JSEL
Journal of Science Education Literacy (2026) Vol 1 Issue 2
https://doi.org/10.30872.jsel.v1i2.6499

An analysis of the environmental awareness of prospective physics teachers in the tropical forest environmental science course

Rabiatul Adawiyah[1], Delma Baruku[1], Nurul Fitriyah Sulaeman[1,*], and Lambang Subagiyo[1]
[1]Universitas Mulawarman, Samarinda, Indonesia
[*]nurul.fitriyah@fkip.unmul.ac.id

© The Author(s) 2026

Article

Keywords:
Awareness; Environment; Prospective teacher; Tropical forest

Article History
Received: April 22, 2026
Accepted: October 30, 2026
Published: October 31, 2026

Abstract

Environmental awareness is critical to addressing environmental challenges and fostering pro-environmental behaviors across individuals and communities. This study aims to analyze the environmental awareness of physics education students who take the Tropical Forest Environmental Science course. The subjects of this study were students from the Physics Education program at Mulawarman University, selected using a cluster random sampling technique, comprising 30 students. The research instrument used was an environmental awareness questionnaire with 20 items. The research data were analyzed using descriptive statistics. The results indicate that the students' environmental awareness is classified as fairly good (63.93). While most students agreed that they feel proud to put their rubbish in its place, most of them said that they rarely clean up. Therefore, future physics teachers have a solid foundation but lack the deep awareness necessary to be environmental leaders. The curriculum for future science teachers in tropical countries should be updated to include more local tropical forest case studies that enhance environmental awareness.

INTRODUCTION

The environment is currently one of the issues of greatest concern to the international community. This is due to human behavior that shows a lack of concern for the environment, resulting in environmental conditions that are becoming increasingly alarming. The current decline in environmental quality, such as water [1] and air [2] that is caused by excessive exploitation of the environment without regard for its carrying capacity and ecological functions [3]. Environmental awareness must be instilled continuously through habit formation. The aspects of environmental awareness developed in an educational setting include fostering habits to maintain the cleanliness and sustainability of the school environment, such as the habit of separating organic and inorganic waste, providing waste disposal facilities, supplying cleaning equipment, etc [4].

Environmental awareness is broadly defined as the understanding and deep recognition of the critical importance of protecting the natural environment and addressing its associated challenges [5]. A high level of environmental awareness enables individuals to absorb information carefully and think rationally, thereby fostering an attitude of environmental concern [6]. If an individual's understanding of the environment is lacking, they are also likely to show little concern for it. The formation of an individual's behavior begins with knowledge, which then gives rise to an inner response in the form of an attitude, and is demonstrated through action [7]. The efforts that can enrich the public's environmental knowledge are through formal, informal, and non-formal education. Environmental education not only covers environmental knowledge but can also increase each individual's awareness and concern for the environment.

An environmentally conscious attitude is one characterized by actions and behaviors that consistently seek to prevent damage to the surrounding natural environment and to initiate efforts to repair environmental damage that has already occurred [8]. All individuals are expected to be actively

involved in environmental management, especially teachers and pre-service teachers with leadership skills [9,10]. The awareness shown as such is expected to demonstrate the following environmentally conscious attitudes: to preserve the functions of the environment and to prevent and tackle pollution and environmental degradation; providing accurate and reliable information on environmental management; leading the way in promoting the importance of maintaining a clean environment and restoring ecosystems that have already been polluted; providing solutions to create a comfortable, clean, attractive, and tidy environment. Promoting and raising awareness of the need to preserve the environment starts on campus [11], in the home [12], and within the community by making simple use of flora and fauna [13].

Mulawarman University offers several degree programs that cover environmental studies, including the Physics Education program. This program includes an environmental course entitled Tropical Forest Environmental Science. This course is a compulsory module that all students must take. Knowledge of tropical forest environmental science is not merely received as information; rather, given the cognitive level of the students, they must adopt a positive attitude towards the course material so that they can develop and foster a positive attitude towards environmental cleanliness at all times, whether on campus, at home, or wherever they may be. However, the level of environmental awareness of physics education students remains unclear. Therefore, this research aims to analyze the environmental awareness of physics education students who have taken Tropical Forest Environmental Science courses.

