Analysis of environmental care attitudes based on students' ecological intelligence

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ABSTRACT

Ecological intelligence is crucial in enhancing human awareness of environmental issues. However, there is a lack of research on how environmental care attitudes are developed through the learning process in the classroom. This study aims to explore how students perceive environmental care attitudes based on ecological intelligence. The research used a quantitative methodology with a percentage technique and involved 120 students from Madrasah as the sample. Research data were obtained through a closed-ended questionnaire, and the data were analyzed through percentages. The findings show that students possess a high level of environmental care, as evidenced by the highest agreement level in the head (cognition) or learning to know with 89.3%, followed by the heart (affection) or learning to be with 86.5%, and then the hands (conation) or learning to do with 85.6%. The result indicates that students who participate in environmental care activities in school have good ecological intelligence. These results suggest that integrating ecological intelligence into classroom learning can effectively foster environmental care attitudes. Therefore, educators and curriculum developers should consider incorporating more environmental education components into daily instruction. Future research may explore the long-term impact of ecological intelligence-based learning on students' environmental behavior outside school.

Keywords: ecological intelligence, environmental care attitude, environmental education

INTRODUCTION

The world today faces increasingly complex and urgent environmental challenges. According to the World Bank, approximately 33% of global waste is mismanaged, leading to significant environmental pollution and global health risks (Kaza et al., 2018). Plastic waste remains one of the most critical environmental issues, with over 300 million tons produced annually and nearly 14 million tons ending up in the oceans, threatening marine ecosystems. High-

income countries account for nearly 34% of the world's total waste, despite representing only 16% of the global population. In many urban areas, issues such as waste accumulation, air pollution, and the deterioration of river quality are increasingly prevalent (Abidin, Irawan, & Devis, 2022). In Indonesia, major environmental concerns include waste management, air and soil pollution, and limited green open spaces (Kementrian Lingkungan Hidup dan Kehutanan 2022).

Various studies have emphasized the role of human attitudes and behaviors in exacerbating or alleviating environmental problems (Bahuguna et al., 2023; Juanda et al., 2024; Zahrawati, Aras, Syahrul, Jumaisa, & Nzobonimpa, 2023). Despite growing awareness among younger generations regarding the importance of environmental preservation, many students still encounter difficulties in consistently adopting environmentally responsible behaviors (Han, 2021). This issue is particularly evident at the junior high school level, where ecological problems are more prominent and students often demonstrate a lack of understanding regarding the environmental consequences of their actions (Dyllick, 2015).

Education, particularly social studies education, plays a pivotal role in fostering environmental awareness and responsibility. Social studies, as a multidisciplinary subject, offers opportunities to explore the relationship between society and the environment, thereby supporting character development and civic responsibility. The integration of ecopedagogy in social studies enables learners to critically engage with both local and global environmental issues, and to reflect on their role in promoting sustainability (Hjorth Warlenius, 2022; Yunansah & Herlambang, 2017). The key principle of ecopedagogy is student-centered learning that emphasizes environmental contexts, critical thinking, and reflective actions (Supriatna et al., 2018).

An initial study has shown that environmental care values have begun to be incorporated into the school curriculum, particularly through social studies (Fauzi, Fitriasari, & Muthaqin, 2022). However, the actual development of students' environmental attitudes and ecological awareness varies across schools. Some schools have successfully embedded environmental education into social studies, while others still struggle to move beyond theoretical learning (Misiaszek, 2019).

While previous research has examined environmental awareness, ecological insight development, and environmentally friendly character, few studies have specifically investigated how students' environmental care attitudes are structured based on the principles of ecological intelligence. This gap highlights the novelty of the current research.

This study aims to explore students' perspectives on environmental care attitudes, framed through the three key principles of ecological intelligence proposed by Goleman (2010): head (cognition—understanding environmental issues), heart (affection—emotional connection and concern), and hands (conation—practical actions and habits). These dimensions represent a holistic integration of knowledge, emotion, and action toward sustainability.

It is assumed that students who develop strong ecological intelligence will be more likely to exhibit consistent environmental care behaviors, both in understanding environmental issues and in acting responsibly. The integration of ecological intelligence into social studies learning is expected to strengthen students' cognitive, emotional, and behavioral responses to environmental challenges.

