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The Effectiveness of the Green Activity Program in Improving Pro-Environmental Consumer Behavior in Elementary School Students

Deasy Rahmawati [1], Nana Supriatna [2], Sapriya [3]

[1] Universitas Pendidikan Indonesia, Indonesia; derafatri35@upi.edu
[2] Universitas Pendidikan Indonesia, Indonesia; nanasup@upi.edu
[3] Universitas Pendidikan Indonesia, Indonesia; nanasup@upi.edu

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Abstract

This study aims to examine the effectiveness of green activity programs in shaping the pro-environmental consumer behavior of elementary school students. The program was implemented as part of the Pancasila Student Profile Strengthening Project within the independent curriculum framework. The study involved 71 fifth-grade students from three public elementary schools in Bandung: SDN 240 Cijerah Indah, SDN 099 Babakan Tarogong, and SDN 191 Babakan Surabaya. The program was conducted over four weeks and included waste sorting, composting, recycling, energy-saving campaigns, and vegetable planting. A one-group pretest-post-test pre-experimental design was used, and data were collected through a green consumer behavior questionnaire assessing five behavioral stages: product search, purchase, usage, evaluation, and disposal. Quantitative analysis using paired sample t-tests showed a statistically significant improvement in students' behavior ($p < 0.001$), with an average increase in scores ranging from 15.45 to 22.74 points across schools. The N-Gain analysis revealed moderate learning gains, with values between 0.558 and 0.563. These findings confirm the effectiveness of green activity programs in fostering pro-environmental consumer behavior. The study recommends implementing similar programs in other schools and conducting further research to assess long-term behavioral impacts and contributing factors. This research has implications for developing environmental education strategies that cultivate sustainable habits from an early age.

Keywords Elementary School; Green Activity Program; Green Consumer Behavior

Corresponding Author
Deasy Rahmawati
Universitas Pendidikan Indonesia, Indonesia; derafatri35@upi.edu

1. INTRODUCTION

Environmental issues remain a serious global concern, with around 30–40% of environmental damage caused by unsustainable individual consumption (Chekima et al., 2016). Modern lifestyles prioritize efficiency and convenience, often overlooking their environmental impacts, such as increased waste from production and consumption activities. Waste prevention, through changes in consumption patterns, is considered the most effective waste management strategy (Concari et al., 2020).

Promoting *Pro-Environmental Consumer Behavior* (PECB) from an early age is essential. As future agents of change, elementary school students can develop responsible habits such as reusing school supplies, reducing plastic use, and conserving energy. Studies have shown that structured programs

like *Green Activity Programs,* which incorporate hands-on and reflective environmental learning, are effective in improving students' environmental attitudes and sustainable consumption behaviors (Sesini et al., 2020). This highlights the importance of early environmental education.

Increasing food consumption patterns is a small step to protect the environment for future generations. All members of the community, especially schools, can start with small actions to contribute to greater environmental protection efforts (Supriatna, 2017). A framework is needed to equip students with accurate environmental knowledge and guide them in activities promoting environmental sustainability.

The lack of environmental awareness among primary school students stems from a lack of understanding of environmental issues and the importance of sustainable practices. Through school-based green activity programs, students can be taught about environmental responsibility and sustainable consumption practices (Kamil et al., 2020; Sharma, 2022). Participation in environmental education programs can increase ecological awareness and lead to more environmentally friendly consumer behavior (Lubowiecki-Vikuk et al., 2021; Prieto-Sandoval et al., 2022). Pro-environmental behavior must be nurtured early in children to foster responsible environmental citizenship characterized by a healthy, clean, and caring lifestyle (Syaodih & Handayani, 2015). Learning experiences are essentially the result of interactions between individuals and their environment (Bandura, 1977; Sapriya, 2018). Elementary school is a critical stage in shaping children's thoughts and behaviors.

The green activities program introduces students to being environmentally friendly and highlights the importance of their role in environmental protection. The effectiveness of these programs is highly dependent on their implementation and the approach adopted by the school (Putri & Nikawanti, 2018). Green activities include actions and behaviors by individuals, groups, and organizations that aim to reduce negative environmental impacts through sustainable consumption, production, and innovation. Reed Johnston et al. (2025), showed that elementary school students involved in green activity programs significantly increased their environmental awareness.