RESEARCH METHOD

This study employs a descriptive research method. This quantitative descriptive study analyzes the impact of the Tropical Forest Environmental Science course on the environmental awareness of physics education students at Mulawarman University. The data collection instrument utilized a questionnaire administered via Google Forms. A questionnaire is a data collection method carried out by providing a set of written questions or statements to respondents for them to answer [14].

Table 1. Environmental Awareness Likert Scale Category

No.	Category	Score
1	Always	5
2	Often	4
3	Sometimes	3
4	Rarely	2
5	Never	1

This study was prepared in January and carried out from February to May 2024. The research population consisted of Physics Education students at Mulawarman University. Convenience sampling technique was used by sharing the questionnaire with the entire population, and students participated voluntarily. The sample comprised 30 Physics Education students from the 2021 and 2022 cohorts at Mulawarman University. This study used a questionnaire with 20 items that was well-developed, with validation and reliability estimation by previous researchers [15]. The environmental awareness questionnaire measures cognition, affection, and conation. The Likert scale measured environmental awareness among 2021 and 2022 Physics Education students. Each student's response was assigned a score based on the Likert scale (Table 1).

Table 2. Environmental Awareness Category

No.	Category	Range of score
1	Very good	86% - 100%
2	Good	76% - 86%
3	Fairly good	60% - 75%
4	Poor	55% - 59%
5	Very poor	≤ 54%

We used descriptive analysis to explore students' environmental awareness after the course. We presented the results in Table 1 using SPSS. The Physics Education students' environmental awareness regarding the Tropical Forest Environmental Science course was then categorized according to the following criteria in Table 2.

RESULTS AND DISCUSSION

The Tropical Forest Environmental Science course aims to enable students to examine the phenomena of humid tropical forests, particularly those relating to the forests of Kalimantan, with their diverse biodiversity, natural resources, and ecosystems, analyzing issues arising in tropical forest environments and methods for their mitigation, as well as approaches to managing the natural resources contained within them. Course learning outcomes: identifying the biodiversity of tropical forest environments; explaining the various environmental potentials of tropical forests; explaining the various types of biodiversity found in tropical forests; explaining environmental ethics to preserve the various resources found in tropical forests; identifying various symptoms and issues in tropical forest environments, both physical and social; analyzing various specific cases in tropical forest environments based on natural phenomena and environmental issues in tropical forests, both physical and social; implementing various technical solutions to a range of resource-related issues in tropical forest environments; and planning for the utilization of various potential resources in tropical forest environments.

The data obtained in this study are quantitative. These data were collected from questionnaires completed by physics education students from the 2021 (66.7%) and 2022 (33.3%) cohorts at Mulawarman University. The sampling technique is purposive sampling, limited to students who took the course. This section describes data on physics education students' environmental awareness regarding the tropical forest environmental science course. The data on the environmental awareness of physics education students regarding the tropical forest environmental science course were obtained from the questionnaire scores of physics education students, comprising a total of 20 items [16]. Table 3 shows the overall results of the data analysis. Table 3 shows that, overall, the average level of environmental awareness among physics education students taking the Tropical Forest Environmental Science course is classified as fairly good, with an average percentage of 63.93%.

Tabel 3. Environmental Awareness Result

Sample	Average Score	Percentage	Category
30	63,93	63,93%	Fairly good

The research findings indicate that the environmental awareness of Physics Education students at Mulawarman University is classified as moderate, with an average score of 63.93. The 'Cognition' attitude indicator, with an average score of 63.93, is classified as low compared to the other attitude indicators, meaning that students score low when assessing whether their attitude towards the environment is already good or not. This assessment is derived from knowledge or experience. The "Conation" attitude indicator, with an average score of 63.93, falls between the "Cognition" and "Affection" indicators, meaning students are moderately engaged in actions that support or oppose environmental care initiatives. The "Affective" attitude indicator, with an average score of 63.93, ranks high among the others, meaning students are highly likely to express whether they are pleased or not with environmental care initiatives, which will naturally lead to their own evaluation of the environment. It is evident that some students still do not demonstrate a caring attitude towards the environment [16]. An interesting example in Figures 1 and 2: most students agreed that they feel proud to put their rubbish in its place (Figure 1).

