

30. Profile of Enviromental Literacy of Students on the Topic of Renewable Energy.pdf

by specialgra2025_4 specialgra2025_4

Submission date: 25-Jul-2025 09:12PM (UTC+0300)

Submission ID: 2676802386

File name: 30._Profile_of_Enviromental_Literacy_of_Students_on_the_Topic_of_Renewable_Energy.pdf
(332.92K)

Word count: 6709

Character count: 40324



Profile of Environmental Literacy of Students on the Topic of Renewable Energy

Suratmi^{1*}, Laihat¹, Marwan Pulungan¹, Aswasulasikin¹, Nadiah Tri Rahma¹, Latisya Ardi Utami¹

¹ Department of Elementary Teacher Education, Faculty of Teacher Training Education, Sriwijaya University, Palembang, Indonesia

Received: November 19, 2024

Revised: February 13, 2025

Accepted: March 12, 2025

Published: March 31, 2025

Corresponding Author:

suratmi@fkip.unsri.ac.id

DOI: [10.29303/jppipa.v11i3.9774](https://doi.org/10.29303/jppipa.v11i3.9774)

© 2025 The Authors. This open access article is distributed under a (CC-BY License)



Abstract: Environmental issues are becoming increasingly urgent, particularly concerning the transition to environmentally friendly renewable energy. This study aims to map the environmental literacy profile of grade VI elementary school students in the context of renewable energy, covering knowledge, attitudes, environmental utilization, and interest in environmental issues. This descriptive qualitative study utilized an instrument adapted from The Scale of Environmental Literacy (SEL). The instrument comprises four main components: (1) knowledge, (2) attitudes, (3) environmental utilization, and (4) interest in environmental issues, each measured using a Likert scale with 10 statements. The instrument was validated by experts and tested on 10 students before being distributed to 91 grade VI students from several elementary schools in Palembang via Google Forms. The findings indicate that students have a good basic understanding of environmental concepts but face challenges in comprehending renewable energy in depth. Students' positive attitudes toward the environment were relatively high, though their awareness of plastic-related issues remains low, indicating the need for increased consciousness. Their environmentally friendly behaviors were generally consistent, albeit with some inconsistencies. Students showed a high interest in environmental issues but require reinforcement through real-world contextual learning approaches and active support from teachers and parents. These findings can serve as a basis for designing more effective and contextual learning strategies in environmental education at the elementary level.

Keywords: Elementary School; Environmental Issues; Environmental Literacy; Renewable Energy

Introduction

Environmental issues remain a major concern. Environmental issues remain a major concern across various sectors, including global policy and education, as efforts to address climate change and environmental degradation become increasingly urgent. Among the pressing challenges is the lack of awareness regarding sustainable use of natural resources, particularly energy. Renewable energy, as an environmentally friendly alternative to fossil fuels, plays a strategic role in achieving sustainability. However, public awareness of the importance of transitioning to renewable energy remains low. Renewable energy utilization is still not widely understood, and energy-saving awareness and

behavior among the public are also lacking (Rusdi et al., 2021). This aligns with Dewi et al. (2023) research, which shows that many people are still unfamiliar with the basic concepts of renewable energy, such as using solar panels for household electricity needs.

In the educational context, environmental literacy is a crucial foundation for fostering youth awareness and responsibility toward the environment. Environmental literacy encompasses the ability to understand, interpret, and take actions supporting environmental preservation. Kurniati et al. (2021) define environmental literacy as a set of knowledge, awareness, and skills essential for maintaining environmental balance and solving various environmental problems. Similarly, Nuri et al. (2023) emphasize that environmental literacy involves not only

How to Cite:

Suratmi, S., Laihat, L., Pulungan, M., Aswasulasikin, A., Tri Rahma, N., & Utami, L. A. (2025). Profile of Environmental Literacy of Students on the Topic of Renewable Energy. *Jurnal Penelitian Pendidikan IPA*, 11(3). <https://doi.org/10.29303/jppipa.v11i3.9774>

awareness but also practical skills supporting environmental norms.

Elementary environmental education plays a strategic role in shaping environmentally conscious character, as highlighted by Ainin & Asafri (2023) and Ludiya (2024). Integrating environmental education into the elementary curriculum is essential for raising environmental awareness and encouraging active involvement in preservation efforts. Childhood is a critical period for forming values and attitudes that influence future behaviors (Azima & Yumna, 2022; Nurhikmah & Hasanah, 2021). However, little research has explored the extent of environmental literacy, particularly on the topic of renewable energy, among elementary school students. This research gap underscores the importance of environmental education in cultivating a generation aware of sustainable energy practices. Most environmental literacy studies at the elementary school level tend to be general in nature, focusing on issues such as pollution, waste management, or recycling. This study specifically highlights the aspect of renewable energy, which represents a strategic and complex theme to introduce at an early age (Varela-Candamio et al., 2018).

This study aims to map the environmental literacy profile of grade VI elementary school students on the topic of renewable energy. The findings are expected to provide a comprehensive overview of students' literacy levels, including their knowledge, attitudes, and skills. Furthermore, the research outcomes could inform the development of more effective learning strategies for enhancing students' environmental literacy, especially on critical topics such as renewable energy.

