**Pedagogia: Jurnal Ilmiah Pendidikan**
Vol. 17, No. 1, July 2025, pp. 22~36
eISSN: 2460-2175 DOI: 10.55215/pedagogia.v17i1.16 

# Cultivating Pro-environmental Literacy in Future Primary School Teachers: A Pathway to Sustainable Education

**Dita Destiana, Resyi A. Gani, Fitri Siti Sundari, Aanisah Nur Fitriany**
ditadestiana@gmail.com, resyi@unpak.ac.id, fitri.siti.sundari@unpak.ac.id, aanisahnurfitriany@gmail.com
Faculty of Teacher Training and Education, Universitas Pakuan, Bogor, Indonesia

**Article Info**

***Article history:***

Submission Nov 30, 2024
First Revised Dec 20, 2024
Accepted Jan 16, 2025
Published Jul 15, 2025

***Keywords:***

environmental attitudes
environmental knowledge
primary school teacher education students
pro-environmental literacy

**ABSTRACT**

The aims of this study is to reveal the picture of pro-environmental education in elementary school teacher education students. The research sample through convenience sampling is 100 elementary school teacher training students of Pakuan University. Qualitative research methods, descriptive approaches with survey data collection techniques using questionnaire instruments and multiple-choice question tests were used to determine the percentage of students' pro-environmental literacy consisting of indicators of environmental knowledge, cognitive skills, environmental attitudes and pro-environmental behavior. The results of data processing and analysis showed that the environmental education of primary school teacher education students (PGSD students) was at a moderate level, the indicators of environmental knowledge (78.3%), cognitive skills (63.3%) and pro-environmental behavior were at a moderate level (65.6%), and attitudes towards knowledge were in the high category with a percentage (81%). In addition, the percentage also shows several sub-indicators with the highest percentage of environmental literacy, including the sub-indicator of problem-solving knowledge, the environment above the environmental literacy indicator, the sub-indicator has the ability to plan activities to investigate environmental problems on the cognitive skills indicator, the environmental assessment sub-indicator on the environmental care attitude indicator and the eco-friendly consumption sub-indicator on the pro-environmental behavior. The hope of most students is to expect more activities on campus that combine academic learning with environmental practices.



***Corresponding Author:***

Resyi A. Gani
Elementary School Teacher Education Study Program, Faculty of Teacher Training and Education
Universitas Pakuan
Jl. Pakuan, Tegallega. Kecamatan Bogor Tengah, Kota Bogor. Jawa Barat
Email: resyi@unpak.ac.id

***How to cite:***

Destiana, D., Gani, R.A., Sundari, F.S., & Fitriany, A.N. (2025). Cultivating pro-environmental literacy in future primary school teachers: A pathway to sustainable education. *Pedagogia: Jurnal Ilmiah Pendidikan*, *17*(1), 22–36. https://doi.org/10.55215/pedagogia.v17i1.16

## Introduction

Environmental issues become a global concern that requires severe attention from various parties, including educational institutions. Environmental education plays a vital part in enhancing pro-environmental education, such as understanding and awareness in fostering environmental behavior and skills to take action to support environmental sustainability (Hayati, 2020; Djanegar & Citraningtyas, 2024). The students' level of environmental education indicates strategic role in instilling pro-environmental values to young learners from a young age, especially in elementary education prospective teachers. The values of eco-spiritual education also act as an effort to strengthen pro-environmental attitudes early on in elementary school (Sari et al., 2023; Maharani et al., 2024). It also aligned with the findings which highlighted the importance of raising environmental awareness among students at the elementary or primary level of education (Pambudi et al., 2022; Simsekli, 2015; Sukma et al., 2020). However, preliminary observation showed that pro-environmental education among primary education students at one of the private universities in Bogor requires further attention. These students tend to have theoretical awareness regarding environmental issues, yet there is an imbalance between the actual practice and participation in environmental conservation activities.

Furthermore, the inadequate integration of environmental issues within the curriculum and insufficient support for the eco-friendly campus program is a challenge in and of itself. The interview results with 10 elementary education prospective teachers revealed that the students understood the importance of environmental issues but did not feel a lack of in-depth learning in class. The students mentioned that they had low participation in environmental activities due to the lack of free time or incentives, and they expressed a wish for more campus activities that combined academic learning and environmental practices.

Raising public awareness regarding the importance of environmental conservation is vital, as anti-environmentalism behavior or environmental degradation will harm the community. Since the environment is an inseparable part of human life, increasing awareness and respect for the environment can reduce environmental damage. Environmental awareness, environmental literacy, and sustainable development in education are interrelated concepts that form a critical foundation for cultivating responsible and informed citizens. Environmental awareness refers to an individual's sensitivity and concern for environmental issues, serving as the initial step toward deeper engagement (Iizuka, 2016; Handayani et al., 2021). This awareness, when developed through structured learning, evolves into environmental literacy, which encompasses knowledge, skills, attitudes, and behaviors needed to make informed decisions and take responsible actions for the environment. Sustainable development in education integrates these components into curricula and pedagogy, aiming to empower learners to contribute to environmental sustainability through critical thinking, problem-solving, and proactive behavior. Thus, enhancing environmental awareness and literacy among learners is essential for achieving the goals of Education for Sustainable Development (ESD), ensuring that education not only informs but also transforms societies toward a more sustainable future (Utomo & Roshayanti, 2025; Wilujeng et al., 2019; Kopnina, 2018).