The findings of this research are expected to make both theoretical and practical contributions. Theoretically, the study will enhance understanding of the relationship between environmental attitudes and ecological intelligence. Practically, the results may assist educators in designing effective ecopedagogical approaches within the social studies curriculum to cultivate

environmentally responsible students capable of addressing current and future sustainability challenges.

RESEARCH METHODS

This study employs a quantitative approach with a descriptive method. The main objective of this study is to analyze students' environmental care attitudes. The quantitative method was chosen to measure students' attitudes using numerical data objectively, allowing clear identification of patterns in ecological intelligence components. The subjects of the study consist of students from MTsN 2 and MTsN 3 in Pamekasan Regency. These two madrasas were chosen because they are both deeply committed to environmental sustainability. The students actively participate in environmental care activities. A purposive sampling technique was used to select 120 active students who participated in the school program related to environmental care and filled out the questionnaires from the two madrasas (Table 1).

Table 1. Sample characteristics

Number	Characteristics	Information	Amount
1.	Madrasah	MTsN 1=63 MTsN 2=57	120
2.	Class	VII= 35 VII=47 IX=38	120
3.	Age	≤12 Years =32 13 Years = 57 ≥14 Years =31	120

Source: Research data

The instrument used in this study is a specially designed closed-ended questionnaire to evaluate students' attitudes toward the principles of ecological intelligence. The survey utilizes a binary Likert scale, with 0 indicating "No" and 1 indicating "Yes," to measure the level of agreement students have with various statements related to environmental care attitudes. Data collection was carried out by distributing the questionnaire to the selected participants.

Once the data was collected, content validity was tested by experts to ensure that the questionnaire covered all the key aspects of the principles of ecological intelligence. The concept of environmental attitudes refers to the affective (corresponds to emotional involvement, i.e., concern), the cognitive (environmental knowledge), and the conative (behavioural intention) (Hadler et al. 2021). The questionnaire related to these environmental attitudes is stated below.

Table 2. Questionnaire statements

Number	Ecological intelligence principles	Number of Question
1.	The head (cognition) or learning to know	1, 3, 4
2.	The heart (affection) or learning to be	2, 5, 7
3.	The hands (conation) or learning to do	6, 8, 9

Source: Research data

Additionally, the reliability of the instrument was tested using Cronbach's Alpha to ensure internal consistency and the reliability of the research results. The instruments used were proven

to be valid and reliable based on the tests, making them appropriate for this study. The obtained data were analyzed using Microsoft Excel to calculate the percentage for each question and aspect of the ecological intelligence principles.

RESULTS AND DISCUSSION

This study is designed to analyze students' environmental care attitudes based on the three principles of ecological intelligence: the head (cognition) or learning to know, the heart (affection) or learning to be, and the hands (conation) or learning to do. The results of this analysis can be observed in Table 3.

Table 3. The attitude of environmental care on the principles of ecological intelligence

Number	Ecological intelligence	Statement	Yes	No
1	The head (cognition) or learning to know	Identifying environment problem that can arise consequence accumulation waste in the school environment	88.3	11.7
		Know environment impact problem caused by waste	94.3	5.7
		Know method guard environment at school	85.3	14.7
		Average	89.3	10.7
2	The heart (affection) or learning to be	Differentiate organic and inorganic rubbish	81.2	18.8
		Invite Friend For care environment	86.3	13.7
		Committed For guard environment	92.1	7.9
		Average	86.5	13.4
3	The hands (conation) or learning to do	Use tool to clean in the school environment by good and right	85.5	14.5
		Reduce rubbish accumulation by bring supplies and equipment that can Reused	80.2	19.8
		Minimize the use of electricity and water in schools	91.3	8.7
		Average	85.6	14.3

Source: Research data

Table 3 provides a detailed percentage and explains that a large portion of students selected Yes for the three categories of aspects. Cognition stands out as the most favoured aspect, followed by affection, with conation coming last in order of preference. This suggests that students have a strong understanding of environmental issues (cognition) and feel emotionally connected to the environment (affection), but their actions or behaviours toward environmental preservation (conation) need further reinforcement.