The lack of environmental awareness among primary school students is often due to limited understanding of environmental issues and the importance of sustainable practices. School-based green activity programs have been shown to educate students about environmental responsibility and sustainable consumption (Kamil et al., 2020). Participation in such programs can significantly improve ecological awareness and foster environmentally friendly consumer behavior (Lubowiecki-Vikuk et al., 2021; Prieto-Sandoval et al., 2022). Moreover, nurturing pro-environmental behavior from an early age is crucial to developing responsible environmental citizenship, which is reflected in clean, healthy, and caring lifestyles (Syaodih & Handayani, 2015). Learning is shaped through interaction between individuals and their environment (Bandura, 1977; Sapriya, 2018), and elementary school is a critical period for shaping children's values and behaviors.

However, existing studies have generally focused on broad environmental education outcomes without addressing how structured green activity programs influence *Pro-Environmental Consumer Behavior (PECB)* in elementary school contexts. This study aims to fill that gap by examining how targeted green activities implemented in elementary schools can foster specific pro-environmental consumption habits in students. Focusing on PECB development within the framework of daily student behavior, this research contributes to a more detailed understanding of environmental education's impact at the foundational level of formal schooling.

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Programs such as the "Green School" and "Zero Waste School" teach students the importance of preserving the environment, which is reflected in their daily habits, such as reducing the use of plastics and recycling. Espino-Díaz et al. (2025), found that contextualized learning through green activities helps students better understand the environmental impact of their actions. For example, students who learn about the life cycle of a product and its environmental impact are more likely to choose eco-friendly products.

Green activity programs have been proven to change students' attitudes towards consumption. Research by Baharuddin et al (2025) shows that elementary school students who engage in green programs are more likely to develop values that support sustainability. Students show a more positive attitude towards reuse, waste reduction, and choosing eco-friendly products. Efiariza et al. (2021) point out that school-based green programs establish new social norms among students, where green behavior is expected and valued, encouraging students to act accordingly, both inside and outside school.

Previous studies have shown the positive impact of green programs on students' environmental behavior. For instance, Salazar et al. (2024) Students involved in school-based green programs developed more sustainable consumption habits, such as choosing reusable items and reducing packaging waste. Similarly, Biancardi et al. (2023) Reported that green activities at the elementary school level influenced students and extended to their families and communities through shared practices. While these studies emphasize the broad benefits of environmental education, they focus on general behavioral changes rather than specifically addressing *Pro-Environmental Consumer Behavior (PECB)* in daily student life. Moreover, few studies have examined the structured integration of green activity programs within formal elementary education as a targeted strategy to foster PECB.

This study aims to bridge that gap by investigating how green activity programs can systematically shape students' consumption choices and environmental responsibility in everyday school contexts. Unlike previous research that highlights behavioral outcomes at a broader level, this study focuses on developing conscious, responsible consumer behavior in elementary students as an early foundation for sustainable living.

This green activity program was implemented over 12 sessions. Each session was designed not only to assess the achievement of the *Pancasila Student Profile* dimensions but also to evaluate the effectiveness of the program in fostering students' *Pro-Environmental Consumer Behavior* (PECB). This research investigates how structured, school-based green activities can contribute to developing environmentally responsible consumption habits among elementary school students. Specifically, the study aims to examine the extent to which the green activity program can support behavioral change aligned with the values of sustainability and environmental awareness from an early age.

2. METHODS

This study employed a quantitative field research design using a pre-experimental method with a one-group pretest-post-test design (Haryati, 2012; Sugiyono, 2018). The aim was to evaluate the effectiveness of a green activity program in fostering Pro-Environmental Consumer Behavior (PECB) among elementary school students. The population in this study consisted of fourth-grade students

from three public elementary schools in Bandung, selected purposively to represent diverse school characteristics and student backgrounds. 120 students participated in the study, with balanced gender representation and varying socioeconomic backgrounds (Fraenkel et al., 2011).

