerbates global warming. I understand the difference between organic and inorganic trash.
Pro-Environmental Attitude	I understand the negative impact of plastic waste on the ocean and marine life. I understand the importance of recycling as a waste reduction measure. I know that deforestation affects the global climate balance. I understand that polluted air can cause breathing problems. I know that living in a way that uses less energy can help the environment. I always throw away trash the right way. I turn off lights and electronic devices when not in use.
Environmental Behavior	I use enough water when bathing or washing. I bring my own water bottle to reduce plastic waste. I have participated in tree planting and environmental cleanup activities. I use environmentally friendly transportation whenever possible. I sort my trash at home before throwing it away.

Source: Researcher Analysis, 2025

RESULTS AND DISCUSSION

1. Efforts to Enhance Environmental Awareness in Early Childhood

The environment we live in continues to face significant challenges, especially in

the area of waste management (Salvia et al., 2021). The environment we live in continues to face significant challenges, especially in the area of waste management (Abusafieh & Razem,



2017). Individuals who lack awareness of how to preserve, manage, and protect the environment can cause environmental damage. Various environmental problems continue to occur worldwide (Sarikulov, 2024). Addressing environmental problems requires environmental awareness from every individual. This is consistent with prior research that highlights the necessity of enhancing environmental awareness to address the environmental issues faced on Earth, and it should begin with smaller communities, such as schools (Ali, Abduh, Mahmud, & Dunakhir, 2023) and households (Boermans, Jagoda, Lemiski, Wegener, & Krzywonos, 2024).

Implementation of environmental awareness in early childhood is essential. Previous research findings indicate that environmental awareness can be enhanced by implementing environmental education from an early age (Junaidah, Mahardika, & Ma`arif,

2025). Furthermore, environmental education can encourage sustainable and responsible lifestyles among individuals (Ve Kempini, 2025; Yembuu, 2017). Therefore, all school levels should instill environmental care attitudes in their students as part of environmental conservation efforts. This aligns with previous research stating that environmental care education is one of the 18 character traits formulated by the government, making it mandatory for every school (Saadah, Rusnaini, & Muchtarom, 2023). Schools can use Adiwiyata programs to help young children become more aware of the environment (Fazira & Ramadan, 2023; Mutia et al., 2025). The execution of these programs corresponds with prior studies demonstrating that the Adiwiyata Program can cultivate an optimal environment for students to accomplish academic objectives (Saddhono et al., 2019).





Figure 1. "Healthy Classroom, Healthy Student" Program
Source: Research Data, 2025

The Adiwiyata program, namely the "Healthy Classroom, Healthy Student" activity, is shown in **Figure 1** at SDN Pati Kidul 01. Before students leave school every day, students clean their classrooms. Students' understanding of classroom hygiene creates routines for a healthy lifestyle (Setiawan et al., 2024). Cleaning the classroom every day has an impact on establishing a clean and comfortable learning environment (Brink, Krijnen, Loomans, Mobach, & Kort, 2023). Additionally, the school environment is protected from pollutants, improving the health of both teachers and students while they engage in teaching and learning activities.

Students' ability to focus while learning is significantly affected by cleanliness. A clean setting promotes a comfortable and more focused learning environment (Arisnaini, 2022). According to earlier studies, learning is more comfortable in classrooms that are clean, attractive, and well-organized (Widiastuti, Susilo, & Nurfinaputri, 2020). Conversely, because of the distracting and uncomfortable learning environment, unclean and cluttered classrooms limit students' capacity to receive and process lessons.