The findings of this study indicate that students display a positive attitude toward environmental care based on ecological intelligence. Ecopedagogy learning emphasizes the development of individual character, motivating students to be more aware of environmental issues (Zocher and Hougham 2020). The results of this research support previous studies, which show that students are capable of properly disposing of trash, separating organic and inorganic materials, reducing plastic use, and understanding the importance of being environmentally friendly consumers (Dyllick 2015).

The Head (Cognition) or Learning to Know

The research results show that the head (cognition) or learning-to-know aspect obtained the highest level of agreement, reaching 89.3%. This finding indicates that the majority of students possess a good understanding of the principles of ecopedagogy and the importance of environmental protection (Supriatna 2016). The high percentage can be attributed to several factors, including exposure to information through school curricula, social media, and environmental education programs that have been implemented. A strong cognitive understanding is a crucial first step in building ecological awareness, as well-informed students are more likely to recognize environmental problems and understand the solutions that can be applied (Adeolu, Odipe, and Raimi 2018).

The most dominant indicator was students' understanding of the environmental impacts caused by waste, which reached 94.3%. This suggests that a significant number of students are aware of the dangers posed by waste to the environment, such as land, water, and air pollution. This awareness is likely influenced by information from various sources, such as school curricula, environmental campaigns, and social media (Race et al. 2022). A strong understanding of waste issues is an important starting point in building ecological awareness, but it must be followed by real action in responsible waste management. One way to intervene in students' ecological intelligence can be done through learning with an ecopedagogical approach (Rizaq et al. 2024).

However, the study also shows that the lowest level of approval was for the statement "Knowing how to protect the environment at school," with an agreement level of 85.3%. Although this finding is still high, it indicates a gap between students' general understanding of environmental issues and their practical knowledge of how to protect the environment at school. This could be due to a lack of direct implementation or activities that teach students about concrete steps for maintaining the school environment, such as waste management, energy conservation, or cleanliness maintenance (Zahrawati et al., 2023). Additionally, there may be a lack of awareness or understanding among students about their role in directly maintaining the cleanliness and sustainability of the school environment. To improve this attitude, it is important to strengthen educational programs and practical activities in schools that engage students actively in environmental preservation efforts, so they not only understand environmental issues but also know how to contribute directly to safeguarding their sustainability.

The Heart (Affection) or Learning to Be

The heart (affection) or learning to be aspect in this study obtained a level of agreement of 86.5%. This figure indicates that the majority of students have a sense of care and emotional attachment to environmental issues, although not as high as the cognitive attitude (the head). This relatively high affective attitude reflects a positive emotional awareness of the importance of protecting the environment, which can be influenced by factors such as school learning, personal experiences, and social-environmental influences (Saari et al. 2021). However, there is still a portion of students who may not yet fully feel the deep emotional attachment to environmental issues. To enhance this affective attitude, it is crucial to introduce more activities that engage students emotionally, such as direct experiences with nature, environmental cleanup activities, or programs that foster a sense of social responsibility toward the environment (Milfont et al. 2020). Strengthening the emotional connection between students and the environment is expected to increase their care, which can drive more sustainable behaviour changes.

The highest level of agreement in this study was seen in the statement "Committed to protecting the school environment," with an agreement level of 92.1%. This figure reflects a high sense of responsibility among students toward their school environment. This strong commitment is influenced by various factors, such as routine activities that involve students in maintaining the cleanliness and sustainability of the school environment and the presence of environmental education values taught in the schools (Rizaq and Sarmini 2021). The commitment to the school environment also suggests that students feel a sense of ownership and attachment to the space they use daily. Even though this agreement level is high, it is important to continue strengthening and expanding this commitment so that it is not limited to the school environment but can also be applied in students' daily lives outside of school (Peters and Araya 2011). By further increasing this commitment through ongoing programs, students are expected to develop a broader and more impactful attitude toward environmental preservation in all aspects of their lives.