According to the pro-environmental literacy theory, the ability of elementary education prospective teacher to understand, analyze, and respond to environmental problems is defined by key components identified by Salym et al. (2022). The key components include environmental knowledge, conceptual understanding of ecology, awareness of environmental issues, and recognition of the complexity of natural systems. Furthermore, environmental mindsets encompass environmental concern, conservation motivation, ecological responsibility, environmental skills, analytical skills, and sustainable

decision-making competencies. Emphasizesing eco-friendly practices through cognitive dimensions such as critical thinking, problem-solving, and evaluation of ecological information, as well as practical dimensions, concrete conservation actions, behavioral change, and participation in the campus community (Miao et al., 2023; Supriatna, 2021).

Previous studies on environmental literacy have widely explored the topic such as investigating environmental literacy. However, they differed from research examining environmental chemistry knowledge among elementary education prospective teachers and elementary science teachers. Responsible environmental behavior has been encouraged since childhood to promote maintaining and preserving the environment (Otto et al., 2019; Liu, J., & Green, 2024; Afriyeni, 2018). Environmental education in elementary schools has been shown to be effective in fostering environmental learning and shaping pro-environmental attitudes among students. Introducing environmental education from an early age is a highly effective strategy for developing environmental awareness (Jufri et al., 2019). Environmental education aims to foster environmentally conscious character through learning science (Santika et al., 2022). The activities and programs implemented include integrating learning activities through thematic approaches, having extracurricular programs focusing on environmental management, and spreading environmental awareness through school posters and short messages emphasizing the obligation to protect and preserve the environment. Those integrating learning could be delivered by the approach which suitable to enhance environmental awareness, such as STEM approach. Pro-environmental literacy is developed through environmental awareness and literacy among students, mastery of interactive multimedia literacy, active engagement in environmental education, and implement STEM approach-based problem solving during the learning process for elementary education prospective teacher (Widyastuti et al., 2024; Tadena & Salic-Hairulla, 2021; Purwaningsih & Wulandari, 2024).

Environmental knowledge is a fundamental component of students' environmental education and a foundation for cognitive skills, attitudes, and responsible behavior towards the environment (Nasution, 2021; Liu, J., & Green, 2024; Afriyeni, 2018). Primary components of environmental education for students include environmental care, extracurricular learning, environmental awareness, and responsibility toward the environment. These elements influence the development of environmentally conscious character in prospective teachers, reflecting environmental care values (Jayadinata et al., 2024; Yusup, 2021), shaping perspectives on addressing environmental issues and promoting the prevention of environmental damage. It is crucial to foster a sustainable environment (Education for Sustainable Development/ESD) by raising environmental awareness, maintaining cleanliness, and cultivating a caring character for the environment from an early educational stage. This concept has been widely recognized in environmental education theory (Nugroho, 2022; Aryanti, 2020).

This study aims to analyze the pro-environmental literacy level within the elementary education prospective teacherand provide recommendations to enhance the quality of this literacy through a holistic and comprehensive approach. This research presents novelty by integrating a holistic approach in the development of pro-environmental literacy specifically within the context of primary school teacher education, an area that has been relatively underexplored in previous studies. The novelty of this research lies in its focus on building environmental competence conceptually and practically for prospective teachers through a transdisciplinary approach that links knowledge, attitudes, and concrete actions towards sustainability issues. The significance of this research is very important, as prospective teachers have a strategic role as agents of change in the future who can instill sustainability values early on in their students. Thus, this research not only contributes to strengthening

environmental education at the higher education level but also supports the achievement of the Education for Sustainable Development (ESD) goals in the long term.

## Method

This study utilizes an analytical descriptive research method. According to (Walliman, 2021), analytical research encompasses a range of statistical approaches, from basic techniques to more sophisticated statistical test formulas. A key feature of this method is its reliance on responses gathered from participants selected through random sampling, followed by basic descriptive statistical analysis. This approach can be applied to both quantitative and qualitative research (Syahrizal & Jailani, 2023).

This study aims to employ a descriptive qualitative research design using a survey method based on random sampling (Walliman, 2021). The chosen survey approach seeks to provide an overview of pro-environmental literacy within the research sample, building on prior studies that examined students' competencies in environmental education during classroom learning.

The study was conducted in June 2024, targeting a population of elementary education prospective teacher at Pakuan University in Bogor. The research sample consisted of 100 students enrolled in the second semester of the 2023/2024 academic year across classes 6A, 6B, 6C, and 6D who took environmental courses with STEM approaches. Details regarding the number of respondents from each class are presented in Table 1.

**Table 1.** Research Subject

| Class respondents | Number (people/class) | Sample |
|---|---|---|
| 6A | 32 | 27 |
| 6B | 29 | 24 |
| 6C | 28 | 24 |
| 6D | 30 | 25 |
| TOTAL | 119 | 100 |

The survey method used in this research is explained in the diagram in Figure 1.

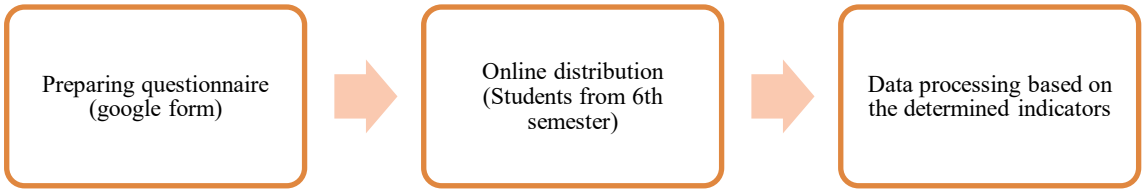


**Figure 1.** Diagram of the survey for questionnaire development

The survey was conducted online using Google Forms to reach 100 respondents. The environmental literacy questionnaire for elementary education prospective teacher at Pakuan University was distributed through the Google Form, which was administered to 100 students of sixth-semester who was selected through a random sampling technique, where respondents had completed course integrated with environmental education in the Elementary Teacher Education study program at Pakuan University.

