



THE ROLE OF ENVIRONMENTAL LITERACY IN SHAPING STUDENTS' ECOLOGICAL AWARENESS

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ABSTRACT

This study aims to analyze the role of environmental literacy in shaping students' ecological awareness at SMK Muhammadiyah Delanggu. The research employed a qualitative approach with a case study design. Data were collected through in-depth interviews, participatory observation, and documentation, and analyzed using thematic analysis involving data reduction, data display, and conclusion drawing. The findings indicate that environmental literacy plays a significant role in fostering ecological awareness through four main aspects: the development of ecological thinking patterns, the strengthening of moral responsibility based on religious values, the transformation of collective environmental behavior within the school environment, and the formation of a pro-environmental social identity. However, the consistency of environmentally responsible behavior remains a challenge, particularly beyond the school setting. This study highlights that environmental literacy integrated with school culture and religious values has strategic potential in building sustainable ecological awareness among vocational high school students.

ABSTRAK

Penelitian ini bertujuan untuk menganalisis peran literasi lingkungan dalam membentuk kesadaran ekologis siswa di SMK Muhammadiyah Delanggu. Penelitian menggunakan pendekatan kualitatif dengan desain studi kasus. Data diperoleh melalui wawancara mendalam, observasi partisipatif, dan dokumentasi, kemudian dianalisis menggunakan teknik analisis tematik dengan tahapan reduksi data, penyajian data, dan penarikan kesimpulan. Hasil penelitian menunjukkan bahwa literasi lingkungan berperan dalam membentuk kesadaran ekologis siswa melalui empat aspek utama, yaitu pembentukan pola pikir ekologis, penguatan tanggung jawab moral berbasis nilai keagamaan, perubahan perilaku kolektif di lingkungan sekolah, serta pembentukan identitas sosial ramah lingkungan. Meskipun demikian, konsistensi perilaku ramah lingkungan masih menghadapi tantangan, terutama dalam penerapan di luar

ARTICLE INFO

Submitted: 22 April 2024

Revised: 3 May 2024

Accepted: 10 June 2024

Keywords:

Environmental literacy; ecological awareness; environmental education; vocational high school; religious values.

DOI:

[10.55080/agronimal.v2i1.1898](https://doi.org/10.55080/agronimal.v2i1.1898)

Kata kunci:

literasi lingkungan; kesadaran ekologis; pendidikan lingkungan; sekolah menengah kejuruan; nilai keagamaan

lingkungan sekolah. Penelitian ini menegaskan bahwa literasi lingkungan yang terintegrasi dengan budaya sekolah dan nilai religius memiliki potensi strategis dalam membangun kesadaran ekologis yang berkelanjutan pada siswa sekolah menengah kejuruan.

INTRODUCTION

Today's environmental problems are becoming an increasingly urgent global issue. A national report from the Ministry of Environment and Forestry (2023–2024) shows that Indonesia's waste generation is still in the range of tens of millions of tons per year with the dominance of organic and plastic waste. This condition not only impacts soil and water pollution, but also contributes to increased greenhouse gas emissions. The data confirms that environmental issues are not just a technical issue of waste management, but are closely related to people's mindsets, awareness, and behavior. Therefore, the educational approach is a fundamental strategy in building long-term behavioral transformation.

In the context of education, environmental literacy is understood as the ability of individuals to understand ecological concepts, identify environmental problems, and make ecologically responsible decisions. This literacy includes the dimensions of knowledge, attitudes, and acting skills. A number of studies over the past five years (2021–2025) show that increasing environmental literacy is positively correlated with strengthening students' pro-environmental attitudes. However, various studies also indicate that there is a gap between cognitive understanding and the implementation of real behaviors. Many students know the importance of waste reduction and energy conservation, but have not consistently applied them in their daily lives.