Method

This study utilized a descriptive qualitative method to obtain an overview of the environmental literacy profile of grade VI elementary school students on the topic of renewable energy. The method enabled researchers to explore the characteristics of students' environmental literacy in detail based on data collected through research instruments. The primary instrument in this study was an environmental literacy scale developed based on The Scale of Environmental Literacy (SEL) created by Kaplowitz and Levine (2005) and adapted by Tuncer et al. (2009), as cited in Suratmi et al. (2024). The instrument focused on four components of environmental literacy: knowledge, attitudes, environmental utilization, and interest in environmental issues. Modifications were made to adapt the language and context for better comprehension by elementary school students, while maintaining the essence of the components being measured.

The knowledge component referred to students' understanding of various environmental aspects, including biodiversity, climate change, renewable energy utilization, and environmentally friendly lifestyles. This knowledge is crucial as a foundation for students' awareness and actions toward the environment. The attitudes component focused on students' perspectives on the environment, encompassing awareness of environmental impacts, responsibility for preservation, concern for critical issues, and appreciation for natural beauty. Positive attitudes are expected to encourage active participation in environmental conservation efforts.

The third component, environmental utilization, described how students responsibly used the environment, such as conserving energy, managing water efficiently, and participating in greening activities around their homes or schools. Wise environmental utilization supports the sustainability of all living things. The final component, interest in environmental issues, measured students' desire to delve into environmental topics and actively engage in activities aimed at solving environmental problems. This interest drives students to take proactive roles in preserving the environment.

The knowledge component was measured using 15 multiple-choice questions that assessed students' understanding of basic environmental and renewable energy concepts. Meanwhile, the attitudes, environmental utilization, and interest components were measured using a Likert scale with 10 statements, where students were asked to indicate their level of agreement with the presented statements. Instrument validation was conducted by an expert to ensure the accuracy and relevance of the instrument in measuring elementary school students' environmental literacy.

The instrument was then tested on 10 grade VI students from SDN 25 Indralaya, consisting of 5 male and 5 female students. The trial was conducted in person using paper-based media to identify valid instrument items aligned with the research objectives. The trial results were analyzed, and adjustments were made to aspects requiring refinement before the instrument was deemed ready for use.

The refined environmental literacy instrument was subsequently converted into a Google Form and distributed to grade VI students from various elementary schools in Palembang. The instrument was disseminated online without restriction to a single school, ensuring representation of students from multiple schools. A total of 91 students participated in completing the instrument, comprising 48 males and 43 females, from several schools in Palembang, including SDN 4, SDN 17, SDN 19, SDN 23, and SDN 27. Online data collection enabled respondents to complete the

questionnaire flexibly, minimizing external influences on students' responses.

The collected data were analyzed using a descriptive qualitative method to portray the environmental literacy profile of students across the four predetermined components. Data analysis began with downloading results from Google Forms in spreadsheet format, followed by grouping responses based on the environmental literacy components, which included knowledge, attitudes, environmental utilization, and interest in environmental issues. The data were analyzed descriptively, including percentage and frequency calculations, to identify students' overall environmental literacy profile. The findings were interpreted to provide a comprehensive understanding of the environmental literacy level of grade VI students concerning renewable energy, enriching insights into the state of environmental literacy at the elementary school level.

Result and Discussion

The results and discussion aim to provide a detailed overview of the environmental literacy profile of grade

VI elementary school students on the topic of renewable energy. Students' environmental literacy was measured through four main components: knowledge, attitudes, environmental utilization, and interest in environmental issues. This study involved 91 grade VI students from several elementary schools in Palembang, comprising 48 male and 43 female students.

The collected data were analyzed and presented in result diagrams, facilitating the interpretation of students' response distribution. Each chart was interpreted descriptively to identify general patterns, understand areas where students excel, and recognize aspects requiring further attention. This provides in-depth insights into the students' level of environmental literacy. The discussion also examines factors that may influence students' understanding and attitudes, offering recommendations for educators to enhance environmental literacy through more effective teaching approaches.

Knowledge Component

The analysis of the knowledge component reveals students' understanding of environmental concepts.

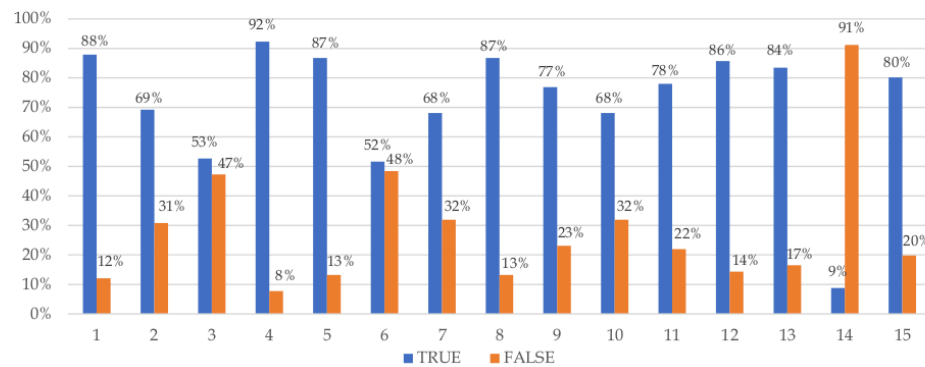


Figure 1. Environmental literacy of elementary school students in the knowledge aspect

The diagram above illustrates the percentage distribution of correct and incorrect answers across 15 questions provided to the students. Most students were able to answer correctly; however, for some questions, students exhibited low levels of understanding. For instance, Question 14 showed a significantly high percentage of incorrect responses compared to other questions. Similarly, Questions 3 and 6 also had relatively high incorrect response rates, exceeding 40%. This indicates that the concepts tested in these questions were not fully understood by most students. On the other hand, Question 4 had an almost 100% correct

response rate, demonstrating good comprehension of the tested concept. Other questions with high correct response rates, such as Questions 1, 4, 5, and 8, revealed that nearly 90% of students had a strong grasp of the basic concepts of renewable energy being assessed.