Data collection involved written tests and questionnaires, both designed as assessment instruments to gather and describe data on environmental knowledge, attitudes, behaviors, and learning environment characteristics based on (Uno & Koni, 2024). The written test used multiple-choice questions to measure environmental knowledge and cognitive skills, while

the questionnaire aimed to capture students' pro-environmental attitudes and environmentally conscious behaviors. The indicators for environmental education used in the test instruments are cognitive skills assessment, environmental attitudes, and pro-environmental behavior instruments, presented in Table 2.

**Table 2.** Environmental Literacy Indicators

| Environmental literacy indicators | Sub-indicators for environmental literacy |
|---|---|
| Environmental knowledge | • Knowledge regarding the environmental ecology and the condition of the surrounding environment;<br>• Knowledge regarding environmental pollution (including analysis of its causes, impacts, and environmental changes);<br>• Comprehensive understanding of issues related to environmental problems. |
| Cognitive skills | • Identifying environmental problems or hurdles;<br>• Addressing environmental issues;<br>• Having the ability to plan investigative actions regarding environmental issues. |
| Environmental care attitude | • Evaluative attitude towards the environment;<br>• Cautious attitude towards the environment;<br>• Environmental sensitivity;<br>• Motivation and intention to act in solving environmental problems. |
| Pro-environmental behavior (PEB) | Taking responsibility for the environment based on *green consumerism* in daily life, including transportation, consumerism, recycling or waste reduction, and social behavior. |

The data collected from the multiple-choice tests and questionnaires consisted of 57 items: 11 questions measuring environmental knowledge, 12 questions assessing cognitive skills, 18 statements regarding environmental care attitudes, and 16 statements on pro-environmental behavior. The test and questionnaire were completed independently within a 60-minute time limit. Each multiple-choice item on environmental knowledge and cognitive skills was scored as 1 for correct answers and 0 for incorrect answers. Meanwhile, the environmental care attitude and pro-environmental behavior questionnaires were scored using a Likert scale, with response options ranging from "strongly agree" to "strongly disagree" and "always" to "never," rated from 4 to 1, based on the statements related to environmental care and pro-environmental behavior.

Upon completing the tests and questionnaires, data were collected and analyzed to determine the levels of environmental knowledge, cognitive skills, pro-environmental attitudes, and pro-environmental behavior among geography education students. The categories for these levels can be seen in Table 3.

**Table 3.** Environmental Literacy Categories

| | Incicators | Category – Score | | |
|---|---|---|---|---|
| | | Low | Moderate | High |
| 1 | Environmental knowledge | 1-4 | 5-8 | 9 - 11 |
| 2 | Cognitive skills | 1-4 | 5-8 | 9-12 |
| 3 | Environmental care attitude | 18-35 | 36-54 | 55-72 |
| 4 | Pro-environmental behavior | 16-31 | 32-48 | 49-64 |

After analyzing the data based on the categorization of environmental literacy indicators, the next step involved calculating the percentage of responses according to the environmental education indicator categories using the following formula (1):

$$P = \frac{f}{N} \, x \, 100\% \quad (1)$$

*Where:*
*P : Percentage*

*f : Number of students who agreed with the specific indicator category*
*N : Total number of respondents*

The percentage formula was also used to determine the percentage for each sub-indicator of the four environmental education indicators. Once the percentage results were obtained, they were summarized and tabulated according to the category levels of each environmental education indicator.

## Results and Discussion

The findings of the study indicate that the overall proficiency in environmental education amongst elementary school teacher education students at Pakuan University is classified as relatively high. This assessment is based on the percentage distribution across various environmental education indicators, which predominantly fall within the medium and high categories. The development of this proficiency occurs each semester within a structured learning framework, which is designed to convey moral messages promoting environmental conscious behavior and a pro-environmental mindset without imposing obligations (Raisa, 2019). The percentage results for each environmental education indicator are exemplified in the Table 4, with data derived from specific environmental pro-literacy criteria.

**Table 4.** Environmental Literacy Results

| Class respondents | Environmental knowledge | Environmental care attitude | Cognitive skills | PEB |
|---|---|---|---|---|
| 6A | 80% | 82% | 92% | 90% |
| | 80% | 82% | 98% | 92% |
| | 81% | 80% | 100% | 92% |
| | 80% | 70% | 100% | 98% |
| 6B | 90% | 82% | 98% | 92% |
| | 92% | 79% | 90% | 90% |
| | 98% | 80% | 81% | 80% |
| | 96% | 83% | 80% | 90% |
| 6C | 68% | 80% | 67% | 71% |
| | 85% | 79% | 80% | 83% |
| | 90% | 80% | 100% | 100% |
| | 80% | 81% | 85% | 88% |

A random sample of data was collected from 100 respondents divided into 12 groups, who either responded or did not respond through the provided Google Form link. According to the theory of planned behavior (Conner, 2020), pro-environmental behavior is influenced not only by individual intentions but also by social norms and perceived behavior control. In this context, universities are expected to create a supportive environment and provide an adequate curriculum to enhance students' environmental education. Preliminary observations reveal that while elementary school teacher education students at Pakuan University possess sufficient theoretical knowledge, their participation in environmental activities remains limited.

Indicators of environmental knowledge, cognitive skills, and pro-environmental behavior amongst sixth-semester elementary education prospective teachers were found to be at an average level, while environmental concern indicators were at a high level. These findings align with previous research conducted by Fidan & Ay (2016), which highlighted that the environment serves as a space for daily activities and environmental literacy implemented in social studies. However, environmental degradation persists due to the negative impacts of human activities, despite awareness of the importance of environmental

preservation. One approach to addressing this issue is through education that integrates cognitive, attitudinal, and motor skills to promote sustainable environmental development.