Environmental education programs such as Adiwiyata initiated by the Ministry of Environment and Forestry together with the Ministry of Education, Culture, Research, and Technology have shown a positive contribution to increasing ecological awareness in various schools. The latest evaluative study (2022–2025) reveals that the success of the program is highly dependent on consistency of implementation, school management support, teacher participation, and active student involvement. However, most of the research is still quantitative and focuses on measuring literacy levels or attitudes, not on the process of internalizing the meaning of literacy itself.

This is where the research gap of this research lies. First, there are still limited qualitative studies that explore how students interpret environmental literacy and how the process shapes ecological awareness in depth. Second, previous research was mostly conducted at the elementary and public secondary school levels, while studies at vocational high schools (SMK) were relatively minimal. In fact, the characteristics of vocational practices based on vocational practices have their own dynamics in producing and managing potential waste from productive learning activities. Third, there have not been many studies that specifically examine the integration of environmental literacy in Islamic values-based school culture and community organizations.

Based on official data from Dapodik in 2026, SMK Muhammadiyah Delanggu is one of the private vocational high schools under the auspices of the Muhammadiyah organization. As an educational institution based on Islamic values, this school has strategic potential in integrating moral teachings and environmental ethics with vocational education practices. The value of human responsibility as a caliph on earth can be a normative foundation in shaping students' ecological awareness. However, there has been no research that specifically describes how environmental literacy plays a role in building students' ecological awareness in these schools.

The urgency of this research lies in the need to understand the process of forming ecological awareness in a contextual and in-depth manner. The qualitative approach allows

researchers to explore experiences, perceptions, and social dynamics that affect the internalization of environmental literacy in the school environment. The results of this research are expected not only to enrich the scientific treasures in the field of environmental education, but also provide practical recommendations for school managers, teachers, and policy makers in designing strategies to strengthen environmental literacy that are more effective and sustainable, especially at the vocational education level.

Thus, this research is important to answer the fundamental questions: how environmental literacy is interpreted by students, how the process shapes ecological awareness, and what factors support or hinder the internalization of environmental care values in Islamic-based vocational school environments.

METHODS

This research uses a qualitative approach with a case study design that focuses on exploring the role of environmental literacy in shaping students' ecological awareness at SMK Muhammadiyah Delanggu.

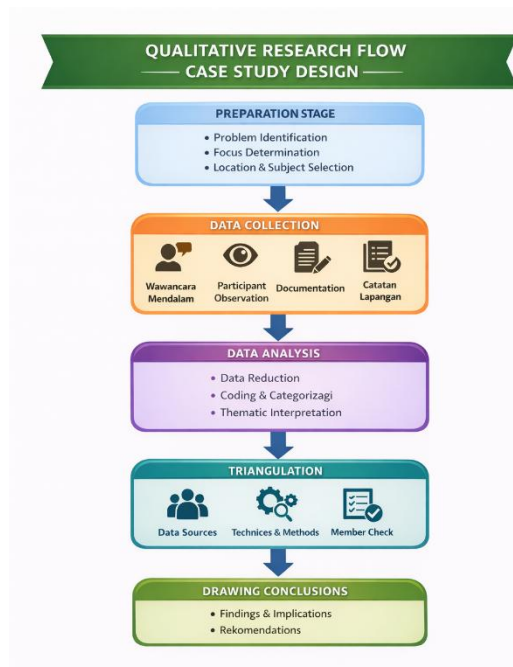


Figure 1. Qualitative research flow with case study design

This approach was chosen to gain a deep understanding of the meaning, experience, and internalization process of environmental literacy in the real context of school life. The research subjects are determined through purposive sampling techniques, including students from several expertise programs, teachers of related subjects, and vice principals for student affairs or curriculum. Data were collected through in-depth interviews, participatory observation of school activities (such as waste management, cleaning activities, and environment-based learning practices), as well as documentation in the form of school programs, disciplines, and extracurricular activities related to environmental literacy. Data analysis is carried out thematically through the stages of data reduction, data presentation, and conclusion drawn. The validity of the data is maintained through triangulation of sources and techniques, as well as *member checks* to ensure the suitability of the researcher's interpretation with the informant's experience. With this method, the research is expected to be able to comprehensively describe the

dynamics of the formation of students' ecological awareness through environmental literacy in the context of vocational schools based on Islamic values.