The analysis results show that most students possess a solid foundational understanding of environmental concepts, such as biodiversity and environmentally friendly lifestyles. However, in-depth comprehension of renewable energy, especially in questions requiring analytical skills, remains a challenge for students. This gap may be due to the basic

environmental knowledge more frequently taught in various contexts, both within school settings and daily life. For example, research by Mulyana et al. (2024) highlights that physical education emphasizing healthy lifestyles effectively enhances students' understanding of the importance of maintaining health, making it relatively easier for students to grasp compared to renewable energy material.

Additionally, the complex and abstract nature of renewable energy topics makes them more challenging for students to understand. This aligns with Natalia (2020) research, which found that students often struggle with renewable energy concepts due to a lack of interest in studying the subject. Questions demanding analytical abilities also pose challenges. According to Bloom's taxonomy, analytical skills fall under the C5 cognitive level, requiring students to critically break down information. This analysis indicates that students' critical thinking abilities in this area are still underdeveloped, especially for Question 14, where the incorrect response rate reached 91%. Research suggests that education emphasizing the development of critical thinking skills can enhance students' ability to address complex environmental issues (Shutaleva, 2023). This underscores the necessity of critical thinking skills to understand complex environmental topics like renewable energy, which demand higher-order analytical and evaluative skills.

Environmental literacy should encompass not only descriptive but also analytical knowledge. This is crucial as environmental issues, such as renewable energy, require understanding both the benefits and challenges involved, necessitating the ability to analyze data and information. Descriptive environmental literacy provides students with foundational knowledge about various environmental phenomena, such as types of renewable energy, pollution impacts, and the importance of biodiversity. However, this knowledge alone is insufficient to prepare students for complex environmental challenges. Critical and analytical thinking skills are needed to effectively understand and address these issues (Hariandi et al., 2023).

The low comprehension of analytical questions related to renewable energy may stem from a lack of interactive and contextual teaching approaches. One potential strategy is the implementation of project-based learning, which involves students in practical activities. For instance, Ardiyanto et al. (2021) demonstrated that implementing solar-powered public lighting systems could serve as an effective educational tool. Such activities not only provide an understanding of renewable energy but also enhance students' practical skills in applying this technology in real-life contexts. Moreover, Gumelar et al. (2019) emphasized the importance of active learning in improving students'

knowledge of renewable energy, where students showed significant increases in knowledge and enthusiasm after engaging in interactive and participatory learning activities. Research shows that project-based learning can boost students' motivation and engagement while helping them develop the analytical skills needed to comprehend complex material (Putri et al., 2022).

These findings also highlight that teaching environmental literacy in elementary schools should emphasize more contextual learning approaches. For instance, on the topic of renewable energy, students need to understand how renewable energy technologies function and the social and environmental impacts of their use. Contextual approaches can help students see the connection between theory and practice, enabling them to analyze and apply their knowledge in real-world situations (Diale et al., 2021). This aligns with findings that teaching materials tied to students' everyday lives can enhance their understanding (Herawati et al., 2023). Complex topics like renewable energy can be more easily understood when presented through hands-on activities or simulations, allowing students to relate them to their daily experiences.

Additionally, questions with high correct response rates, such as Questions 1, 4, 5, and 8, show that students have a stronger understanding of basic concepts, such as healthy lifestyles and biodiversity. These concepts are often taught through direct teaching methods, allowing students to directly grasp the impact of their actions on the environment. For example, physical exercise or sports activities in schools are conducted to encourage students to adopt healthy lifestyle practices in their daily lives (Azima & Yumna, 2022).

Overall, the environmental literacy profile of students in the knowledge component indicates that while their foundational understanding of the environment is adequate, specific concepts like renewable energy require further reinforcement. This suggests that environmental literacy demands diverse and sustainable approaches, particularly for more technical and scientific issues. Therefore, it is essential to understand that environmental literacy encompasses not only knowledge but also the skills and attitudes necessary to act responsibly toward the environment (Kurniati et al., 2021).

Building on these findings, enhancing environmental literacy in the knowledge component can be achieved through implementing more interactive project-based learning methods. Project-based learning engages students in independent or group problem-solving processes, aligning with environmental literacy education. Additionally, students are given opportunities to investigate environmental issues in depth, gather data, and analyze the information they

obtain. This approach not only enhances students' understanding of environmental issues but also helps them develop the analytical skills necessary to evaluate information and make informed decisions (Fang et al., 2023). Thus, students will be better prepared to tackle cognitive challenges at the analytical and evaluative levels, deepening their understanding of renewable energy and other environmental issues.

Attitude Component

The attitudes component focuses on students' attitudes toward the environment, including awareness of environmental impacts, responsibility for preservation, concern for critical issues, and appreciation of nature. Below is a diagram showing the results for this component.