While environmental education can be integrated into school and university curricula to foster environmentally responsible character development (Rezkita & Wardani, 2018). However, there remains a weak correlation between environmental knowledge and environmental awareness (Handayani et al., 2022). Nevertheless, elementary school teacher education students at Pakuan University demonstrate a high percentage of environmental awareness. This can be attributed to experiences, integrated program activities within lectures, and participation in Guseda student association program Milampah Ilmu. This program involves direct community and environmental engagement, such as establishing community libraries and organizing food-sharing events. These activities play a pivotal role in shaping environmental awareness as part of students' character development, particularly amongst elementary school teacher students who are encouraged to care for their surroundings. Adolescents naturally grow their self-concept and environmental knowledge in alignment with caring attitudes toward their environment (Pusparani & Miranto, 2021).

Therefore, the moderate level of pro-environmental behavior amongst students is influenced by their environmental knowledge, reflecting the symmetrical relationship between these two variables (Effendi et al., 2020). Social motivation also significantly impacts pro-environmental behavior, such as reducing the use of single-use plastics. This behavior is rooted in understanding the environmental knowledge and concern, which serves as a foundation for individuals to preserve nature and mitigate environmental problems (Ardhiyansyah et al., 2023).

Based on the acquired data, the overall environmental concern amongst elementary education prospective teachers is reasonably moderate. Their interaction with the environment further reinforces this behavior. Integrating a STEM (Science, Technology, Engineering, and Mathematics) approach in learning is particularly relevant in preparing students for the challenges of the industrial revolution 4.0 (Mulyani, 2019). Furthermore, STEM-based learning positively impacts students' outcomes, particularly in the context of alternative energy. So that, this indicates a positive influence of the STEM approach on both teachers and students, especially in experimental class. Thus, the students' also has environmental awareness and literacy in positive way (Tadena & Salic-Hairulla, 2021; Purwaningsih & Wulandari, 2024).

Environmental literacy is a foundational ability shaped by early exposure to environmental education within the family. It is crucial for individuals to develop environmental literacy as part of their education to enhance environmental knowledge, cognitive skills, attitudes, and pro-environmental behavior. The objectives of environmental education extend beyond individuals to encompass broader community groups (Sari et al., 2023; Al Idrus & Rahmawati, 2021). Environmental education aims to promote environmental awareness among all living beings (Santoso et al., 2021).

Environmental literacy consists of four main indicators, each encompassing specific sub-indicators. For instance, environmental knowledge is divided into three levels of understanding. For elementary school teacher education students, environmental education includes knowledge about environmental pollution, impact analysis, and strategies to address environmental issues. The percentage responses for each sub-indicator of environmental knowledge amongst elementary school teacher education students are presented in Table 5.

**Table 5.** Percentage of Environmental Knowledge Sub-indicators

| Environmental literacy indicator | Sub-indicators for environmental literacy | Answers (%) | |
|---|---|---|---|
| | | Yes | No |
| Environmental knowledge | Knowledge regarding the environmental ecology and the condition of the surrounding environment. | 56.1 | 45.9 |
| | Knowledge regarding environmental pollution (including analysis of its causes, impacts, and environmental changes. | 66.5 | 53.7 |
| | Comprehensive understanding of issues related to environmental problems. | 77.6 | 29.4 |

In the environmental knowledge indicator, key topics include the growth of environmental knowledge, learning activities, and outcomes through the STEM approach, Earth and Space Sciences, as well as the scientific approach. Additionally, the role and function of an individual's environment knowledge in managing environmental degradation effectively within their surroundings are highlighted (Muharuddin, 2019). Amongst the sub-indicators of environmental knowledge, the highest percentage, 77.6%, pertains to students' problem-solving knowledge related to environmental issues. This is followed by knowledge about environmental pollution, encompassing the analysis of causes, impacts, and environmental damage, with a percentage of 66.5%, and knowledge about the environment and its conditions at 56.1%. These findings suggest that geography education students have a significant understanding of environmental knowledge components within the framework of environmental literacy. The teaching process plays a critical role in fostering environmental knowledge, particularly through investigative learning that explores environmental phenomena and challenges. This approach enables students to comprehend local environmental issues and devise effective alternative solutions promptly.

Furthermore, the cognitive skills indicator comprises three sub-indicators, these sub-indicators are: the ability to identify environmental issues or problems; the ability to analyze these issues, and; the ability to plan actions to investigate and address environmental problems. These sub-indicators are utilized to determine the level of cognitive skills amongst geography education students. The percentages of these three sub-indicators of cognitive skills are presented in Table 6.

**Table 6.** Percentage of Environmental Knowledge Sub-indicators

| Environmental literacy indicator | Sub-indicators for environmental literacy | Answers (%) | |
|---|---|---|---|
| | | Yes | No |
| Cognitive skills | Identifying environmental problems or hurdles. | 58 | 48 |
| | Addressing environmental issues. | 65.2 | 38.8 |
| | Having the ability to plan investigative actions regarding environmental issues. | 66.4 | 38.2 |

The skills of identifying, analyzing, and planning actions to investigate environmental issues are recognized as mental activities within the cognitive (internal). The cognitive domain encompasses various mental processes such as thinking, understanding, and problem identification (Hartini et al., 2021). Amongst elementary education prospective teachers, the ability to plan actions for investigating environmental issues and analyze environmental problems is reflected in their performance, with 66.4% and 65.2% of answers correct, respectively. The ability to identify environmental issues is slightly lower, with 58% of questions answered correctly. These percentages represent the cognitive skills of elementary school teacher education students and highlight their capacity to address environmental problems effectively.