RESULTS AND DISCUSSION

1. Environmental literacy is interpreted and understood by students at SMK Muhammadiyah Delanggu

This section presents the results of research on how environmental literacy is interpreted and understood by students at SMK Muhammadiyah Delanggu. Data was obtained through in-depth interviews, participatory observations, and school documentation, then analyzed using thematic analysis techniques. The findings of the study show that environmental literacy is not only understood as knowledge about cleanliness or waste management, but also as moral values, social awareness, and daily practices that are influenced by school culture and religious background.

In general, the results of the study show that there are three main dimensions in the meaning of environmental literacy by students, namely the cognitive (knowledge), affective (values and attitudes), and behavior (real practice). These three dimensions are interrelated, but not always develop in a balanced manner. These findings are in line with the contemporary environmental literacy model that emphasizes the integration of ecological knowledge, attitude disposition, and environmental action competence as presented in various environmental education studies over the past five years.

a. Conceptual Understanding (Cognitive Dimension)

The results of the interviews showed that most students were able to explain environmental literacy in the form of basic understanding, such as the importance of maintaining cleanliness, sorting waste, and reducing the use of plastic. Of the 15 students interviewed, 11 were able to define environmental literacy in general, but only 5 were able to relate it to broader issues such as climate change, water crisis, or industrial pollution.

These findings show that students' understanding is still at the basic conceptual level (basic environmental knowledge). The 2021–2024 study in environmental education journals in Indonesia also found that students' environmental literacy tends to be in the medium category, with weaknesses in critical analysis skills on global ecological issues. This shows that environmental learning in schools is often still oriented towards knowledge transfer, not yet fully encouraging critical and reflective thinking skills.

In the context of vocational schools, the dominance of vocational curriculum that focuses on technical competence also affects the depth of discussion of environmental issues in the classroom. Environmental materials are usually implicitly integrated, rather than as the main focus of learning.

b. Affective Dimensions: Values, Moral Awareness, and Religious Foundations

Interestingly, students at SMK Muhammadiyah Delanggu not only interpret environmental literacy as knowledge, but also as a moral responsibility. As many as 9 out of 15 students attributed concern for the environment to Islamic religious teachings, especially the concept of humans as caliphs on earth. Islamic Religious Education teachers also stated that religious values are often used to strengthen students' awareness of the importance of protecting the environment.

These findings show that the affective dimension has a significant role in shaping students' ecological awareness. Recent environmental education research (2022–2025) shows that the integration of religious values and local wisdom can increase intrinsic motivation in eco-friendly behavior. Value-based approaches have been shown to be more effective in building long-term commitment than the cognitive approach alone.

In the context of Muhammadiyah-based schools, the integration of religious values is a strategic potential. This can be developed through strengthening the ecological narrative in sermons, routine studies, and habituation based on Islamic character.

c. Behavioral Dimensions: Between Awareness and Consistency of Action

Although understanding and moral awareness are relatively good, the implementation of eco-friendly behaviors has not been completely consistent. The results of the observation show that routine cleaning activities and waste sorting are carried out when there is a school program, but it has not become a sustainable habit of individuals. Only 6 out of 15 students stated that they routinely sorted waste at home.

This phenomenon shows that there is a knowledge-behavior gap. The environmental education literature in the last five years has highlighted this issue a lot, where the increase in literacy is not always directly proportional to changes in behavior. Factors of the social environment, facilities, and school culture are important variables in bridging this gap.