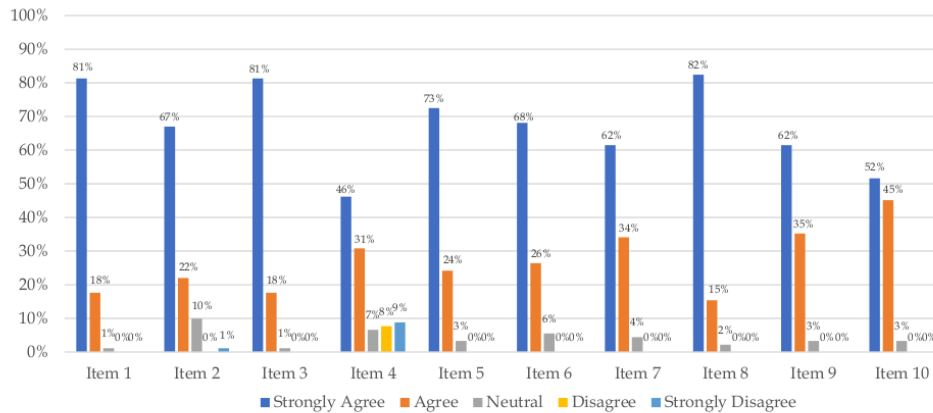


Figure 2. Environmental literacy of elementary school students in terms of attitude

Based on the analysis, the majority of students demonstrated positive attitudes toward the environment. This was evident in Items 1, 3, and 8, where more than 80% of students strongly agreed with statements emphasizing the importance of maintaining cleanliness and environmental conservation. These attitudes reflect high environmental awareness among students, forming an essential foundation for pro-environmental behavior. These findings align with the Environmental Attitude Behavior Model proposed by Kaiser et al. (1999), which suggests that positive attitudes toward the environment influence tangible conservation actions. Additionally, in Item 5, over 70% of students strongly agreed about maintaining cleanliness in their school environment, indicating a strong willingness to actively participate in environmental preservation.

In other aspects, Items 2, 6, 7, and 9 revealed that more than 60% of students displayed positive attitudes toward using environmentally friendly products, managing natural resources, and taking personal responsibility for environmental preservation. These attitudes reflect students' understanding of the importance of sustainability, aligning with sustainability education approaches that emphasize integrating

sustainability values into the curriculum. Such approaches aim to equip students with the knowledge, skills, and attitudes needed to address complex environmental challenges and contribute to sustainable development (Correia et al., 2022). Furthermore, in Item 10, nearly 100% of students agreed or strongly agreed with learning more about ways to protect the environment, indicating high enthusiasm for exploring environmental issues. This enthusiasm is a critical asset for fostering students to become environmental change agents in the future. However, low awareness of plastic hazards emerged as a notable concern, as seen in Item 4, where fewer than 50% of students showed concern for the detrimental effects of plastic on the environment, and nearly 10% strongly disagreed with the statement. This condition indicates the need for more specific and contextual educational approaches to raise students' awareness of the dangers of plastic.

Recommended solutions to address this issue include integrating content on plastic hazards into lessons using interactive visual media, such as animated videos or digital posters illustrating the impacts of plastic on ecosystems. The use of visual media can enhance the learning process by providing clear and engaging representations of information that may be

challenging to grasp through text alone (Nurhayati et al., 2023). Additionally, environmental action programs in schools, such as zero-waste initiatives or plastic recycling competitions, can serve as concrete steps to raise students' awareness. Student participation in environmental programs can significantly improve their knowledge and attitudes toward environmental issues (Nurdeni, 2022).

Problem-Based Learning (PBL) and experiential learning approaches can also be employed by leveraging local issues, such as plastic pollution in students' surroundings, to make lessons more contextual and relevant. Individuals' attitudes toward the environment are often shaped by their personal experiences with environmental issues. Research by Ait Taleb et al. (2021) highlights that direct experiences, such as dealing with pollution, natural disasters, or conservation activities, can increase individuals' awareness of environmental problems and encourage them to take more pro-environmental actions. These experiences can serve as strong motivational drivers for more responsible environmental behavior.

Experiential learning can be implemented in various ways within the context of elementary education. For example, students can participate in activities such as planting trees around the school, conducting field observations at environmental

conservation sites, or simulating the impacts of plastic pollution on marine ecosystems using simple teaching aids. Such activities not only provide students with concrete experiences but also allow them to perceive the impacts of their actions on the environment. This approach aligns with the experiential learning theory proposed by Kolb in 1984, as cited by Anggela & Rina (2022), which emphasizes that learning becomes more effective when students can experience, reflect, and apply what they learn in real-life situations.

Moreover, involving teachers and parents in environmental education can strengthen the development of positive attitudes among students toward the environment. These findings underscore the critical role of education in shaping students' environmental attitudes. Innovative teaching strategies are needed to address challenges in raising awareness of specific issues, such as the impact of plastic waste on the environment.

Environmental Utilization Components

The environmental utilization component describes the extent to which students are able to practice wise actions in utilizing their environment, such as energy conservation, efficient water management, or greening activities.

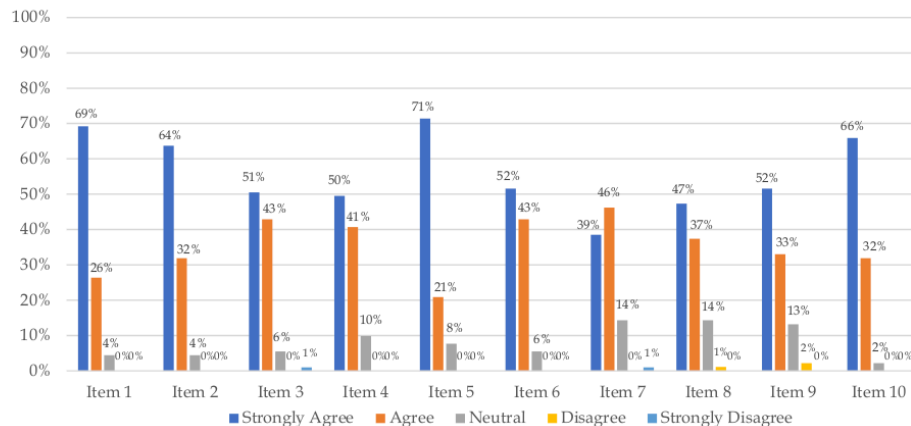


Figure 3. Environmental literacy of elementary school students in terms of environmental utilization