The findings emphasize the interconnectedness of elementary school teacher education teachings, which not only enhances students' environmental awareness and knowledge, but

also develops their cognitive skills, a fundamental component of their competencies. Environmental education fosters both environmental literacy and the cognitive skills required for analyzing environmental issues (Santoso et al., 2021).

The environmental literacy indicator, particularly environmental awareness, plays a vital role in measuring students' literacy level concerning the environment. This is supported by comparative studies that show significant differences in environmental education outcomes and awareness between Adiwiyata and non-Adiwiyata programs (Herlina et al., 2021). Higher-order thinking skills at the tertiary level are cultivated through learning competencies that emphasize critical and analytical thinking (Setiawati et al., 2019). Environmental awareness can be shaped by various factors, including programs such as Adiwiyata, which promote environmental literacy and awareness. Environmental elements, conditions, and personal values as well as individual characters also contribute to fostering environmental awareness. This awareness is further reinforced through environmental-based learning activities on topics such as pollution (Afrianda et al., 2019; Fitriati et al., 2019; Warni et al., 2022). Developing an individual with environment awareness involves demonstrating literacy and sensitivity through practical actions such as cleaning and participating in reforestation (Novianti, 2022; Siskayanti & Chastanti, 2022; Sabardila et al., 2020). The percentages for the sub-indicators of environment awareness amongst elementary school teacher education students are presented in Table 7.

**Table 7.** The percentages for the sub-indicators of environmental awareness

| Sub-indicators for environmental care attitude | Answer (%) | | | |
|---|---|---|---|---|
| | Strongly agree | Agree | Somewhat agree | Disagree |
| Evaluative attitude towards the environment. | 58.2 | 34.8 | 56.8 | 66.1 |
| Cautious attitude towards the environment. | 58.2 | 55.3 | 66.5 | 56.7 |
| Environmental sensitivity. | 33.6 | 56.2 | 45.6 | 34.3 |
| Motivation and intention to act in solving environmental problems. | 45.6 | 56.6 | 67.8 | 56.4 |

Based on the table above, it can be concluded that the evaluative and environmental sensitivity behavior sub-indicators show a high percentage of 58.2% and 55.3% of respondents chose "agree" to support the statement of being environmentally-attentive, respectively. The sub-indicator for motivation and intention to address environmental problems shows that 45.6% of respondents selected "strongly agree," highlighting their commitment to fostering an environmental-care attitude.

The result indicates that the elementary school teacher education students in this program demonstrate an ability to enhance attentiveness and sensitivity as well as motivation in addressing environmental issues, in alignment with the concept of environmental awareness. This result also supports the objectives of elementary school teacher education learning, which aims to improve attitudes and environmental awareness among students, regardless of gender (Dasrita et al., 2015). Environmental education indicators are utilized to assess achievements in attitudes, behaviors, awareness, concern, and environmental friendliness, both globally and within specific communities (Tareze et al., 2022).

Environmental literacy and pro-environmental behavior reflect an individual's capacity to actively participate in addressing environmental challenges (Hendarni et al., 2006). Pro-environmental behavior is characterized by environmentally friendly actions, awareness, and character development through various experiences. The implementation of environmentally friendly behaviors, such as reducing fuel consumption, using sustainable transportation, engaging in recycling, and participating in skill-building activities, requires early awareness to foster concern for the environment. These activities align with the concept of green consumerism. Green consumerism can be integrated into independent curricula

through P5 learning models, where environmentally conscious consumer practices contribute to pro-environmental behaviors in daily life (Kuslantasi et al., 2022; Nindyati, 2023; Istiana et al., 2020).

Environmentally friendly consumer activities are connected to learning components, such as educational materials, and emphasize pro-environmental behaviors in everyday life. These behaviors are reflected in five sub-indicators: transportation, consumerism, recycling activities, environmentally conscious perspectives, and social behaviors (Kuslantasi et al., 2022; Istiana et al., 2020). Additionally, pro-environmental behavior can be promoted through energy-efficient practices in green building designs, which positively impact residents and the surrounding environment. These activities align with the three main pillars of sustainable development: environmental improvement, economic quality, and social well-being (Ghimire, 2023). The percentage distribution of the five sub-indicators of pro-environmental behavior among PGSD students at Pakuan University is presented in Table 8.

**Table 7.** The percentages for the sub-indicators of environmental awareness

| Sub-indicators for the pro-environmental behavior based on green consumerism | Answer (%) | | | |
|---|---|---|---|---|
| | Always | Often | Once | Never |
| Transportation | 14 | 19.9 | 50.7 | 15.4 |
| Consumerism | 14.3 | 24.9 | 38.9 | 21.9 |
| Recycling and waste reduction (3R) | 32.9 | 44.8 | 15.4 | 6.9 |
| Social behavior | 14 | 26 | 35 | 25 |

Based on Table 8, the sub-indicator of recycling or waste reduction activities emerges as the activity most frequently and consistently carried out in daily life. In contrast, the sub-indicator of transportation, such as the use of non-motorized vehicles like walking or cycling to campus, has the highest percentage in the “often” response category.

