



15 (1) (2026) 13-21

Unnes Science Education Journal
Accredited Sinta 2

<https://journal.unnes.ac.id/journals/usej>



Comparative Analysis of Pro-Environmental Behavior Among Junior High School Students in Samarinda: Public vs. Islamic Boarding Schools

Muliati Syam, Putri Sri Rahmawati, Atin Nuryadin✉

DOI: <http://dx.doi.org/10.15294/usej.v13i1.23394>

Universitas Mulawarman, Indonesia

Article Info

Submitted 2025-05-23

Revised 2025-11-21

Accepted 2026-04-29

Keywords

Environmental perceptions;
Junior high school students;
Pro-environmental behavior;
School type

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Abstract

Pro-environmental behavior (PEB) encompasses actions that prevent environmental harm and promote environmental health. This study aims to analyze the PEB of junior high school students in Samarinda based on school type, focusing on three key aspects: preservation, utilization, and appreciation. The research compares students from public junior high schools and Islamic boarding schools, while also exploring their environmental perceptions and how school type influences PEB. A quantitative comparative approach was used, sampling 290 ninth-grade students in Samarinda via purposive sampling and collecting data through questionnaires. Results showed that students from public schools had a lower PEB score (3.60) compared to those from Islamic boarding schools (3.67). Students in Samarinda generally exhibited a positive environmental perception. Statistical analysis indicated that school type significantly impacts PEB. The findings suggest that Islamic boarding schools may implement more effective environmental education practices than public schools, underscoring the need for public schools to adopt similar strategies. In conclusion, school type plays a key role in shaping students' environmental behavior, with Islamic boarding schools showing stronger outcomes. These results support the need for school-based environmental education tailored to specific contexts.

How to Cite

Syam, M., Rahmawati, P. S., & Nuryadin, A. (2026). Comparative Analysis of Pro-Environmental Behavior Among Junior High School Students in Samarinda: Public vs. Islamic Boarding Schools. *Unnes Science Education Journal*, 15(1), 13-21.

✉ Correspondence Author:

E-mail: atin.nuryadin@fkip.unmul.ac.id

p-ISSN 2252-6617

e-ISSN 2502-6232

INTRODUCTION

The environment is a spatial unity that includes circumstances, forces, objects, and living creatures (Corris, 2020). According to the Law of The Republic of Indonesia No. 32 of 2009 Article 1, the environment is the unity of space with all objects, forces, conditions, and living creatures, including humans and their behavior, which influence nature itself, the continuity of life, and the welfare of humans and other living creatures (Government of Indonesia, 2009). The environment is closely related to human activities. Humans always interact with the environment in their daily lives. Humans carry out activities that benefit humans regardless of environmental safety (Kopnina et al., 2018). The problem of environmental pollution continues to grow along with technological, economic, social, cultural, and political developments. Technological developments and industrialization encourage society to influence the level of environmental pollution (Coskun et al., 2025). Pollution and damage that occurs in forests, seas, water, land, atmosphere, and various other forms of damage are caused by human attitudes that are indifferent and irresponsible and only think about the needs of life (Rozenský et al., 2024).

Pollution is one of the problems faced in Indonesia. Pollution has occurred in several large cities in Indonesia, as evidenced by the decline in water quality, which means that it cannot be consumed by humans due to domestic and industrial waste. In addition, the issue of low concern for the environment exacerbates environmental problems (Tran et al., 2025). One of the polluted cities in Indonesia is Samarinda City (Annisa et al., 2022). Samarinda City is the capital of East Kalimantan Province, which has quite a high profile problem in terms of pollution. The Mahakam River around Samarinda City has murky brown water, and water hyacinth plants grow along the river (Sukmono et al., 2024). Then, there are piles of river rubbish, settling to form sediment caused by residents continuing to throw personal waste into rivers and ditches. This happens because there is still low public awareness of living a clean and healthy life with environmental quality (Fayomi et al., 2025). Then, in Kalimantan, significant natural forest destruction has occurred through human use, including illegal logging, replacement of forests with plantations, and mining (Ichsan et al., 2018).