The research variables include the independent variable, namely the green activity program, and the dependent variable, students' pro-environmental consumer behavior. The research instruments used were questionnaires consisting of both closed-ended and open-ended questions designed to measure PECB. The questionnaire was tested for validity and reliability before implementation. In addition to the questionnaire, in-depth interviews with teachers and students and direct observations of program activities were conducted to support and enrich the quantitative data (Patton, 2015).

The data analysis techniques used included descriptive and inferential statistics to analyze quantitative data and determine significant changes in student behavior before and after the program (Creswell & Creswell, 2018). Meanwhile, qualitative data from interviews and observations were analyzed using thematic analysis to identify recurring themes and patterns (Braun & Clarke, 2006).

3. FINDINGS AND DISCUSSIONS

Findings

The Green Activity Program was structured into five interrelated stages to foster pro-environmental behavior among elementary school students systematically. Each stage is designed to guide students through a progressive learning experience beginning with awareness and culminating in strategic environmental actions. The five-stage framework integrates active, reflective, and contextual learning, enabling students to engage with environmental issues meaningfully and practically. This approach is intended to increase knowledge and encourage behavioral transformation through experiential learning and value internalization. The following table outlines the stages of the Green Activity Program and their respective objectives:

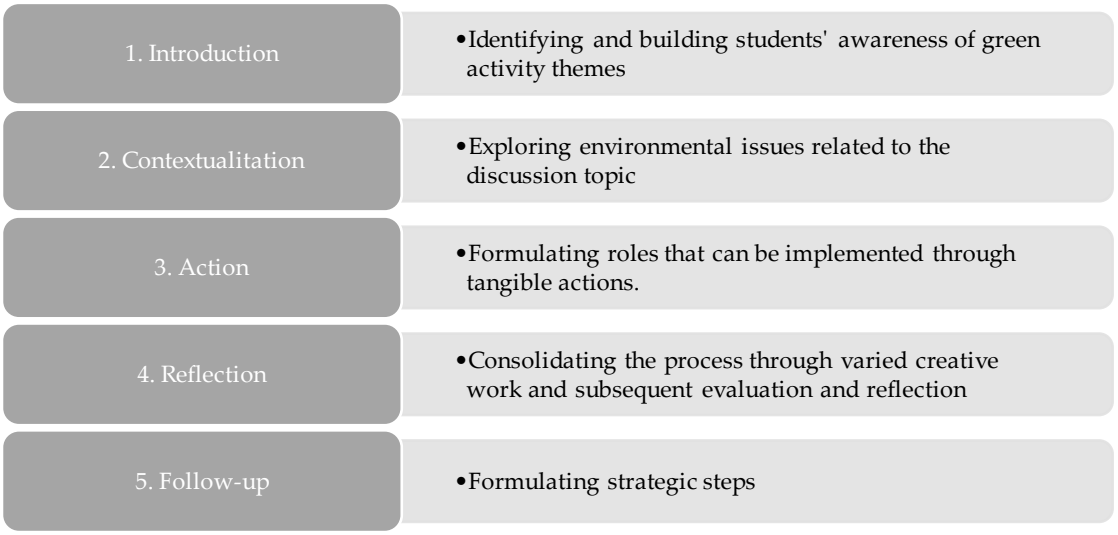

Figure 1. Flowchart of Green Activity Program Activities

The teaching and learning process is always related to the purpose of learning, planning, and implementation. Effective learning emerges from good planning and implementation (Angeli & Valanides, 2015; Susanto, 2016a). This study aims to test the effectiveness of green activity programs in fostering pro-environmental consumer behavior. The research occurred in Bandung's three public elementary schools: SDN 240 Cijerah Indah, SDN 099 Babakan Tarogong, and SDN 191 Babakan Surabaya. Schools are selected based on unique characteristics and local potential to maximize the program's relevance to the students' environment.

Students actively participate in waste sorting, organic waste composting, paper recycling, energy conservation campaigns at school and home, vegetable seed cultivation, and planting. The study used a pretest and a post-test to evaluate changes in pro-environmental consumer behavior.

This study evaluates the program's impact on student behavior and the extent of student engagement and challenges faced during implementation. The wider trial and testing findings provide detailed insights into the effectiveness of green activities programs. These findings will inform continuous improvement and wider implementation in other schools. Based on the Statistics of Paired Samples, there was an increase in the average score between the pretest and post-test after students participated in green activities.