The attitude with the lowest approval in this study was the statement "Distinguishing organic and inorganic waste," with an agreement level of 81.2%. While this figure is still considered high, it indicates a gap in students' practical understanding of waste management. This could be due to a lack of better information or a deeper understanding of the importance of waste separation for supporting recycling and efficient waste management (Pujianto et al. 2021). Additionally, the implementation of lessons on waste sorting may not yet be sufficiently frequent in schools, so students may not be fully accustomed to this practice. To improve this attitude, a more comprehensive and intensive educational program is required, including practical activities that involve students in waste sorting, such as providing separate bins for organic and inorganic waste at schools, as well as more concrete environmental awareness campaigns. With a more consistent approach, it is expected that students will better understand the importance of this simple action in maintaining cleanliness and environmental sustainability.

The Hands (Conation) or Learning to Do

The hands (conation) or learning to do aspect in this study obtained a level of agreement of 85.6%. This figure indicates that a significant number of students show a trend toward taking real actions that support environmental preservation, although there is still room for improvement. This sufficient conative attitude reflects the students' readiness to implement the knowledge and concern they have gained in the form of concrete behaviours, such as reducing waste, saving energy, and maintaining cleanliness (Koul, Yakoob, and Shah 2022). However, despite this trend toward action, factors such as limited facilities or a lack of everyday supportive habits can influence how consistently students apply sustainable behaviours. Therefore, it is important to provide stronger support through practical activities that engage students directly, such as recycling projects, greening activities, or other initiatives that can facilitate the implementation of real actions on a more routine basis.

The highest level of agreement in this study was seen in the statement "Save electricity and water in schools," with a level of agreement of 91.3%. This figure reflects that a significant number of students understand the importance of energy and resource conservation within the school environment. It shows high awareness among students about the efficient use of energy, as well as the positive impact of saving electricity and water on environmental sustainability (Mwaniki and Gathenya 2015). The high agreement level is likely influenced by educational efforts at the school, such as energy-saving campaigns, habits like turning off unused lights and electrical devices, and using water wisely. However, it remains important to continue reinforcing this habit by involving

students in more practical and routine activities so that they not only understand the principles of energy conservation but also become accustomed to applying them in their daily lives.

The lowest level of agreement in this study was seen in the statement "Reduce waste accumulation by bringing supplies and equipment that can be reused," with a level of agreement of 80.2%. Although this figure is still considered relatively high, it indicates that some students have not yet fully adopted the habit of bringing reusable supplies and equipment, which is an important step in reducing plastic waste and single-use products. Possible factors influencing this lower agreement include a lack of practical understanding about the impact of plastic waste, everyday habits that favor single-use packaging, or the absence of facilities that support the use of reusable items (Alabi et al. 2019). Therefore, there is a need for further education and the provision of adequate facilities to encourage students to adopt more environmentally friendly habits, such as providing containers for reusable supplies and campaigning for the reduction of plastic waste.

CONCLUSION

Based on the results of this study, the students' attitudes toward environmental care, as reflected in ecological intelligence indicators, show a good understanding of the importance of awareness and action regarding environmental issues. The highest attitude was observed in the head (cognition) aspect, where students demonstrated a strong awareness of environmental problems, particularly those related to waste management. However, the heart (affection) and hands (conation) aspects indicate that students understand the importance of caring for the environment and have an emotional concern, but their practical implementation in daily life still requires reinforcement, especially in waste management and maintaining cleanliness at school. Overall, the results suggest that environmental education at schools needs to be continuously improved, so that students not only know and care about the environment but can also apply sustainable behaviors consistently.

Then, environmental education should prioritize hands-on activities such as sustainable waste management, energy-saving initiatives, and the promotion of reusable materials. Developing the ability to differentiate types of waste and adopt sustainable habits through structured programs is essential to ensuring that awareness translates into consistent and responsible environmental behavior. The environmental education program at school should be further strengthened, particularly in practical matters that involve active student participation. Several activities, such as waste management, energy saving, and the use of reusable items, must be integrated more frequently into everyday school activities. Additionally, this research recommends educating students to find concrete ways to reduce waste, such as bringing environmentally friendly supplies. The habit formation through programs based on real actions is expected to strengthen students' attitudes toward environmental preservation and encourage them to apply these practices in their daily lives.

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