One of the behaviors that needs to be developed for the nation's young generation is environmental care and responsibility. This is based

on the many problems of environmental damage that occur in the environment (Guazzini et al., 2025). Human behavior has a huge influence on the environment (Keck et al., 2025). To minimize these problems, it is necessary to provide guidance on environmental awareness so that people have environmental awareness and Pro-Environmental Behavior (PEB). Generally, PEB is obtained from the family, community, and school environments. Schools, as institutions or organizations, have a role in educating people about environmental care (Nuryadin et al., 2024). In this case, junior high school students are considered managers of interests because they will face the burden of past and present environmental carelessness (Nuryadin et al., 2023). Therefore, it is necessary to conduct an investigation into PEB among junior high school students as a first step in overcoming environmental issues in the future. PEB research not only focuses on preserving and utilizing nature but also on appreciating it as a positive form of utilizing nature (Nuryadin et al., 2023).

Measurements need to be taken to find out the PEB of an individual. Measuring children's environmental perceptions has been considered increasingly important as it correlates with their PEB and suggests a need for future environmental education research (Liu & Green, 2024). PEB refers to actions that prevent damage or protect the environment (Marcinkowski & Reid, 2019). Environmental perceptions are often measured using one of two standard tools: the revised New Ecological Paradigm (NEP) scale and the Two Major Environmental Values (2-MEV) scale. According to the NEP, individuals will have a biocentric (conservation) or anthropocentric (utilization) perspective, whereas the 2-MEV identifies environmental perception as a two-dimensional construct, which treats conservation and utilization as two distinct and not necessarily related components (Manoli et al., 2019). Based on a solid theoretical basis, aspects are defined and designed to measure factors, including preservation and utilization. However, to complete the 2-MEV instrument, Bogner (2018) includes positive aspects of (pleasant) use of nature with an additional aspect, namely appreciation. In several previous studies, the type of school influences PEB. Measurement based on school type is something that needs to be done.

However, research analyzing PEB based on school type, particularly comparing public junior high schools and Islamic boarding schools, remains limited, especially in the context of Samarinda, a city facing pressing environmental

challenges. Previous studies have focused on general PEB, but not specifically on how different educational environments influence students' behavior across the dimensions of preservation, utilization, and appreciation (Tapia-Fonllem et al., 2017; Zheng & Zhang, 2024). This study fills that gap by examining how school type affects PEB, using a structured framework derived from the 2-MEV model with the addition of appreciation. The urgency of this research lies in the environmental degradation currently affecting Samarinda, driven by urbanization, industrialization, deforestation, and the accelerating development of Ibu Kota Nusantara (IKN), which has increased pressure on natural resources and surrounding ecosystems (Spencer et al., 2023). Given that today's junior high school students will inherit and shape the future environmental landscape, understanding the role of school environments in shaping PEB is critical for designing effective, targeted environmental education programs. This study thus offers novel insights by combining context-specific environmental issues with psychological and educational dimensions of student behavior.

The novelty of this research lies in its comparative approach, examining how different school types (public schools and Islamic boarding schools) shape students' PEB within the unique ecological context of Samarinda. As the region faces increasing environmental pressure due to rapid urban development and the establishment of the IKN, understanding these behavioral differences becomes increasingly important. Furthermore, this study expands the analysis of PEB by incorporating three dimensions (preservation, utilization, and appreciation) based on an extended 2-MEV model. This integrated framework allows for a more comprehensive evaluation of students' environmental behavior across school types.

School type differences are a concern for environmental concerns, especially for junior high school students. For example, Islamic boarding school students and public school students are different. The results of the analysis show that there is a significant difference in the PEB of Islamic boarding school education students and general education students (Athoillah et al., 2024). More in-depth research by school type would provide important information for further research aimed at supporting increased PEB.

Misunderstandings about the environment can lead to serious environmental problems (Sörqvist & Langeborg, 2019), and this situation is intensified when teachers' attention is inadequate (Plutzer et al., 2016) and adults' behavior is

inadequate (Ichsan et al., 2021). Creating a positive environmental attitude in society will have a positive impact on the environment (Adinugroho et al., 2022). Community participation is very important to reduce or resolve environmental problems in the area.

This research was conducted in Samarinda because we saw that the current problem is that infrastructure development in the Indonesian Capital City (Ibu Kota Nusantara), palm oil, and mining have the potential to have an environmental impact. These mean the environmental problems in Samarinda have become very important. There is a need to measure PEB for junior high school students who are the next generation. In Samarinda, research has never been conducted on PEB analysis in junior high school students based on school type. Based on the background described previously, this research analyzes the PEB of junior high school students in Samarinda. PEB analysis was carried out based on three aspects, namely preservation, utilization, and appreciation. PEB analysis was categorized based on school type.