The results of the paired samples t-test for each school are summarized in Table 1. The analysis includes data from SDN 240 Cijerah Indah, SDN 191 Babakan Surabaya, and SDN 099 Babakan Tarogong, each participating fully in the intervention. The table presents the mean scores, sample sizes (N), t-values, and significance levels (Sig. 2-tailed), collectively providing insight into the behavioral shifts due to the program.

Table 1. Paired Samples T-Test Result

Paired Samples Statistic						
No	**Elementary School**	**Pretest**	**Post-test**	**N**	**t**	**Sig (2-tailed)**
1	SDN 240 Cijerah Indah	63,3333	82,0370	27	-15,474	0,000
2	Pretest_SDN191BabakanSurabaya	65,7083	82,6667	24	-22,741	0,000
3	Pretest_SDN099BabakanTarogong	67,2500	83,500	20	-14,584	0,000

The results of the paired sample t-test analysis indicate that the Green Activity Program had a significant positive impact on enhancing *Pro-Environmental Consumer Behavior* (PECB) among elementary school students. The study was conducted in three public elementary schools in Bandung, SDN 240 Cijerah Indah, SDN 191 Babakan Surabaya, and SDN 099 Babakan Tarogong, each showing statistically significant improvements in students' green consumer behavior after participating in the program.

At SDN 240 Cijerah Indah, the mean pretest score was 63.33, which increased to 82.04 in the post-test. The t-test yielded a value of t = -15.474 with a significance level of p = 0.000, indicating a significant improvement. This demonstrates that students exhibited more responsible environmental consumption after participating in the 12-session green activity program. Such behavioral changes include increased awareness of resource use, reduced plastic consumption, and proper waste management.

Similarly, SDN 191 Babakan Surabaya showed a mean increase from 65.71 (pretest) to 82.67 (post-test), with a t-value of -22.741 and p = 0.000. This significant change reflects the program's effectiveness in fostering environmentally responsible habits, such as bringing reusable water bottles and choosing products with minimal packaging.

At SDN 099 Babakan Tarogong, the average pretest score was 67.25, increasing to 83.50 in the post-test. The t-test result of t = -14.584 with a significance value of p = 0.000 confirms a statistically significant difference. The consistent improvement across all three schools highlights the program's success in instilling sustainable consumption behavior among students from diverse backgrounds.

These findings affirm that the Green Activity Program, designed with experiential and participatory learning methods, effectively cultivates pro-environmental attitudes and behaviors in young learners. The significant gains in post-test scores across schools suggest that students gained knowledge about sustainable practices and began to apply these behaviors in their daily lives.

An N-Gain analysis was conducted to strengthen the results of the paired samples t-test, which

showed a statistically significant difference between students' pretest and post-test scores. The N-Gain test measures the effectiveness of an educational intervention by calculating the normalized gain score, which reflects the proportion of the maximum possible improvement achieved by the students. Unlike the t-test, which emphasizes statistical significance, the N-Gain provides insight into the practical significance of the learning gains.

This analysis helps to determine the extent to which students improved their pro-environmental consumer behavior after participating in the Green Activity Program. The N-Gain score is interpreted using a standard scale: low (< 0.3), medium (0.3–0.7), and high (> 0.7). The following table summarizes the average pretest and post-test scores, the corresponding N-Gain values, and their interpretations across the three participating schools.

Table 2. Results of Average N-Gain Values

School Name	Average value		N-Gain	Interpretation
	Pretest	Post-test		
SDN 099 Babakan Tarogong	67,25	83,5	0,560	Sedang
SDN 191 Babakan Surabaya	65,7	82,7	0,558	Sedang
SDN 240 Cijerah Indah	63,33	82,04	0,563	Sedang

The results of the N-Gain analysis presented in Table 2 confirm the effectiveness of the Green Activity Program in improving students' pro-environmental consumer behavior across three elementary schools. All three schools, SDN 099 Babakan Tarogong, SDN 191 Babakan Surabaya, and SDN 240 Cijerah Indah, recorded N-Gain scores within the medium category, with values of 0.560, 0.558, and 0.563, respectively. These values indicate a moderate improvement in students' behavior following the intervention, which is considered pedagogically meaningful.