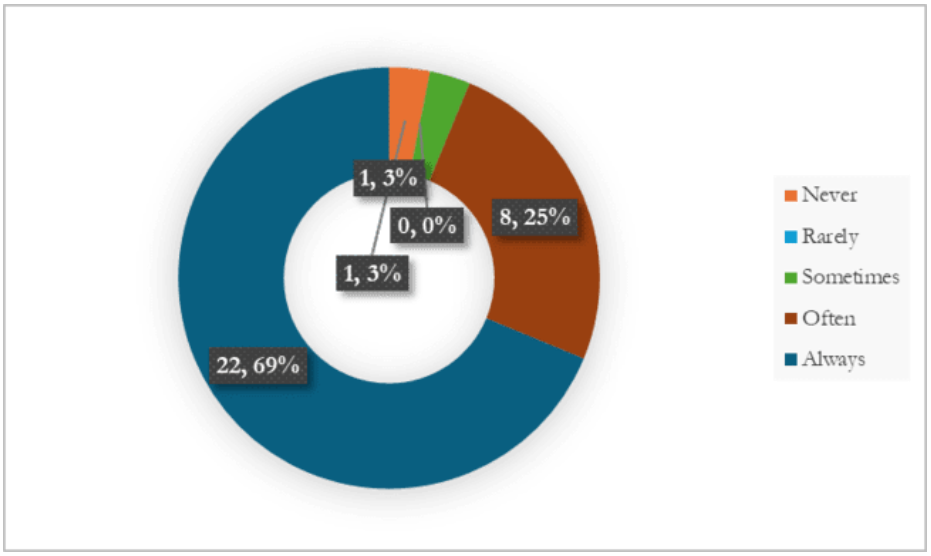


Figure 1. Response to statement "I feel proud when I throw rubbish in its place"

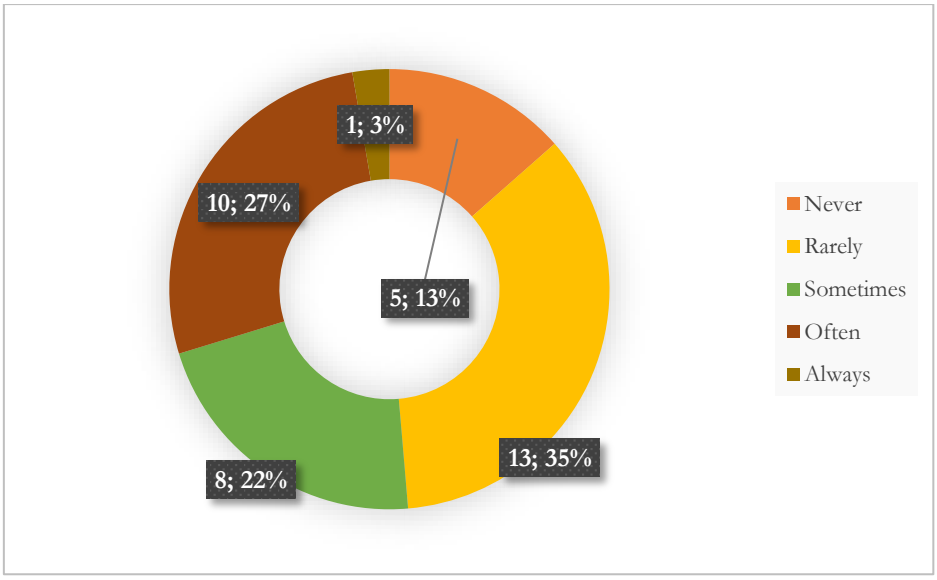


Figure 2. Response to statement "When walking past scattered rubbish, I will pretend not to see it and let the rubbish remain scattered"