The prevalent use of private vehicle transportation amongst elementary school teacher education students may be influenced by several factors, including travel time, distance, costs, and the frequency of mode shifts in transportation (Pramesti et al., 2024). The behavior of addressing social studies issues, which enhances elementary education prospective teachers’ environmental sensitivity. However, the percentage of environmentally friendly activities remains low, as indicated by the sub-indicators of pro-environmental behavior based on green consumerism among education students. This reflects a need to cultivate pro-environmental behavior within elementary education prospective teachers, as it serves as a foundation for humanistic environmental education. Such education fosters responsible, environmentally friendly actions and the ability to independently protect and preserve the environment (Effendi et al., 2020; Liobikienė & Juknys, 2016).

The formation of environmental awareness enables individuals to develop sensitivity to their surrounding environmental conditions, which is often influenced by the values instilled by parents and family members (Suhardin, 2016). This is exemplified by the implementation of environmental character education in elementary schools (Naziyah et al., 2021). The relatively low percentage of various pro-environmental behavior sub-indicators amongst elementary school teacher education students presents a challenge for the elementary school teacher education study program at Pakuan University. Addressing this challenge is essential to fostering a sense of environmental responsibility and enhancing pro-environmental literacy. Efforts to cultivate pro-environmental behavior amongst elementary school teacher education students should include diverse teaching and learning programs. The enthusiasm of elementary education prospective teachers is integral to higher education’s broader role in guiding individuals toward greater social and environmental awareness. Such initiatives are critical for shaping students into environmentally conscious individuals who contribute positively to sustainable development goals.

## Conclusion

Based on the research findings, it can be inferred that the overall percentage of environmental education literacy among elementary education prospective falls within the moderate category. Specifically, the environmental knowledge indicator reached 78.3%, cognitive skills 63.3%, and pro-environmental behavior 65.6%, while the environmental-care attitude indicator was categorized as high at 81%. Meanwhile, within the pro-environmental behavior sub-indicator based on green consumerism, the sub-indicator of natural resource conservation has the highest percentage. Moreover, several steps can be taken. These indicate that three environmental education indicators among PGSD students, namely environmental knowledge, cognitive skills, and pro-environmental behavior—are still not optimal. Therefore, it is advised to implement innovative and creative learning processes that use the environment as a learning resource. This method aims to improve students' environmental knowledge and cognitive skills. Enhancing environmental knowledge will, in turn, positively affect the pro-environmental behavior of PGSD students.

## References

Afrianda, R., Yolida, B., & Marpaung, RRC (2019). Dampak program adiwiyata terhadap pendidikan lingkungan hidup dan sikap peduli lingkungan. *Jurnal Bioedukasi: Sarana Ekspresi Ilmiah*, *7* (1), 32-42.

Afriyeni, Y. (2018). Pembentukan karakter anak untuk peduli lingkungan yang ada di sekolah adiwiyata mandiri SDN 6 Pekanbaru. *PAUD Lectura: Jurnal Pendidikan Anak Usia Dini*, *1*(02), 123-133.

Al Idrus, SW, & Rahmawati, R. (2021). Analisis kemampuan awal literasi lingkungan siswa pada pembelajaran kimia lingkungan. *ANWARUL*, *1* (1), 242-253.

Ardhiyansyah, A., Iskandar, Y., & Riniati, WO (2023). Perilaku pro lingkungan dan motivasi sosial dalam mengurangi penggunaan plastik sekali pakai. *Jurnal Multidisiplin Sains Barat*, *2* (07), 580-586.

Aryanti, W. S. (2020). Menjaga Kebersihan Sekolah dan Karakter Peduli Lingkungan bagi Murid MI/SD di Indonesia. *Jurnal Ilmiah Edukatif*, *6*(1), 76-85.

Conner, M. (2020). Theory of planned behavior. *Handbook of sport psychology*, 1-18.

Dasrita, Y., Saam, Z., Amin, B., & Siregar, Y. I. (2015). Kesadaran Lingkungan Siswa Sekolah Adiwiyata. *Dinamika Lingkungan Indonesia*, *2*(1), 61-64.

Djanegar, R. S., & Citraningtyas, C. E. C. (2024). Pemanfaatan Coding dalam Ilmu Pengetahuan Alam untuk Meningkatkan Kesadaran dan Perilaku Lingkungan serta Persepsi Siswa terhadap Coding. *Jurnal Sosial Teknologi*, *4*(8), 595-608.

Effendi, M. I., Sugandini, D., Sukarno, A., Kundarto, M., Arundati, R., & Berliana, N. (2020). *Perilaku siswa yang pro lingkungan*. Zahir Publishing.

Fitriati, M., Sahputra, R., & Lestari, I. (2019). Pengaruh pembelajaran berbasis lingkungan terhadap sikap peduli lingkungan terhadap materi pencemaran lingkungan. *Jurnal Pendidikan dan Pembelajaran Khatulistiwa (JPPK)*, *8* (1).

Ghimire, B. J. (2023). Three pillars of sustainable development: Challenges versus achievements. *Journey for Sustainable Development and Peace Journal*, *1*(02), 132-146.

Handayani, A., Soenarno, S. M., & A'ini, Z. F. (2022). Hubungan pengetahuan lingkungan hidup terhadap sikap peduli lingkungan siswa SMPN 20 Depok. *EduBiologia: Biological Science and Education Journal*, *2*(1), 80-86.

Handayani, W., Ariescy, R. R., Cahya, F. A., Yusnindi, S. I., & Sulistyo, D. A. (2021). Literature review: environmental awareness and pro-environmental behavior. *Nusantara Science and Technology Proceedings*, 170-173.

Hartini, P., Setiadi, H., & Ernawati, E. (2021). Cognitive domain analysis (LOTS and HOTS) assessment instruments made by primary school teachers. *Jurnal Penelitian Dan Evaluasi Pendidikan*, *25*(1), 16-24.