In the context of vocational schools, vocational practices actually have great potential to become a vehicle for the implementation of environmental literacy, for example through workshop waste management, energy efficiency in engineering practices, or the reduction of plastic waste in student production units. However, such integration still requires systematic strengthening in the curriculum and school policies.

d. Sources of Environmental Literacy Formation

Thematic analysis shows that students' environmental literacy is influenced by four main sources: 1) Teachers and classroom learning; 2) School activities (community service, cleaning competitions, routine cleaning programs); 3) Social media and the internet; 4) Family

Practical teachers and religious teachers are the figures most often referred to as sources of inspiration. However, students also acknowledge that social media plays a big role in providing information about global environmental issues. This shows that environmental literacy is multidimensional and is not only formed through formal education.

The latest digital education research also confirms that the younger generation gains a lot of ecological knowledge from digital platforms, so schools need to direct this literacy to be more critical and applicative.

e. Barriers and Reinforcing Factors

The main obstacles found include: a) Limited waste sorting facilities; b) Lack of continuous monitoring; c) Pressure of a dense vocational curriculum

The strengthening factors include: a) Commitment of teachers and principals; b) Islamic values as a moral foundation; (c) A Culture of School Collaboration

These findings are in line with various environmental education program evaluation studies (2021–2025) which stated that the success of environmental literacy is greatly influenced by structural and cultural support of schools.

Dimensions	Findings Indicators	Number of Informants
Cognitive	Understand basic concepts of the environment	11/15 students
Advanced Cognitive	Relate to global issues	5/15 students
Affective	Relating to religious values	9/15 students
Consistent Behavior	Routine practice at home	6/15 students
Situational Behavior	Active during school program	12/15 students

Table 1. Summary of Findings

Overall, environmental literacy at SMK Muhammadiyah Delanggu is interpreted as a combination of basic knowledge, religious moral values, and social practices in schools. However, internalization towards consistent behavior still faces structural and cultural challenges. This shows that strengthening environmental literacy needs to be carried out integratively through curriculum, school culture, and facility support.

These findings enrich the study of environmental literacy in the context of religious-based vocational high schools, which have been relatively limited in qualitative research. With a more contextual and value-based approach, schools have a great opportunity to shape students' ecological awareness in a more profound and sustainable way.

2. The role of environmental literacy in shaping students' ecological awareness at SMK Muhammadiyah Delanggu

This section describes the findings of research on how environmental literacy plays a role in shaping the ecological awareness of students at SMK Muhammadiyah Delanggu. Ecological awareness in this study is interpreted as a condition when students not only understand environmental issues, but also have sensitivity, moral responsibility, and a tendency to act environmentally friendly in daily life.

Based on the results of interviews, observations, and documentation, the role of environmental literacy in shaping students' ecological awareness can be classified into four main aspects, namely: (1) the formation of an ecological mindset, (2) the strengthening of moral values and responsibilities, (3) changes in collective behavior in the school environment, and (4) the formation of environmentally friendly social identity. These four aspects interact with each other in shaping students' ecological awareness gradually and contextually.

a. Environmental Literacy as an Ecological Mindset Builder

The results of the study show that environmental literacy plays a role in building students' ecological mindsets, especially in understanding the cause-and-effect relationship between human activities and their impact on the environment. As many as 12 out of 15 students stated that after getting materials or participating in school's activities related to the environment, they became more aware of the consequences of actions such as littering or excessive use of plastics.

This change in mindset reflects the cognitive dimension of environmental literacy that develops into reflective awareness. The latest environmental education study (2021–2024) shows that increasing literacy based on contextual understanding is able to encourage students to think systems (system thinking) about ecological issues. In the context of vocational schools, this understanding is important because students are directly involved in production practices and technical skills that have the potential to generate waste.

Thus, environmental literacy serves as an intellectual foundation that fosters awareness that small actions have far-reaching ecological implications.

b. Environmental Literacy in Strengthening Moral Responsibility

In addition to the cognitive aspect, environmental literacy also plays a role in strengthening the moral and spiritual dimensions of students. In Islamic values-based schools such as SMK Muhammadiyah Delanggu which is under the auspices of Muhammadiyah, the concept of responsibility for the environment is often associated with religious teachings.