METHOD

This study used a quantitative comparative research design to analyze pro-environmental behavior (PEB) among junior high school students in Samarinda based on school type (public and Islamic boarding schools). The approach aimed to identify differences in PEB dimensions-preservation, utilization, and appreciation-between these school types.

A total of 290 ninth-grade students from six junior high schools were involved in this research, selected through purposive sampling to represent both public schools and Islamic boarding schools across Samarinda. The criteria for selection included schools that were officially registered and had environmental-based programs or policies. The sample was considered representative of the student population in Samarinda, allowing generalization within this context.

Data collection was conducted using a structured questionnaire, adapted and modified from the instrument developed by (Bogner, 2018; Subagiyo et al., 2024). The questionnaire consists of 21 items organized into three dimensions of Pro-Environmental Behavior (PEB): Appreciation (Items 1-7), Utilization (Items 8-14), and Preservation (Items 15-21). The detailed mapping of dimensions, indicators, and item numbers is presented in Table 1.

Table 1. PEB dimensions, indicators, and item numbers

Dimension	Indicator	Items
Appreciation	Enjoyment of nature	1-7
Utilization	Views on resource use	8-14
Preservation	Environmental protection	15-21

The preservation category measures attitudes and behaviors aimed at environmental protection and conservation. The Utilization category evaluates students' tendencies to use natural resources for human benefit. The Appreciation category captures students' emotional connection to and enjoyment of nature, such as valuing landscapes and natural beauty. All responses were recorded on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Table 2 summarizes the Likert scale categories.

Table 2. Likert Scale Categories

Scale	Description
1	Strongly disagree
2	Disagree
3	Neither agree nor disagree
4	Agree
5	Strongly agree

The original instrument was developed in English, and one of the authors translated it into Indonesian. The translated version was reviewed through several author discussions to ensure content accuracy and clarity. Because the respondents were 9th-grade students, a small-scale trial involving 10 students was conducted to examine the readability and comprehension of the items. Feedback from this trial was used to refine the wording of the instrument. The questionnaire items were adapted from a previously validated PEB scale, and therefore follow the construct validity established in prior research. Since the study employed descriptive statistical analysis, prerequisite tests such as normality and homogeneity were not required for the chosen analytical procedures.

The data collected were entered and initially organized using Microsoft Excel, while further analysis was conducted using IBM SPSS Statistics version 26. The analysis included descriptive statistics to determine the mean scores for each category of pro-environmental behavior (PEB). An independent samples t-test was performed to evaluate whether there was a statistically sig-

nificant difference in PEB between students from public schools and Islamic boarding schools. The interpretation of findings was based on the score categories summarized in Table 3 and the p-values obtained from hypothesis testing, with a p-value of less than 0.05 considered statistically significant.

Table 3. Score categories used for interpreting pro-environmental behavior (PEB) results

Score Range	Category
1.00–2.99	Low
3.00–3.99	Moderate
4.00–5.00	High

Ethical approval was obtained from the school authorities, and informed consent was collected from all participants. The research adhered to ethical standards, ensuring voluntary participation. Confidentiality of all responses was strictly maintained throughout the study. The step-by-step implementation of this research is illustrated in Figure 1, which outlines the entire process from problem identification to the formulation of conclusions and recommendations.

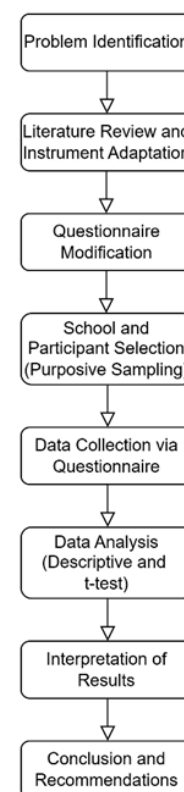


Figure 1. Flowchart of research implementation outlining the step-by-step process used in the study

RESULT AND DISCUSSION

This research aims to explore the PEB of junior high school students in Samarinda. Student scores for each aspect of PEB are presented in Figure 2. Descriptive analysis shows that the average appreciation score is higher than other aspects. The average appreciation score is 3.91, while the utilization and preservation dimensions have lower scores of 2.76 and 3.75 out of a maximum of 5.00. These results indicate that junior high school students in Samarinda tend to demonstrate stronger appreciation for the environment compared to their perceptions of utilization and preservation. The higher appreciation score likely reflects students' stronger emotional and sensory connection to nature, as appreciation-based items are generally grounded in aesthetic responses and direct experiences that are easier for students to identify. In contrast, the lower scores for preservation and utilization suggest that students may lack sufficient conceptual understanding of environmental management or may still hold a mildly anthropocentric view, where practical use and conservation decisions are not yet fully embedded in their ecological reasoning. This pattern is plausible because preservation and responsible utilization require more complex cognitive processing, whereas appreciating environmental beauty demands comparatively minimal conceptual effort and is more accessible to younger learners.