Figure 2 shows that there are still students who litter, claiming it is normal or that the nearest bin is too far away; there is a lack of awareness regarding the care of campus plants, as some students still trample on them; and some toilets remain dirty after use because they are not cleaned, often due to being in a hurry. However, some students already demonstrate a good level of environmental awareness. This includes disposing of rubbish in the correct bins, picking up litter to keep the floor clean, switching off lights after use—which is not only more economical but also helps reduce global warming—and using reusable items such as water bottles and handkerchiefs. An individual's attitude also varies widely; not everyone on this earth shares the same attitude toward the environment [13,17]. An attitude is an evaluative predisposition that largely determines how an individual will act [18,19]. Attitudes are not determined solely by internal factors but are also influenced by external factors [20]. The positive attitude need to be supported by community engagement [21,22]. This result showed that environmental awareness needs a serious, systematic approach beyond a single course such as inclusion in more course such as climate change challanges [23,24].

CONCLUSION

Based on the study results, environmental awareness is classified as fairly good, with an average score of 63.93. Based on the research findings, discussion, and conclusions, the researcher offers the following recommendations: students can enhance their knowledge of the environment by using books and information from reliable sources, so they develop a sound understanding of and a responsible attitude toward the environment. Lecturers are encouraged to impart more environmental knowledge to students and organize practical sessions that foster a stronger sense of environmental awareness. Moreover, educational institutions are encouraged to incorporate environmental topics into their program, for example by increasing the number of books on the subject in their libraries, providing a platform for, and promoting activities related to the environment, thereby fostering a sense of environmental awareness among students.

ACKNOWLEDGMENTS

This research was supported by the Faculty of Teacher Training and Education, Mulawarman University, Indonesia.

AUTHOR CONTRIBUTIONS

Conceptualization, NFS and LS. Methodology, DB. Software, RA. Formal Analysis, RA. Investigation, DB. Resources, DB. Data Curation, RA. Writing Original Draft Preparation, DB. Writing Review and Editing, NFS.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Subagiyo L, Nuryadin A, Sulaeman NF, Widyastuti R. Water Quality Status of Kalimantan Water Bodies Based on The Pollution Index. Pollution Research 2019;38:536–43.

[2] Sulaeman NF, Nuryadin A, Widyastuti R, Subagiyo L. Air quality index and the urgency of environmental education in Kalimantan. Jurnal Pendidikan IPA Indonesia 2020;9:371–83. https://doi.org/10.15294/jpii.v9i3.24049

[3] Indrajaya Y, Yuwati TW, Lestari S, Winarno B, Narendra BH, Nugroho HYSH, et al. Tropical Forest Landscape Restoration in Indonesia: A Review. vol. 11. 2022. https://doi.org/10.3390/land11030328

[4] Runhaar P, Wagenaar K, Wesselink R, Runhaar H. Encouraging Students' Pro-environmental Behaviour: Examining the Interplay Between Student Characteristics and the Situational Strength of Schools. Journal of Education for Sustainable Development 2019;13:45–66. https://doi.org/10.1177/0973408219840544

[5] Jumintono, Bin Taha MR. Encouraging Awareness among Secondary School Students on Air Pollution in Supporting Environmental Protection. Journal of Curriculum and Teaching 2022;11:31–6. https://doi.org/10.5430/JCT.V11N7P31

[6] Benzehaf B, Razkane H, Benzehaf O. Exploring university students ' perceptions and engagement in environmental awareness and sustainable practices. Discover Environment 2025;3. https://doi.org/10.1007/s44274-025-00462-w

[7] Mkumbachi RL, Astina IK, Handoyo B. Environmental awareness and pro-environmental behavior: A case of university students in Malang city. Jurnal Pendidikan Geografi 2020;25:161–9. https://doi.org/10.17977/um017v25i22020p161