The consistency of the medium category across schools suggests that the program was equally effective regardless of the school's initial average or local characteristics. This aligns with Hake's (Hake, 1998) Framework, which posits that an N-Gain score between 0.3 and 0.7 reflects a moderate gain and typically indicates that the instructional intervention has had a substantial impact on student learning. Furthermore, this outcome supports the theory of experiential learning (Kolb, 1984), which emphasizes that learning is most effective when students are actively involved in meaningful, real-world tasks.

The program's success can also be interpreted through constructivist learning theory, where students construct new knowledge through engagement with authentic environmental problems, such as waste management and energy conservation. The moderate gains observed in all schools reflect that students did not merely acquire theoretical knowledge but could also apply environmentally responsible behaviors in school and home settings.

In conclusion, the N-Gain findings reinforce the results of the paired t-tests by offering a more practical perspective on student improvement. The moderate effectiveness demonstrated across all schools underscores the Green Activity Program's potential as a replicable model for cultivating pro-environmental behavior in primary education contexts.

Discussion

The Green Activity Program, as outlined in the five-stage model—Introduction, Contextualization, Action, Reflection, and Follow-up demonstrates a structured approach to fostering pro-environmental behavior among elementary school students. This pedagogical framework integrates theoretical foundations from environmental education, behavioral psychology, and constructivist learning to guide students from awareness to action. The first stage, *Introduction*, focuses on identifying and raising students' awareness of green activity themes. This aligns with Hungerford and Volk's (1990) Model of environmental education, which emphasizes the importance of developing environmental sensitivity

as a precursor to responsible behavior. It also reflects Ajzen's (1991) Theory of Planned Behavior, where increased awareness influences attitudes and, in turn, behavioral intentions.

In the *Contextualization* stage, students explore real environmental issues that relate to their daily lives, which is essential in making the content meaningful. This approach is grounded in Vygotsky's (1978) Constructivist theory highlights the importance of social and cultural contexts in learning. By connecting abstract concepts with local and tangible environmental problems, students develop a stronger cognitive and emotional connection to sustainability issues. The third stage, *Action*, allows students to formulate and implement environmental roles through concrete practices actively. This reflects Kolb's (1984) Experiential learning theory, where direct experience and active participation are central to deep learning and the internalization of values. It also resonates with Kollmuss and Agyeman's (2002) Work stresses that environmental knowledge must be accompanied by opportunities for action to influence behavior truly.

Reflection, the fourth stage, allows students to consolidate what they have learned and done through creative outputs and evaluation. Dewey (1933) Emphasized reflection as a critical learning component, allowing individuals to assess their experiences and draw meaningful conclusions critically. This stage enhances students' metacognitive awareness and encourages the development of long-term environmental values. Finally, in the *Follow-up* stage, students are guided to formulate strategic steps for sustaining their actions. This is closely related to Bandura's (1986) Social Cognitive Theory, particularly the concept of self-efficacy the belief in one's ability to take effective action. This stage supports lasting behavioral change by involving students in goal-setting and future planning.

Overall, the Green Activity Program supports cognitive and behavioral outcomes and contributes to developing the Pancasila Student Profile, particularly in cultivating critical thinking, cooperation, personal responsibility, and environmental care. Through this integrative, theory-informed structure, students are equipped with knowledge and the motivation and capacity to act as responsible green consumers.

Effective teaching and learning hinge upon clear learning objectives, thorough planning, and faithful implementation (Angeli & Valanides, 2015; Susanto, 2016b). This study explicitly designed the Green Activity Program to cultivate pro-environmental consumer behavior (PECB) through experiential, participatory lessons. The program was piloted at three public elementary schools in Bandung SDN 240 Cijerah Indah, SDN 099 Babakan Tarogong, and SDN 191 Babakan Surabaya—each selected for its distinctive local context and potential to make the activities meaningful for students.

During the twelve-session program, students engaged in various hands-on green activities: waste sorting, organic-waste composting, paper recycling, energy-conservation campaigns (both at school and home), vegetable seed cultivation, and vegetable planting. These activities reflect Kolb's (Kolb, 1984) Experiential learning theory posits that learners construct understanding most effectively when they directly experience and experiment with real-world tasks. The program encouraged students to acquire knowledge and internalize sustainable values through active participation by involving students in concrete, context-relevant environmental tasks.