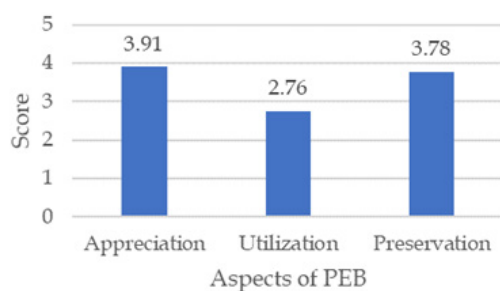


Figure 2. Overall PEB Aspects Scores of Students

This research also compares the types of schools between public schools and Islamic boarding schools. In this study, the number of students involved from public schools and Islamic boarding schools was the same, 145 students each. The PEB aspects scores of students in public schools can be seen in Figure 3. The research results show that the highest PEB aspect in public schools is appreciation (3.82).

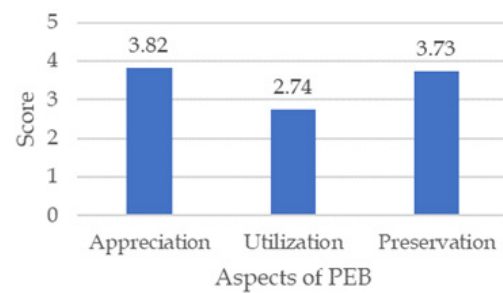


Figure 3. PEB Aspects Scores of Students in Public Schools

Figure 4 compares the average scores for each aspect of PEB for students at Islamic boarding schools. Just like in public schools, students at Islamic boarding schools have the highest score in appreciation, with a value of 4.00 out of a maximum score of 5.00.

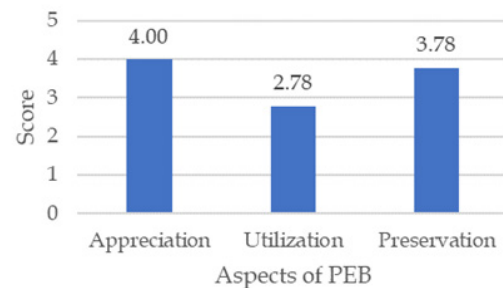


Figure 4. PEB Aspects Scores of Students in Islamic Boarding Schools

Public and Islamic boarding schools tend to have a higher appreciation of the environment. It was concluded that junior high school students in Samarinda prefer to appreciate by enjoying or even preserving their environment rather than exploiting nature. Appreciation or respect for nature can create a positive correlation with more ecological behavior (Li et al., 2025). Appreciation of nature has a positive tendency for pleasant natural experiences (Akçakese et al., 2024; Koivisto & Grassini, 2023). People who value nature seem to develop better preferences and support environmental protection (Barclay & Barker, 2020). Appreciation or respect for nature can create a positive correlation with more ecological behavior (Adinugroho et al., 2022).

Statements expressing appreciation for natural phenomena, such as "I like watching the clouds in the blue sky," tend to receive high scores from students, indicating a strong positive response, likely because such items tap into simple, plea-

sant nature experiences that require little cognitive effort. Observing clouds often induces a sense of calm and promotes positive mental states. To fully appreciate the beauty of clouds, it is essential to understand the impacts of air pollution. This understanding can serve as a foundation for raising students' awareness about the importance of maintaining air quality and implementing pollution prevention strategies. By linking the aesthetic enjoyment of natural environments with the scientific principles of air pollution, educational programs can foster a deeper commitment to environmental stewardship among students (Reilly et al., 2022). These results also indicate that there is a need for educational efforts, how to change students' high appreciation of nature into a positive attitude towards the environment.