[8] Sukoco AA, Stefia CM, Haryanto B, Rohwiyati R, Fenitra RM. The Influence of Environmental Awareness, Environmental Attitudes, and Perceptions of Green Marketing on Consumer Trust in Environmentally Friendly Products in Modern Retail. Journal of Management and Entrepreneurship Research 2025;6:328–40. https://doi.org/10.34001/jmer.2025.12.06.4-78

[9] Smith W. The leadership role of teachers and environment club coordinators in promoting ecocentrism in secondary schools: Teachers as exemplars of environmental education. Australian Journal of Environmental Education 2020;36:63–80. https://doi.org/10.1017/aee.2020.8

[10] Aye S, Win YM, Maw SS. In-service teachers' perception towards Education for Sustainable Development (ESD) in Myanmar. Journal of Physics: Conference Series 2019;1280. https://doi.org/10.1088/1742-6596/1280/3/032043

[11] Karataş A, Karataş ; Environmental education as a solution tool for the prevention of water pollution. Journal of Survey in Fisheries Sciences 2016;3:61–70. https://doi.org/10.18331/SFS2016.3.1.6

[12] Kollmuss A, Agyeman J. Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research 2002;8:239–60. https://doi.org/10.1080/13504620220145401

[13] Boca GD, Saraçlı S. Environmental education and student's perception, for sustainability. Sustainability 2019;11:1553. https://doi.org/10.3390/su11061553

[14] Sugiyono. Metode penelitian pendidikan (pendekatan kuantitatif, kualitatif dan r & d). Bandung: Alfabeta; 2008.

[15] Indriyani S, Afandi, Wahyuni ES. Profile of Environmental Literacy Disposition Inventory (Eldi) Students of Pontianak State High Schools. Jurnal Pelita Pendidikan 2022;10:94–104.

[16] Sholahuddin A, Fitriyana R, Sya'ban MF, Sadiqin IK. Students' caring attitudes to wetland environment: A case of environmental education in Banjar district Indonesia. Jurnal Pendidikan IPA Indonesia 2021;10:149–58. https://doi.org/10.15294/jpii.v10i1.27838

[17] Dinurrohmah S, Sulaeman NF, Komariyah L, Nuryadin A, Saparini, Subagiyo L. Which Value Supports Pro-environmental Behavior ? Future Direction for Pre-service Physics Teacher. Unnes Science Education Journal 2022;11:152–8.

[18] Shultz PW. Inclusion with nature: The psychology of human-nature relations. Psychology of sustainable development., Dordrecht, Netherlands: Kluwer Academic Publishers; 2002, p. 61–78. https://doi.org/10.1007/978-1-4615-0995-0_4

[19] Oyserman D. Values, Psychology of. International Encyclopedia of the Social & Behavioral Sciences: Second Edition 2015:36–40. https://doi.org/10.1016/B978-0-08-097086-8.24030-0

[20] Maurer M, Bogner FX. First steps towards sustainability? University freshmen perceptions on nature versus environment. PLoS ONE 2020;15:1–16. https://doi.org/10.1371/journal.pone.0234560

[21] Walker C, Ardron K, Bryan A, Kavanagh AM, Runeckles H. From classrooms to communities: creating inclusive and expansive pathways to climate justice. Environmental Education Research 2026;0:1–24. https://doi.org/10.1080/13504622.2026.2648629

[22] Dewanti PA, Alhudawi U, Hodriani. Gotong Royong dalam Memperkuat Partisipasi Warga Negara (Civic Participation) 2023;2:15–22. https://doi.org/10.30596/jcositte.v1i1.xxxx

[23] Competente RJT. Pre-service teachers' inclusion of climate change education. International Journal of Evaluation and Research in Education 2019;8:119–26. https://doi.org/10.11591/ijere.v8i1.16923

[24] Vasconcelos C, Orion N. Earth science education as a key component of education for sustainability. Sustainability (Switzerland) 2021;13:1–11. https://doi.org/10.3390/su13031316