A one-group pretest–post-test design was used to evaluate the program's impact, and the results of paired-samples t-tests are summarized in Table 1. At SDN 240 Cijerah Indah, the average PECB score rose from 63.33 (pretest) to 82.04 (post-test); the t-value was –15.474 ($p = 0.000$), indicating a highly significant improvement. SDN 191 Babakan Surabaya showed a rise from 65.71 to 82.67 ($t = –22.741$, $p = 0.000$), and SDN 099 Babakan Tarogong improved from 67.25 to 83.50 ($t = –14.584$, $p = 0.000$). In each case, $p < 0.001$ demonstrates that the shift from pretest to post-test was statistically significant. These consistent gains across schools confirm that the Green Activity Program effectively enhanced students' pro-environmental consumer behaviors.

Several theoretical frameworks help explain these outcomes. First, Ajzen's Theory of Planned

Behavior (1991) Suggests that behavior change results from positive attitudes, perceived social norms, and a sense of self-efficacy. The program fostered positive environmental attitudes and reinforced social norms around responsible consumption by immersing students in collaborative, real-life activities such as carrying reusable water bottles instead of buying plastic bottles. Students observed peers and teachers modeling green behaviors, which in turn strengthened their belief that they could make an environmental difference (Bandura, 1986)

Second, Vygotsky's sociocultural theory (Vygotsky, 1978) Emphasizes that meaningful learning is embedded in social and cultural contexts. Each school's unique local environment was leveraged so students encountered environmental issues directly relevant to their community (e.g., neighborhood waste streams, local gardening). Embedding these activities in students' everyday contexts made the learning more authentic and increased their emotional investment. As a result, students were not merely acquiring abstract knowledge but actively co-constructing solutions in their social setting.

Third, the central role of experiential and participatory learning (Dewey, 1933; Kolb, 1984) Students moved from "knowing" environmental facts to "doing" concrete tasks. For example, composting sessions required students to observe firsthand organic waste decomposition, reinforcing the relationship between waste practices and environmental health. During subsequent reflection sessions, learners analyzed the outcomes of their actions, mirroring Dewey's (1933) View that reflection consolidates experience into a deeper understanding. These reflective discussions helped students critically evaluate their behavior and consider improvements in future activities.

Finally, the program's success in promoting PECB aligns with research on constructivist learning (Piaget, 1970). Rather than passively receiving instructions, students constructed their understanding of sustainable consumption by solving real problems, sorting recyclables, designing energy-saving posters, and managing compost bins. Through trial, feedback, and adaptation, students built mental models of how individual choices (e.g., reducing plastic use, conserving energy) contribute to broader environmental goals.

In summary, the paired-samples t-test results demonstrate that the Green Activity Program significantly improved students' PECB in all three schools. These findings support that well-planned, contextually grounded, experiential learning interventions can effectively shape young learners' environmental attitudes and behaviors. The program addressed the cognitive, social, and motivational components necessary for lasting behavior change by engaging students directly in meaningful, hands-on activities and fostering reflection. Ultimately, this study underscores the importance of integrating context-based, participatory environmental education into elementary curricula to cultivate the next generation of responsible green consumers.

The N-Gain analysis presented in Table 2 strengthens the findings from the *paired samples t-test*, which showed a statistically significant difference between students' pretest and post-test scores. Unlike the t-test that focuses on *statistical significance*, the N-Gain test offers insight into the *practical significance* of student improvement, particularly in pro-environmental consumer behavior following the Green Activity Program.

The three participating schools, SDN 099 Babakan Tarogong, SDN 191 Babakan Surabaya, and SDN 240 Cijerah Indah, recorded average N-Gain scores of 0.560, 0.558, and 0.563, respectively. Based on Hake's (1998) Classification, these values fall within the medium category (0.3–0.7), indicating that the program had a moderate level of effectiveness in promoting pro-environmental behavior among students.