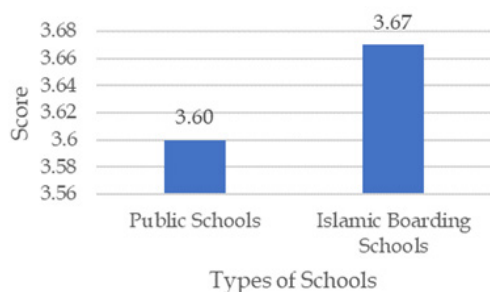


Figure 5. PEB Based on School Types

The results of the descriptive analysis indicate that Islamic boarding schools exhibit a higher Pro-environmental Behavior (PEB) score compared to public schools, as illustrated in Figure 5, with an average score of 3.67 for Islamic boarding schools. Additionally, Table 4 confirms a statistically significant difference in PEB scores between public schools and Islamic boarding schools, as evidenced by a significance value greater than 0.05. These test results demonstrate that the type of school significantly influences students' PEB.

Table 4. The F-Test for PEB Based on School Types

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.310	1	0.310	4.458	0.036
Within Groups	20.004	288	0.069		
Total	20.314	289			

Observations indicate that the disparity in Pro-environmental Behavior (PEB) between pub-

lic schools and Islamic boarding schools can be attributed to specific practices and routines implemented in the latter. At Islamic boarding schools, students engage in daily picketing, conducted twice a day-morning and afternoon-in designated areas. Additionally, these schools organize regular weekly communal clean-up activities every Friday morning throughout the campus. Another contributing factor is the system of penalties for failing to maintain cleanliness in their rooms and the surrounding environment. Students at Islamic boarding schools face consequences such as fines or being assigned tasks like cleaning toilets if they do not adhere to cleanliness standards. These measures enforce a consistent practice of environmental stewardship among students, fostering better PEB. In contrast, public school students are not subjected to similar routines or penalties, which may explain the lower PEB scores observed in public schools.

These findings underscore the important role of schools as agents of change in shaping students' environmental attitudes and behaviors, particularly in Islamic boarding schools where environmental responsibility is embedded in daily routines, community activities, and disciplinary systems, creating a consistent religious culture that reinforces pro-environmental norms. Such structured practices align with the principles of 21st-century education, which emphasize character development, collective responsibility, and sustainability-oriented values, showing that educational institutions can cultivate PEB not only through instruction but also through lived experiences and communal engagement. However, these findings must also be viewed in light of broader 21st-century challenges, such as lifestyle shifts, increasing digitalization, and reduced direct interaction with nature, which may weaken students' everyday engagement with environmental issues and limit the development of strong pro-environmental behaviors. At the same time, the results highlight that PEB should be viewed not merely as a series of individual actions but as an integral component of key 21st-century competencies, reflecting broader skills such as environmental literacy (Sanchez et al., 2025), global citizenship, sustainability awareness, and social responsibility (Nascimento & Reis, 2025). High appreciation scores, for instance, indicate students' ability to recognize ecological value and develop empathy toward natural systems, capacities essential for responsible global citizenship, while the structured environmental routines in Islamic boarding schools further strengthen social responsibility, a core competency in contemporary education

frameworks. Recognizing PEB as part of these competencies underscores its critical role in preparing students to contribute to sustainable and environmentally conscious futures.

This difference highlights how school culture and daily practices can shape students' environmental attitudes and behaviors, an important consideration in the context of 21st-century education in Indonesia, which emphasizes character building, responsibility, and alignment with environmental sustainability goals. These findings are especially relevant in the context of today's environmental challenges, such as the development of IKN, rapid urbanization, and increasing pollution, which require schools to cultivate PEB from an early age.

The results of this research contribute to a deeper understanding of how institutional routines and disciplinary structures influence students' pro-environmental behavior. These findings can inform educational policy and curriculum development by emphasizing the importance of structured environmental engagement within school settings. For future research, it is recommended to explore the long-term impacts of such practices on students' environmental behavior outside of school, as well as to investigate similar interventions in diverse educational contexts across different regions in Indonesia. Expanding the study to include qualitative insights could also enrich the understanding of students' motivations and values related to environmental responsibility.

CONCLUSION

In this study, we analyzed the Pro-environmental Behavior (PEB) of junior high school students in Samarinda, focusing on differences based on school type. The findings reveal that among the PEB aspects, appreciation scored highest (3.91), followed by preservation (3.75) and utilization (2.76). Additionally, the PEB score of students in Islamic boarding schools (3.67) surpassed that of students in public schools (3.60), indicating that school type influences PEB. These results suggest that the educational environment plays a crucial role in shaping students' pro-environmental behaviors. This research provides valuable insights for designing effective environmental education programs tailored to different school settings.

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