Figure 2. "Green School" Program
Source: Research Data, 2025

The Green School program is the second Adiwiyata project put into place at SDN Pati Kidul 01 to increase environmental awareness (see **Figure 2**). One of the primary goals of the Green School program is to preserve and maintain plants (Trihantoyo & Rahma, 2018). Students engage in greening activities on Wednesdays, according to observations. Green school activities have been shown to have an impact on environmental awareness (Goldman, Ayalon, Baum, & Weiss, 2018). Previous studies have demonstrated that students' environmental awareness is impacted by environmental initiatives such as planting tree (Balasha et al., 2022). Additionally, green schools minimize the effects of climate change in educational settings (Dominata, 2023). Furthermore, establishing sustainable school systems is made easier by combining

environmental education with green school programs (Prasetyo et al., 2020). The ability of green schools to lower carbon dioxide emissions is one of their main environmental advantages (Suryani et al., 2019). Schools can minimize carbon dioxide (CO₂) emissions by growing plants that photosynthesize (Filonchuk, Peterson, Zhang, Hurynovich, & He, 2024; Skrzypczak et al., 2025). This has a direct impact on reducing the accumulation of greenhouse gases that contribute to global warming. Greening projects encourage environmental responsibility in students from a young age. A dedication to sustainably preserving the school environment demonstrates this active involvement (Yli-Panula, Jeronen, & Mäki, 2022). From a psychological perspective, green environments create refreshing learning environments that



increase students' motivation to learn (Chen, Tsai, Chung, & Lo, 2022).



Figure 3. "Friday Cleanup" Program
Source: Research Data, 2025

Figure 3 illustrates environmental actualization activities through the implementation of Friday Cleanup programs by students. The Friday Cleanup program is conducted once a week, involving students, teachers, and school staff. The activities carried out involve not only cleaning but also planting and watering plants. The Friday Cleanup program involves homeroom teacher supervision to foster collaborative and harmonious learning atmospheres. Furthermore, students engage in plant decoration competitions to promote pro-environmental practices. Students who consistently practice clean habits demonstrate increased environmental awareness (Khasana, Pambudi, & Masaei, 2023). This Friday Cleanup program serves multiple

objectives, including fostering clean living habits among students (Nurhayati & , Langlang Handayani, 2020) and promoting environmental preservation (Chan et al., 2022).

2. Environmental Awareness in Adiwiyata Schools

Environmental awareness is characterized by humans' capacity to reflect on environmental conditions and understand the complexity of environmental problems (Kousar, Afzal, Ahmed, & Bojnec, 2022). Environmental awareness is linked to individuals who can comprehend and actively participate in solving environmental issues (Dabbous, Horn, & Croutzet, 2023). Furthermore, a deep-



rooted environmental awareness in humans will encourage positive behaviors towards the environment (Zhang, Yu, & Guo, 2024). Environmental awareness is formed when children conduct observations, understanding, and practices regarding environmental conditions (Mousavi et al., 2024). Education becomes the foundation for forming environmental awareness integrated into learning processes (Mahsun, Sumarmi, Utaya,

Handoyo, & Wibowo, 2025). Environmental awareness can be measured through three indicators: environmental issue knowledge, pro-environmental attitudes, and environmental care behaviors (Baltodano-Nontol, Alvarado-Silva, Fernández-Mantilla, Gálvez-Carrillo, & Acevedo-Duque, 2024; Jusniar, Syamsidah, & Auliah, 2023). Research results regarding environmental awareness are shown in **Figure 4**.