Based on the displayed results diagram, it can be concluded that the majority of students demonstrated good abilities in utilizing the environment responsibly, as evidenced by the dominance of "agree" and "strongly agree" responses across nearly all items. The analysis of the environmental utilization component indicates a

high level of student awareness in practicing environmentally friendly behaviors in most aspects. For Item 5, more than 70% of students strongly agreed with the habit of using personal water bottles, which reduces the use of single-use plastic bottles. This reflects a strong awareness of the importance of reducing non-

biodegradable plastic waste, aligning with the "Reduce" principle in the 3R waste management framework (Reduce, Reuse, Recycle). The application of 3R principles can help foster greater awareness of sustainable and responsible waste management (Sukmawati, 2021).

Furthermore, for Items 1, 2, and 10, more than 60% of students strongly agreed on energy-saving practices, such as turning off lights and electrical devices after use, minimizing water waste by using only the necessary amount for bathing or washing hands, and ensuring faucets are tightly closed after use. These responses indicate that the majority of students practice energy and water conservation habits, supporting the preservation of natural resources. Good learning habits can contribute to the development of resource-saving attitudes among students. These habits encompass not only effective study techniques but also heightened environmental awareness, which in turn can encourage students to adopt energy- and water-saving practices in their daily lives (Agustina et al., 2022).

For Items 3, 4, 6, 7, 8, and 9—covering the sustainability of all living beings, greening efforts, environmental cleanliness, recycling programs, energy conservation through walking, and water management for plant irrigation—the percentage of students selecting "agree" and "strongly agree" was also relatively high. However, for some items, a small number of students chose "disagree" or "strongly disagree". For example, in Items 3, 7, 8, and 9, the negative responses, though small, indicate a need to strengthen their understanding of the direct benefits of these actions for their surroundings.

Strengthening students' understanding of the immediate benefits of daily actions on their environment is crucial. Research indicates that character education focusing on environmental care can be instilled early, particularly at the elementary school level (Hariandi et al., 2023). Providing students with the knowledge and skills necessary to understand the impact of their actions on the environment can foster a more responsible and caring generation.

These findings suggest that most students are capable of applying environmentally friendly values in their daily activities. However, the presence of students who disagreed with certain items indicates the need for additional approaches, such as experiential learning, to more deeply instill sustainability values. Through this method, students can observe the tangible impacts of their actions on the environment, enhancing their motivation to act responsibly.

Moreover, it is essential to create a supportive learning environment. This aligns with Jamilah (2023), who emphasized that support from teachers and parents is vital in fostering positive habits among students. Establishing a nurturing environment and providing opportunities for students to actively engage can encourage them to consistently practice positive habits in their environmental utilization.

Components of Interest in Environmental Issues (Concern)

Below is a diagram illustrating the results of the interest component, which measures students' desire to delve into environmental issues and actively contribute to solving environmental problems.

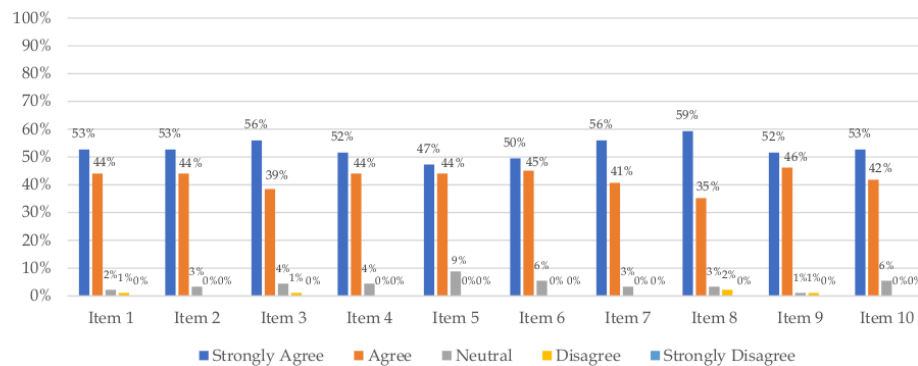


Figure 4. Environmental literacy of elementary school students in terms of interest

Based on the analysis of the interest component (Concern) in environmental issues, most students demonstrated positive responses, with most selecting

"agree" and "strongly agree" across various statements. This indicates a high level of student interest in exploring environmental issues and contributing to

solving these problems. For example, in Items 3, 7, and 8—related to the desire to learn about the impacts of air pollution on health and the environment, protecting animals, and saving energy—most students showed strong interest and curiosity. Positive responses were also observed in statements regarding reducing plastic waste and efficient water management, reflecting students' interest in the importance of environmentally friendly practices in daily life. However, a small number of respondents selected "disagree" for certain items, such as Items 1, 3, 8, and 9. This suggests there is still room to improve students' understanding and active engagement with specific environmental issues.