As many as 10 out of 15 students stated that maintaining cleanliness and the environment is part of their responsibility as Muslims. The Islamic Religious Education teacher also emphasized that the integration of religious values in learning strengthens students' ecological awareness.

Research over the past five years in the field of character education and environmental education has shown that the integration of religious values is effective in deepening students' ecological commitment. Environmental literacy combined with spiritual values is able to build intrinsic motivation, not just obedience to school rules. Thus, environmental literacy plays a role as a medium for internalizing values that form ecological awareness based on ethics and moral responsibility.

c. **The Role of Literacy in Driving Collective Behavior Change**

The results of observations show that there are changes in collective behavior in schools, such as increased student participation in community service activities, reduction of plastic waste in canteens, and waste sorting efforts although not consistent. A total of 12 students were actively involved in school environment activities, while 7 students stated that they began to implement the habit of carrying their own drinking bottles.

This change shows that environmental literacy functions as a social stimulus that influences school culture. An evaluative study of environmental education (2022–2025) states that literacy followed by collective practice is able to form new social norms in the school environment.

However, the results of the study also show that behavioral consistency is still a challenge. Some students admitted that this habit was stronger when they were in the school environment than at home. This shows that ecological awareness is still in the transition stage to personal habituation.

d. **Environmental Literacy and the Formation of an Environmentally Friendly Social Identity**

Another interesting finding is the emergence of student pride when schools run hygiene programs or environment-based activities. Some students stated that a clean school reflects a positive image of the educational institution. This shows that environmental literacy plays a role in shaping an environmentally friendly social identity. In the perspective of contemporary social theory, collective identities formed through shared practices can strengthen the sustainability of ecological behaviors.

In the context of vocational schools, the formation of this identity can be developed through the integration of environmental programs in extracurricular activities, environmentally friendly vocational practices, and green school competitions or campaigns.

Role Aspects	Findings Indicators	Number of Informants
Ecological mindset builder	Be aware of the cause-and-effect relationship of the environment	12/15 students
Reinforcement of moral responsibility	Relating to religious values	10/15 students
Drivers of collective behavior	Active in environmental activities	12/15 students
Social identity formation	Proud of a clean school culture	8/15 students

Table 2. Summary of the Role of Environmental Literacy

Overall, environmental literacy at SMK Muhammadiyah Delanggu plays a significant role in shaping students' ecological awareness through a gradual process that includes the transformation of knowledge into values, then into social practice. This role does not stand alone, but is influenced by school culture, integration of religious values, and internal policy support.

Nonetheless, the study also found that sustainability of ecological awareness requires structural strengthening, such as integration in vocational curricula and the provision of supporting facilities. The environmental education literature of the last five years confirms that literacy will be more effective if it is systematically integrated into school culture and not just a momentary program.

Thus, environmental literacy is not just a learning material, but a strategic instrument in building sustainable ecological awareness in vocational high school students.

CONCLUSION

Based on the results of the research, environmental literacy at SMK Muhammadiyah Delanggu plays an important role in shaping students' ecological awareness through a gradual and multidimensional process. Environmental literacy not only serves as a source of knowledge about ecological issues, but also as a means of internalizing moral and spiritual values that strengthen students' responsibility towards the environment. The conceptual understanding possessed by students develops into reflective awareness when supported by social habits in schools and the integration of religious values that are characteristic of Muhammadiyah-based institutions.

However, the ecological awareness that is formed still faces challenges in terms of behavioral consistency. Although students show active participation in environmental activities at school, the application of eco-friendly behaviors in daily life has not been fully sustainable. Therefore, strengthening environmental literacy needs to be carried out systematically through the integration of vocational curriculum, the provision of supporting facilities, and the formation of a consistent school culture. With a holistic and sustainable approach, environmental literacy has the potential to be a strategic instrument in building a generation that has strong ecological awareness and social responsibility for environmental sustainability.

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