These results align well with *constructivist learning theory*, which posits that learning is most effective when students construct knowledge through real-world experiences. The activities in the Green Activity Program, such as waste sorting, composting, recycling, energy conservation, and planting, provided authentic learning experiences that connected students with their environment, thus

reinforcing environmental values and behaviors.

Furthermore, the findings are supported by *Kolb's Experiential Learning Theory* (Kolb, 1984), which emphasizes learning through concrete experience and reflective observation. The program allowed students to engage in meaningful actions that required critical thinking, collaboration, and reflection, key components in developing new behaviors and habits. As students moved through the stages of experiencing, reflecting, conceptualizing, and applying, their pro-environmental behaviors were developed cognitively and practiced behaviorally, and emotionally.

The consistently medium N-Gain scores across all three schools suggest that while the program has not yet reached high levels of effectiveness, it has succeeded in generating *notable and practical behavior change*. Students were informed about green practices and began applying them in their daily lives at school and home. This demonstrates that integrating real-life, action-based environmental programs into education can foster meaningful behavioral transformation.

In conclusion, the N-Gain results affirm the practical value of the Green Activity Program and support the use of experiential, contextual, and constructivist learning approaches in developing sustainable behaviors in students. Future improvements could enhance these activities' depth, frequency, and scope to push effectiveness into the "high" category.

4. CONCLUSION

This study concludes that the Green Activity Program is effective in fostering students' pro-environmental consumer behavior, as intended by the research objective. The results of the *paired sample t-test* showed a statistically significant increase in post-test scores ($p < 0.001$), while the *N-Gain* values across the three schools indicated moderate learning gains (0.558–0.563), confirming the program's practical effectiveness. These findings highlight the importance of structured and context-based environmental education in shaping environmentally responsible behavior among students. Future research should examine the long-term sustainability of behavioral changes, explore the program's impact at different educational levels, and identify supporting or inhibiting contextual factors.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-t

Angeli, C., & Valanides, N. (2015). *Technological Pedagogical Content Knowledge*. Springer. https://doi.org/10.1007/978-1-4899-8080-9

Baharuddin S, A., Saihan, S., & Usriyah, L. (2025). Green School Initiatives: Cultivating Environmental Awareness in Elementary Education. *Journal of Educational Research and Practice*, *3*(1), 50–68. https://doi.org/10.70376/jerp.v3i1.285

Bandura, A. (1977). *Social Learning Theory* (Vol. 1). Prentice Hall, Englewood Cliffs, NJ.

Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Prentice-Hall.

Biancardi, A., Colasante, A., D'Adamo, I., Daraio, C., Gastaldi, M., & Uricchio, A. F. (2023). Strategies for developing sustainable communities in higher education institutions. *Scientific Reports*, *13*(1), 20596. https://doi.org/10.1038/s41598-023-48021-8

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Chekima, B. C., Syed Khalid Wafa, S. A. W., Igau, O. A., Chekima, S., & Sondoh, S. L. (2016). Examining green consumerism motivational drivers: Do premium price and demographics matter to green purchasing? *Journal of Cleaner Production*, *112*, 3436–3450. https://doi.org/10.1016/j.jclepro.2015.09.102

Concari, A., Kok, G., & Martens, P. (2020). A Systematic Literature Review of Concepts and Factors Related to Pro-Environmental Consumer Behaviour about Waste Management Through an Interdisciplinary Approach. *Sustainability*, *12*(4452). https://doi.org/10.3390/su12114452

Creswell, W. J., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (5th ed.). SAGE Publications Inc.

Dewey, J. (1933). *How We Think: A Restatement of the Relation of Reflective Thinking to the Educative Process*. D. C. Heath.

Efiariza, R. R., Dewi, O. C., Panjaitan, T. H., & Felly, R. (2021). The green-based school and the creation of students' environmental attitude and behavior. *ARTEKS : Jurnal Teknik Arsitektur*, *6*(2), 249–258. https://doi.org/10.30822/arteks.v6i2.715

Espino-Díaz, L., Luque-González, R., Fernández-Caminero, G., & Álvarez-Castillo, J.-L. (2025). Exploring the Impact of Project-Based Learning on Sustainable Development Goals Awareness and University Students' Growth. *European Journal of Educational Research*, *14*(1), 283–296. https://doi.org/10.12973/eu-jer.14.1.283

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2011). *How to Design and Evaluate Research in Education* (8th ed.). McGraw-Hill.

Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics*, *66*(1), 64–74. https://doi.org/10.1119/1.18809

Haryati, S. (2012). Research And Development (R&D) sebagai Salah Satu Model Penelitian dalam Bidang Pendidikan. *Majalah Ilmiah Dinamika*, *37*(1), 11–26.

Hungerford, H. R., & Volk, T. L. (1990). Changing Learner Behavior Through Environmental Education. *The Journal of Environmental Education*, *21*(3), 8–21. https://doi.org/10.1080/00958964.1990.10753743

Kamil, P. A., Putri, E., Ridha, S., Utaya, S., Sumarmi, & Utomo, D. H. (2020). Promoting environmental literacy through a green project: A case study at Adiwiyata School in Banda Aceh City. *IOP Conference Series: Earth and Environmental Science*, *485*(1), 12035. https://doi.org/10.1088/1755-1315/485/1/012035

Kolb, D. A. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Prentice Hall.

Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why do people act environmentally, and what are the barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239–260. https://doi.org/10.1080/13504620220145401

Lubowiecki-Vikuk, A., Dąbrowska, A., & Machnik, A. (2021). Responsible consumer and lifestyle: Sustainability insights. *Sustainable Production and Consumption*, *25*, 91–101. https://doi.org/10.1016/j.spc.2020.08.007

Patton, M. Q. (2015). *Qualitative Research & Evaluation Methods* (4th ed.). SAGE Publications.

Piaget, J. (1970). *Science of Education and the Psychology of the Child*. Orion Press.

Prieto-Sandoval, V., Torres-Guevara, L. E., & García-Díaz, C. (2022). Green marketing innovation: Opportunities from an environmental education analysis in young consumers. *Journal of Cleaner Production*, *363*, 132509. https://doi.org/10.1016/j.jclepro.2022.132509

Putri, S. U., & Nikawanti, G. (2018). Pengenalan Green Behaviour Melalui Ecoliteracy Pada Anak Usia Dini. *Cakrawala Dini: Jurnal Pendidikan Anak Usia Dini*, *8*(2). https://doi.org/10.17509/cd.v8i2.10538

Reed Johnson, J. A., Marston, S., Happle, A., & Majid, N. (2025). Climate change and sustainability education framework: An opportunity for pre-service teaching. *Cogent Education*, *12*(1). https://doi.org/10.1080/2331186X.2025.2460412

Salazar, C., Jaime, M., Leiva, M., & González, N. (2024). Environmental education and children's pro-environmental behavior on plastic waste. Evidence from the green school certification program in Chile. *International Journal of Educational Development*, *109*, 103106. https://doi.org/10.1016/j.ijedudev.2024.103106

Sapriya, S. (2018). *Pendidikan IPS: Konsep dan Pembelajaran* (D. Effendi, Ed.). Remaja Rosdakarya.

Sesini, G., Castiglioni, C., & Lozza, E. (2020). New Trends and Patterns in Sustainable Consumption: A Systematic Review and Research Agenda. *Sustainability*, *12*(5935). https://doi.org/10.3390/su12155935

Sharma, M. (2022). Understanding the impact of social learning forms on environmentally sustainable consumption behavior among school children. *International Journal of Educational Management*, *36*(7), 1097–1111. https://doi.org/10.1108/IJEM-01-2022-0047

Sugiyono. (2018). *Metode penelitian kuantitatif*. Alfabeta.

Supriatna, N. (2017). *Ecopedagogy: Membangun Kecerdasan Ekologis dalam Pembelajaran IPS*. PT. Remaja Rosdakarya.

Susanto, A. (2016a). *Model-model Pembelajaran Inovatif*. Rajawali Pers.

Susanto, A. (2016b). *Teori Belajar & Pembelajaran di Sekolah Dasar*. Prenamedia Group.

Syaodih, E., & Handayani, H. (2015). Menumbuhkan Green Behavior Pada Anak Usia Dini Melalui Pembelajaran Proyek. *Proceeding 6th Pedagogy International Seminar*.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (Vol. 86). Harvard university press.