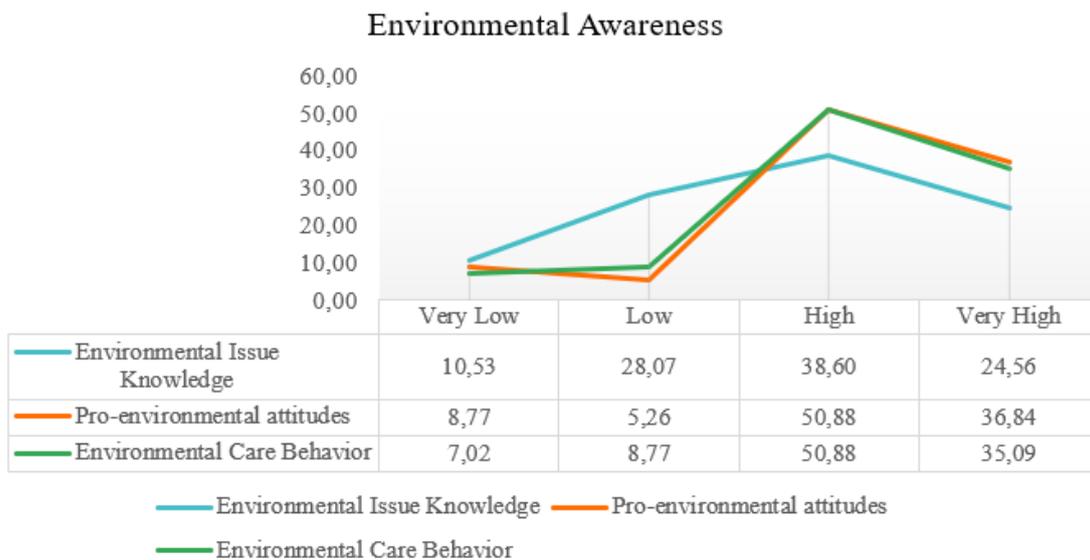


Figure 4. Distribution of Environmental Awareness Categories Among Students

Source: Research Data, 2025

According to research findings, the knowledge aspect of environmental issues is distributed more evenly across different category levels. 38.60% of respondents still have a limited awareness of environmental issues, with

about 10.53% having very low knowledge and 28.07% falling into the low category. In addition, 24.56% of respondents have very high knowledge, and 38.60% demonstrate high knowledge. There is a significant



understanding gap, as evidenced by the approximately 40% of respondents who have low and very low knowledge, even though the majority of respondents (63.16%) fall into the high and very high categories. This suggests that in order to improve student understanding of environmental issues, more extensive learning programs are required. Environmental education programs that are included into lesson plans and applied throughout learning processes can be included in school programs (Kamil et al., 2020). Character education based on religion and cultural values is incorporated into environmental education curricula (Nurwidodo & Ahmad, 2020; Wibowo et al., 2023). Additionally, principles related to Pancasila, literary appreciation, moral behavior, and important historical people and national leaders are all included in environmental education curricula (Wiwi Dwi Daniyarti, 2022). Observable attitudes and behavioral practices are indicators of the use of environmental care character development in primary schools (Sumarmi, Putra, Mutia, Sahrina, Osman, et al., 2024). In order to truly practice environmental care, efforts must be taken to both prevent and restore

harm to the surrounding natural environment. Furthermore, it is thought that teaching children to distinguish between organic and inorganic waste can enhance their understanding of environmental issues (Djirong et al., 2024). Practical experiences and observations of environmental events, human interactions with their surroundings, and knowledge of plants, their advantages, and conservation initiatives are all included in educational learning materials (Ardoin, Bowers, & Gaillard, 2020). It is consistent with the Japanese curriculum, which incorporates environmental awareness and science education (Kodama, 2014). Values representing high categories indicate substantial positive outcomes from pro-environmental attitudes. According to data analysis, 8.77% of respondents have very low environmental attitudes, while 5.26% fall into the low category. A majority of respondents are aware of and concerned about environmental issues; cumulatively, only 14.03% demonstrated low environmental awareness. Up to 50.88% of the participants surveyed have strong pro-environmental attitudes, while 36.84% have high attitudes. According to 87.72% of respondents, there is already a high level of



environmental awareness in society, which can be used as a basis for implementing different conservation and environmental preservation initiatives into action. The Adiwiyata school program is an example of this particular type of program. It gets students involved in environmental activities that make schools healthier and stop them from causing damage the environment. Teachers, academic staff, students, and parents work together to promote environmental awareness through the Adiwiyata program (Fazira & Ramadan, 2023). Through integrated activities in educational settings, this program encourages everyone to actively contribute to increasing environmental awareness.