These findings align with environmental education theories emphasizing that fostering students' interest and awareness of environmental issues is a foundational step in shaping pro-environmental behavior. The theory of environmental literacy posits that environmentally literate individuals possess adequate knowledge, positive attitudes, and behaviors that support environmental preservation (Berlian et al., 2023). Effective environmental education should integrate theoretical knowledge with practical applications. Creating a learning environment that supports positive interactions between students and environmental issues is crucial for building their awareness and interest in environmental conservation. This approach aligns with social cognitive theory, which highlights the interplay between individuals, their environment, and behavior, demonstrating that behavioral change can occur through observation and experience (Ningsih, 2023).

To enhance student interest, educational programs should emphasize real-world context-based learning, such as project-based activities involving waste management, energy conservation, and school greening initiatives. This approach allows students to connect their knowledge to real-life situations, enabling them to not only learn theories but also understand their practical applications in relevant environmental contexts. Studies indicate that learning experiences integrated with local contexts can increase students' awareness and concern for environmental issues (Ginting et al., 2023).

Moreover, support from teachers and parents is key to ensuring the sustainability of real-world context-based learning on environmental issues. Teachers should function not only as information providers but also as facilitators who inspire and motivate students to participate in environmentally related activities (Priantari et al., 2022). Meanwhile, parents can provide support through attention and adequate resources, which enhance students' motivation to learn. Parents who model environmentally friendly behaviors at home can inspire their children to adopt similar attitudes (Bahri & Trisnawati, 2021). This synergy can create a

positive environment that supports the development of students' interest in environmental issues.

Extracurricular activities focusing on the environment, such as environmental clubs or cleanliness campaigns, can also serve as effective platforms for engaging students and their parents. These activities not only improve students' environmental knowledge but also foster a sense of responsibility and care for the environment (Takdir et al., 2023). Through these approaches, students' interest in environmental issues can not only be sustained but also strengthened into a long-term commitment to contribute to environmental preservation.

Conclusion

Based on the research findings, it can be concluded that the environmental literacy profile of grade VI elementary school students on the topic of renewable energy shows varied results across four main components: knowledge, attitudes, environmental utilization, and interest in environmental issues. Students generally possess a good foundational understanding of environmental concepts, such as biodiversity and environmentally friendly lifestyles. However, in-depth understanding of renewable energy, particularly aspects requiring analytical skills, remains a challenge. This highlights the need for more interactive and contextual learning approaches, such as project-based learning, to enhance students' analytical abilities.

Most students demonstrated positive attitudes toward the environment, with a high level of awareness regarding the importance of cleanliness and environmental preservation. However, awareness of the dangers of plastic remains low, necessitating more targeted educational efforts, such as using visual media and environmental action programs in schools. Students have shown prudent practices in utilizing the environment, including energy conservation, water management, and reducing plastic use. Nevertheless, there is a need to strengthen understanding and consistency in applying sustainability values through direct experiences and a supportive learning environment. Students' interest in environmental issues is quite high, particularly in studying the impacts of pollution, protecting animals, and conserving energy. However, there is still room to enhance active student engagement in solving environmental problems through real-world context-based learning approaches.

Overall, these findings indicate that students' environmental literacy requires diverse, interactive, and sustainable educational approaches. The integration of theory and practice, support from teachers and parents, and enriching students' experiences through project-

based activities and environmental actions are expected to enhance their environmental literacy, especially on the topic of renewable energy.

Acknowledgments

The authors express their gratitude to the Research and Community Service Institute (LPPM) of Sriwijaya University for funding this study through the Competitive Flagship Funding Scheme in 2024. Thanks are also extended to all respondents who participated in the research, as well as to the grade VI students from schools in Palembang City who took part as research subjects.

Author Contributions

The first author was responsible for the conceptualization of the research, methodology development, overall supervision of the study, and manuscript writing. The second and third authors contributed to the preparation of research instruments, data collection, and analysis. The fourth author handled data visualization and the initial drafting of the article. The fifth author managed resources, including access to respondents and research facilities. The sixth author performed the final editing of the manuscript, ensured the accuracy of references, and aligned the article with journal guidelines.

Funding

This research was funded by a competitive research grant from Sriwijaya University.

Conflicts of Interest

The authors declare no conflicts of interest related to this research. The study was conducted entirely independently, and the funding institution had no role in the study design, data collection, analysis, interpretation, manuscript writing, or the decision to publish the results.