Hayati, R. S. (2020). Pendidikan lingkungan berbasis experiential learning untuk meningkatkan literasi lingkungan. *Humanika: Kajian Ilmiah Mata Kuliah Umum*, *20*(1), 63-82.

Hendarni, D., Mulyanto, SP, & Suwastono, A. (2006). *Pengantar Geografi*.

Herlina, N., Suprapto, P. K., & Chaidir, D. M. (2021). Studi Komparatif Literasi Lingkungan Dan Sikap Peduli Lingkungan Siswa Sekolah Adiwiyata Dengan Non Adiwiyata. *Quagga: Jurnal Pendidikan dan Biologi*, *13*(2).

Iizuka, M. (2016). Role of environmental awareness in achieving sustainable development. *Economic Commission for Latin America and the Caribbean*. 19-34

Istiana, R., Sunardi, O., Herlani, F., Ichsan, I. Z., Rogayan Jr, D. V., Rahman, M. M., & Arif, W. (2020). Environmentally Responsible Behavior and Naturalist Intelligence: Biology Learning to Support Sustainability. *Online Submission*, *11*(2), 87-100.

Jayadinata, AK, Muqodas, I., & Ardiyanti, D. (2024). Kesadaran lingkungan calon guru sebagai ciri khas nilai kepedulian lingkungan. *Jurnal Konseling dan Pendidikan*, *12* (2), 12-23.

Jufri, J., La Fua, J., & Nurlila, R. U. (2019). Pendidikan lingkungan di sekolah dasar negeri 1 baruga kota kendari. *Al-TA'DIB: Jurnal Kajian Ilmu Kependidikan*, 164-181.

Kopnina, H. (2018). Education for sustainable development (ESD): the turn away from 'environment'in environmental education? In *Environmental and sustainability education policy* (pp. 135-153). Routledge.

Kuslantasi, U., Pambudi, B., & Sawitri, D. R. (2022). Hubungan Antara kebijakan lingkungan dengan perilaku pro-lingkungan: Sebuah kajian literatur sistematis. *Jurnal Litbang: Media Informasi Penelitian, Pengembangan dan IPTEK*, *18*(1), 31-46.

Liobikienė, G., & Juknys, R. (2016). The role of values, environmental risk perception, awareness of consequences, and willingness to assume responsibility for environmentally-friendly behaviour: The Lithuanian case. *Journal of Cleaner Production*, *112*, 3413-3422.

Liu, J., & Green, R. J. (2024). Children's pro-environmental behaviour: A systematic review of the literature. *Resources, Conservation and Recycling*, *205*, 107524.

Maharani, E. P., Budiaman, & Martini. (2024). Profil Tingkatan Literasi Lingkungan pada Peserta Didik Tingkat SMP. *JIMAD: Jurnal Ilmiah Mutiara Pendidikan*, *2*(2), 19–31.

Miao, Y., Iqbal, S., & Ayub, A. (2023). The road to eco-excellence: How does eco-friendly deliberate practice foster eco-innovation performance through creative self-efficacy and perceived eco-innovation importance. *Sustainability*, *15*(4), 3481.

Muharuddin, M. (2019). Peran Dan Fungsi Pemerintah Dalam Penanggulangan Kerusakan Lingkungan. *Justisi*, *5*(2), 97-112.

Mulyani, T. (2019). Pendekatan pembelajaran STEM untuk menghadapi revolusi industry 4.0. In *Prosiding Seminar Nasional Pascasarjana*, *2*(1), 453-460.

Nasution, R. (2021). Analisis tingkat literasi lingkungan mahasiswa FKIP Universitas Mulawarman dengan transformasi skor NELA (National Environmental Literacy Assessment). *Jurnal Ilmiah BioSmart (JIBS)*, *7*(1), 38-51.

Naziyah, S., Akhwani, A., Nafiah, N., & Hartatik, S. (2021). Implementasi Pendidikan Karakter Peduli Lingkungan di Sekolah Dasar. *Jurnal Basicedu*, *5*(5), 3482–3489.

Nindyati, A. D. (2023). *Penerapan employee green behavior: reduce, reuse dan recycling (3r) di rumah dan tempat kerja*. Rena Cipta Mandiri.

Novianti, R. (2022). Model pembelajaran untuk mengembangkan karakter peduli lingkungan pada mata pelajaran IPA. *JPB - Jurnal Pendidikan Biologi*, *2*(2), 16-23.

Nugroho, M. A. (2022). Konsep Pendidikan Lingkungan Hidup: Upaya Penenaman Kesadaran Lingkungan. *Ibtidaiyyah: Jurnal Pendidikan Guru Madrasah Ibtidaiyah*, *1*(2), 93-108.

Otto, S., Evans, G. W., Moon, M. J., & Kaiser, F. G. (2019). The development of children's environmental attitude and behavior. *Global Environmental Change*, *58*, 101947.

Pambudi, P. A., Fardiani, S. N., Zaenab, S., Hidayati, A., Permana, L. J., & Arofah, N. H. (2022). Penguatan Nilai Kepedulian Lingkungan Pada Siswa Jenjang Pendidikan Dasar. *Darma Diksani: Jurnal Pengabdian Ilmu Pendidikan, Sosial, Dan Humaniora*, *2*(2), 88-99.

Pramesti, D., Andini, N. L. P. J., Raharjo, D. A. K., & Dwipayana, A. D. (2024). Efisiensi penggunaan moda angkutan umum dengan kendaraan pribadi. *Indonesian Journal of Multidisciplinary on Social and Technology*, *2*(1), 6-16.