Previous research findings indicate that pro-environmental attitudes among Eco-School students are slightly higher than those of non-Eco-School or regular school students (Larashati, Sukarmin, & Annisa Nur Khasanah, 2022). This demonstrates the significant contribution of Adiwiyata programs in enhancing students' knowledge about environmental issues (Rushayati, Hermawan, & Ginoga, 2023; Wibowo, Putra, Silviariza, & Herwanto, 2025). Limited environmental understanding

prevents students from acquiring the necessary knowledge foundation required for pro-environmental action. Students with environmental knowledge at intermediate levels show tendencies to be more caring and consider the impacts of their actions on the surrounding environment. Meanwhile, students with deep environmental understanding will have greater awareness to protect and preserve their surrounding environments. The aspect of environmental care behavior demonstrates patterns that are almost identical to pro-environmental attitudes. Respondents with very low environmental care behaviors account for 7.02%, and those in the low category account for 8.77%, so the total respondents with low environmental care behaviors reaches 15.79%. Meanwhile, the majority of respondents show positive behaviors with 50.88% in the high category and 35.09% in the very high category, cumulatively reaching 85.97%. Pro-environmental attitudes are notably higher at 87.72%, but their actual implementation in behaviors is slightly lower at 85.97%, indicating a gap between attitudes and actions. This indicates that while society is aware of and has positive attitudes toward the environment, challenges remain in



implementing these pro-environmental attitudes into actionable behaviors in daily life. Environmental initiatives can be implemented through basic measures, including tree planting, minimizing plastic consumption, and promoting recycling practices.

Prior research suggests that environmental initiatives may encompass trash disposal campaigns, classroom sanitation, eco-brick projects, training sessions, or workshops (Sumarmi, Putra, Mutia, Sahrina, & Osman, 2024; Sumarmi, Putra, Sahrina, et al., 2024). Previous research shows that children are more likely to do things that are good for the environment when they are rewarded for doing them, whereas bad environmental behaviors are dealt with through corrective actions (Rushayati et al., 2023). Similar results from earlier studies suggest that taking part in environmental competitions can improve students' behavior when related to caring for the environment (van Horen, van der Wal, & Grinstein, 2018). Environmental competition activities attempt to manage and conserve the environment, which encourages students to take action to protect it. This shows that environmental initiatives can make students more mindful of the

environment (Zhao, Liu, & Han, 2024). It corresponds with Edgar Dale's concept of learning experiences, which asserts that direct engagement in environmental acts will provide students with the skills to address environmental issues (Lee, S.J., Reeves, 2017; Mahsun et al., 2025).

CONCLUSIONS

Research indicates that fostering environmental awareness in early childhood can be efficiently accomplished by including environmental education into regular school activities, especially within Adiwiyata programs. Programs such as "Healthy Classroom, Healthy Student", "Green School", and "Friday Cleanup Day" implemented at SDN Pati Kidul 01 have proven capable of instilling positive habits in maintaining cleanliness, fostering environmental responsibility, and creating comfortable and healthy learning environments. Research results also indicate that environmental awareness in early childhood is formed through three main indicators: environmental issue knowledge, pro-environmental attitudes, and environmental care behaviors. Among these three aspects, the majority of respondents are in high and very high



categories, indicating that implemented environmental education programs have yielded positive results. More intensive and continuous learning activities are necessary since certain students still exhibit poor levels of environmental knowledge and behavior. Thus, it is essential to start environmental education early in order to create generations that understand and care about environmental sustainability. When the Adiwiyata Program is continuously implemented and supported by all members of the school community, it becomes a strategic tool for developing environmental care character and creating an environment-based school culture.

The results of this research provide support to the concept that including environmental education into everyday activities for young children successfully fosters the development of environmental attitudes and actions. It indicates how important it is to learn in context when teaching character. Schools also have strategic roles as agents of change in developing environmental behaviors from an early age. The Adiwiyata Program can serve as an effective medium for building a school culture supporting environmental

preservation. The effectiveness of the role of schools and the implementation of the Adiwiyata program requires real strengthening through pedagogical actions, such as the integration of environmental materials with the environmental education curriculum, strengthening teacher capacity through ongoing environmental training, and developing learning activities that provide direct practice in protecting the environment. The research has limitations in obtaining data that represents only one educational institution with a limited number of participants so that it cannot be generalized widely. From research results, there are limitations that can serve as recommendations for future researchers, namely the need for more in-depth follow-up studies regarding factors influencing low environmental awareness among some students, and the most effective approaches to address this, for example, through visual media, educational games, or direct involvement in environmental projects.

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