References

- Agustina, M. D., Hudha, M. N., & Kumala, F. N. (2022). Pengembangan Video Pembelajaran (Animasi) Lingkungan Terhadap Peningkatan Literasi Lingkungan Siswa Tentang Topik Hemat Energi. *Experiment: Journal of Science Education*, 2(1), 1-10. <https://doi.org/10.18860/experiment.v2i1.13236>
- Ainin, D. T., & Asafri, H. (2023). Improving Environmental Literacy Through Primary Education: Preparing Students as Environmental Advocates. *PPSDP International Journal of Education*, 2(2), 110-118. <https://doi.org/10.59175/pijed.v2i2.114>
- Ait Taleb, Z., El Farouki, M., & El Mejdoub, M. (2021). The environmental knowledge and pro-environmental behavior of future engineers in Morocco. *E3S Web of Conferences*, 234, 1-7. <https://doi.org/10.1051/e3sconf/202123400088>
- Anggela, R., & Rina, R. (2022). Pengaruh Model Experiential Learning Terhadap Kesadaran Lingkungan Siswa Sekolah Dasar. *Sosial Horizon: Jurnal Pendidikan Sosial*, 9(2), 301-310. <https://doi.org/10.31571/sosial.v9i2.4920>
- Ardiyanto, Y., Chamim, A. N. N., & Wiyagi, R. O. (2021). Implementasi Penerangan Jalan Umum Berbasis Sel Surya Sebagai Media Pembelajaran Dan Promosi. *Prosiding Seminar Nasional Program Pengabdian Masyarakat*, 867-873. <https://doi.org/10.18196/ppm.35.62>
- Azima, N. F., & Yumna. (2022). Pendidikan Lingkungan Hidup untuk Siswa Sekolah Dasar. *Jurnal Ilmiah Pendidikan Lingkungan Dan Pembangunan*, 22(02), 1-11. <https://doi.org/10.21009/plpb.222.01>
- Bahri, S., & Trisnawati, N. (2021). The Influence of Family Environment and Social Environment on Interest in Entrepreneurship through Entrepreneurship Education among Students at SMKN 10 Surabaya. *Journal of Office Administration: Education and Practice*, 1(2), 269-281.
- Berlian, M., Vebrianto, R., Yuliastrin, A., & Efendi, S. (2023). Pemetaan Literasi Lingkungan pada Materi Pencemaran Lingkungan. *LITERASI (Jurnal Ilmu Pendidikan)*, 14(1), 47. [https://doi.org/10.21927/literasi.2023.14\(1\).47-53](https://doi.org/10.21927/literasi.2023.14(1).47-53)
- Correia, E., Sousa, S., Viseu, C., & Leite, J. (2022). Using the theory of planned behavior to understand the students' pro-environmental behavior: a case-study in a Portuguese HEI. *International Journal of Sustainability in Higher Education*, 23(5), 1070-1089. <https://doi.org/10.1108/IJSHE-05-2021-0201>
- Dewi, N. N., Sudarti, S., & Yushardi, Y. (2023). Analisis Pengetahuan Masyarakat Desa Sembulung Tentang Pemanfaatan Panel Surya Sebagai Energi Listrik Rumah Tangga. *Jurnal Sains Riset*, 13(1), 1-8. <https://doi.org/10.47647/jsr.v13i1.844>
- Diale, C. D., Kanakana-Katumba, M. G., & Maladzhi, R. W. (2021). Ecosystem of renewable energy enterprises for sustainable development: A systematic review. *Advances in Science, Technology and Engineering Systems*, 6(1), 401-408. <https://doi.org/10.25046/aj060146>
- Fang, W.-T., Hassan, A., & LePage, B. A. (2023). *Introduction to Environmental Education BT - The Living Environmental Education: Sound Science Toward a Cleaner, Safer, and Healthier Future* (W.-T. Fang, A. Hassan, & B. A. LePage (eds.); pp. 3-24). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-4234-1_1
- Ginting, F. W., Mellyzar, M., & Lukman, I. R. (2023). Analysis of Student Environmental Literacy: PjBL-Based Learning that is Integrated STEM. *Jurnal Penelitian Pendidikan IPA*, 9(1), 242-248. <https://doi.org/10.29303/jppipa.v9i1.2599>
- Gumelar, B. W., Widiastuti, I., & Wijayanto, D. S. (2019).