Purwaningsih, S., & Wulandari, S. (2024). Analysis of the Application of SDGs-Based STEM Learning in Improving Critical Thinking Abilities and Environmental Awareness. *Proceedings of the Multidisciplinary Research Community*, *1*(1), 698-704.

Pusparani, D., & Miranto, S. (2021). Hubungan konsep diri dan pengetahuan lingkungan dengan sikap peduli lingkungan peserta didik di SMA. *EduBiologia: Biological Science and Education Journal*, *1*(2), 134-141.

Raisa, S. Pengurangan Risiko Bencana (PRB) Melalui Penguatan Keterampilan Literasi Informasi Kebencanaan dalam Pengajaran Geografi. *Kontribusi Pendidikan Geografi di Era Revolusi 4.0*, 140.

Rezkita, S., & Wardani, K. (2018). Integrasi pendidikan lingkungan hidup membentuk karakter peduli lingkungan hidup di sekolah dasar. *Trihayu: Jurnal Pendidikan Ke-SD-an*, *4* (2).

Sabardila, A., Budiargo, A. D., Wiratmoko, G., Himawan, J. A., Triutami, A., Intansari, A., & Suistri, S. (2020). pembentukan karakter peduli lingkungan melalui kegiatan penghijauan pada siswa MIM Derasan Sempu, boyolali. *Buletin KKN Pendidikan*, *1*(2), 35-41.

Salym, A. Q. N., Sumarmi, S., Soekamto, H., & Osman, S. (2022). Project Based on Environment Learning dan Literasi Lingkungan dalam Kaitannya dengan Creative Thinking Skill. *J-PIPS (Jurnal Pendidikan Ilmu Pengetahuan Sosial)*, *9*(1), 63-81.

Santika, I. G. N., Suastra, I. W., & Arnyana, I. B. P. (2022). Membentuk karakter peduli lingkungan pada siswa sekolah dasar melalui pembelajaran ipa. *Jurnal Education and Development*, *10*(1), 207-212.

Santoso, R., Roshayanti, F., & Siswanto, J. (2021). Analisis literasi lingkungan siswa SMP. *JPPS (Jurnal Penelitian Pendidikan Sains)*, *10*(2), 1976-1982.

Sari, E., Awal, R., Martalasari, M., & Pandia, D. A. (2023). Profil Literasi Lingkungan Peserta Didik Sman 3 Adiwiyata Dan Sman 16 Non Adiwiyata Di Rumbai. *Bio-Lectura: Jurnal Pendidikan Biologi*, *10*(2), 265-272.

Setiawati, W., Asmira, O., Ariyana, Y., Bestary, R., & Pudjiastuti, A. (2019). *Buku penilaian berorientasi higher order thinking skills*. Direktorat Jenderal Guru dan Tenaga Kependidikan

Simsekli, Y. (2015). An implementation to raise environmental awareness of elementary education students. *Procedia-Social and Behavioral Sciences*, *191*, 222-226.

Siskayanti, J., & Chastanti, I. (2022). Analisis karakter peduli lingkungan pada siswa sekolah dasar. *Jurnal Basicedu*, *6*(2), 1508-1516.

Suhardin, S. (2016). Pengaruh perbedaan jenis kelamin dan pengetahuan tentang konsep dasar ekologi terhadap kepedulian lingkungan. *Edukasi: Jurnal penelitian pendidikan agama dan keagamaan*.

Sukma, E., Ramadhan, S., & Indriyani, V. (2020). Integration of environmental education in elementary schools. In *Journal of Physics: Conference Series, 1481*(1), 012136.

Supriatna, J. (2021). *Pengelolaan lingkungan hidup yang berkelanjutan*. Yayasan Perpustakaan Obor Indonesia.

Syahrizal, H., & Jailani, M. S. (2023). Jenis-jenis penelitian dalam penelitian kuantitatif dan kualitatif. *QOSIM: Jurnal Pendidikan, Sosial & Humaniora*, *1*(1), 13-23.

Tadena, M. T. G., & Salic-Hairulla, M. A. (2021). Raising environmental awareness through local-based environmental education in STEM lessons. In *Journal of Physics: Conference Series. 1835*(1), 012092.

Tareze, M., Indri Astuti, & Afandi. (2022). Model pembelajaran kolaborasi sdgs dalam pendidikan formal sebagai pengenalan isu global untuk meningkatkan kesadaran sosial peserta didik. *Visipena*, *13* (1), 42-53.

Uno, H. B., & Koni, S. (2024). *Assessment pembelajaran*. Bumi Aksara.

Utomo, R. K., & Roshayanti, F. (2025). Analysis of Life Skills and Environmental Literacy Oriented to ESD in Elementary School Students. *Jurnal Penelitian Pendidikan IPA*, *11*(5), 1006-1011.

Walliman, N. (2021). *Research methods: The basics*. Routledge.

Warni, K., Wulandari, F., & Sumarli, S. (2022). Analisis Sikap Peduli Lingkungan Siswa Sekolah Dasar. *Jurnal Basicedu*, *6*(2), 1645-1651.

Widyastuti, D. A., Nurtamara, L., & Ulimaz, A. (2024). Analisis Kesadaran Dan Literasi Lingkungan Pada Mahasiswa Pendidikan Biologi. *Journal on Education*, *6*(4)

Wilujeng, I., Dwandaru, W. S. B., & Rauf, R. B. A. (2019). The effectiveness of education for environmental sustainable development to enhance environmental literacy in science education: A case study of hydropower. *Jurnal Pendidikan IPA Indonesia*, *8*(4), 521-528.

Yusup, F. (2021). Learning methods on environmental education to improve pre-service teachers' environmental literacy. *Journal Of Biology Education Research (JBER)*.*2*(2), 50-55.