- Pembelajaran Energi Terbarukan Untuk Sekolah Dasar Studi Kasus Di Kabupaten Klaten. *Jurnal Ilmiah Pendidikan Teknik Dan Kejuruan*, 11(1), 16. <https://doi.org/10.20961/jiptek.v11i1.18504>
- Hariandi, A., Dwitama, D. B. D. P., Rahman, N. A., Ramadhani, R., & Yunsacitra, Y. (2023). Implementasi Pendidikan Karakter Peduli Lingkungan di Sekolah Dasar. *JiIP - Jurnal Ilmiah Ilmu Pendidikan*, 6(12), 10155-10161. <https://doi.org/10.54371/jiip.v6i12.3328>
- Herawati, Setiawan, A., & Hidayat, A. (2023). Development of Physics LMS Based on Science Literacy Related Energy Content in Agricultural Context (Farmer). *Jurnal Penelitian Pendidikan IPA*, 9(6), 4523-4529. <https://doi.org/10.29303/jppipa.v9i6.3590>
- Jamilah, S. (2023). Penanaman Karakter Positif Pada Anak Usia Dini Melalui Metode Ber cerita. *PELANGI: Jurnal Pemikiran Dan Penelitian Islam Anak Usia Dini*, 5(2), 218-230. <https://doi.org/10.52266/pelangi.v5i2.1907>
- Kaiser, F. G., Ranney, M., Hartig, T., & Bowler, P. A. (1999). Ecological Behavior, Environmental Attitude, and Feelings of Responsibility for the Environment. *European Psychologist*, 4(2), 59-74. <https://doi.org/10.1027//1016-9040.4.2.59>
- Kurniati, A., Dike, D., & Parida, L. (2021). Pengembangan Literasi Lingkungan untuk Membangun Sekolah Sehat dan Hijau di SD Negeri 01 Kenukut Kecamatan Kelam Permai Kabupaten Sintang. *Jurnal Abdidas*, 2(2), 223-230. <https://doi.org/10.31004/abdidas.v2i2.243>
- Ludiya, L. F. (2024). Pentingnya Membangun Kesadaran Lingkungan Melalui Pembelajaran PKN di Sekolah Dasar Guna Membentuk Karakter Peduli Lingkungan pada Siswa. *Jurnal Pendidikan Guru Sekolah Dasar*, 1(3), 11. <https://doi.org/10.47134/pgsd.v1i3.529>
- Mulyana, A., Lestari, D., Pratiwi, D., Rohmah, N. M., Tri, N., Agustina, N. N. A., & Hefty, S. (2024). Menumbuhkan Gaya Hidup Sehat Sejak Dini Melalui Pendidikan Jasmani, Olahraga, Dan Kesehatan. *Jurnal Bintang Pendidikan Indonesia*, 2(2), 321-333. <https://doi.org/10.55606/jubpi.v2i2.2998>
- Natalia, S. K. (2020). Analisis Kesulitan Belajar Sumber Energi Terbarukan dan Tidak Terbarukan Pada Mata Pelajaran IPA Kelas III SDN 105316 Beranti. *Portaluniversitasqualy*, 6-32. [http://repository.umsy.ac.id/bitstream/handle/123456789/10559/BAB II.pdf?sequence=6&isAllowed=y](http://repository.umsy.ac.id/bitstream/handle/123456789/10559/BAB%20II.pdf?sequence=6&isAllowed=y)
- Ningsih, E. F. (2023). Teori sosial kognitif dan relevansinya bagi pendidikan di Indonesia. *Humanika*, 23(1), 21-26. <https://doi.org/10.21831/hum.v23i1.29307>
- Nurdeni, N. (2022). Gerakan Cinta Lingkungan Melalui Kegiatan Green School di SDS Arruhaniyah 2 Jakarta Utara. *Jurnal Abdimas Kartika Wijayakusuma*, 3(2), 131-139. <https://doi.org/10.26874/jakw.v3i2.252>
- Nurhayati, N., Thaib, A., Miranda, A., Fitriyanti, C., & Handayani, L. (2023). Edukasi Bahaya Sampah Plastik Terhadap Ekosistem Perairan Pada Siswa Kelas I Min 32 Kecamatan Mesjid Raya Kabupaten Aceh Besar. *Al Ghafur: Jurnal Ilmiah Pengabdian Kepada Masyarakat*, 2(2), 208-214. <https://doi.org/10.47647/alghafur.v2i2.1829>
- Nurhikmah, & Hasanah, E. (2021). Manajemen Pembelajaran Berbasis Lingkungan di Sekolah Dasar 07 Pekat NTB. *Jurnal Studi Guru Dan Pembelajaran*, 4(2), 272-281. <https://doi.org/10.30605/jsgp.4.2.2021.570>
- Nuri, N., Surya, A., Destari, U., Amanda, S. R., Sahendra, Y., & Fahrimal, Y. (2023). Peningkatan Literasi Lingkungan Peserta Didik MIN 3 Aceh Barat Menggunakan Metode Board Game Ular. *Wikrama Parahita: Jurnal Pengabdian Masyarakat*, 7(1), 61-68. <https://doi.org/10.30656/jpmwp.v7i1.5466>
- Priantari, I., Rachman, A. U., & Laili, M. R. (2022). Pelatihan Penyusunan Perangkat Pembelajaran Berbasis STEAM bagi Guru PAUD. *Dedication: Jurnal Pengabdian Masyarakat*, 2(2), 256-260. <https://doi.org/10.31849/dinamisia.v2i2.1819>
- Putri, A. N., Nevrita, N., Hindrasti, N. E. K., & Sarkity, D. (2022). Penanaman Sikap Cinta Lingkungan Melalui Edukasi Pelestarian Ekosistem Mangrove Pada Siswa. *JPPM (Jurnal Pengabdian Dan Pemberdayaan Masyarakat)*, 5(1), 103. <https://doi.org/10.30595/jppm.v5i1.9021>
- Rusdi, M., Hariyanto, H., & Cipto, C. (2021). Sosialisasi Pemanfaatan Energi Terbarukan Dan Pelatihan Teknologi Tepat Guna Berbasis Solarcell Untuk Pelajar SMPIT Ibnu Sina Merauke. *Jurnal Pengabdian Masyarakat Indonesia*, 1(3), 79-84. <https://doi.org/10.52436/1.jpmi.20>
- Shutaleva, A. (2023). Ecological Culture and Critical Thinking: Building of a Sustainable Future. *Sustainability (Switzerland)*, 15(18). <https://doi.org/10.3390/su151813492>
- Sukmawati, P. D. (2021). Pengelolaan Sampah Berbasis Masyarakat Melalui 3R Dalam Upaya Pengurangan Jumlah Timbulan Sampah. *J.Abdimas: Community Health*, 2(1), 11-15. <https://doi.org/10.30590/jach.v2n1.p11-15.2021>
- Suratmi, S., Supriatna, N., Sopandi, W., & Wulan, A. R. (2024). Prospective Elementary School Teachers Environmental Literacy: What, Why, and How? *KuE Social Sciences*, 2024, 1382-1393. <https://doi.org/10.18502/kss.v9i13.16078>

- Takdir, T., Sudiyono, S., & Putra, D. F. (2023). Kontribusi lingkungan belajar dan motivasi belajar terhadap hasil belajar IPS siswa Sekolah Dasar. *Efektor*, 10(1), 88–100.
- Varela-Candamio, L., Novo-Corti, I., & García-Álvarez, M. T. (2018). The importance of environmental education in the determinants of green behavior: A meta-analysis approach. *Journal of Cleaner Production*, 170, 1565–1578. <https://doi.org/10.1016/J.JCLEPRO.2017.09.214>

30. Profile of Enviromental Literacy of Students on the Topic of Renewable Energy.pdf

ORIGINALITY REPORT

7%	7%	0%	0%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	jppipa.unram.ac.id	7%
	Internet Source	

Exclude quotes	On	Exclude matches	< 7%
Exclude bibliography	On		