



The Importance of Environmental Education in Biology Learning to Increase Students' Environmental Awareness

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Abstract. The importance of environmental awareness in modern society demands education that focuses on a deep understanding of ecosystems and environmental responsibility. This research aims to explore the role of environmental education in biology learning as an effort to increase students' awareness of protecting the environment. The research method used is descriptive qualitative. The research results show that the integration of Environmental Education in biology learning is effective in increasing students' understanding of biological concepts while developing their awareness of environmental issues. Students not only gain theoretical knowledge, but also directly experience environmental aspects through practical experiences such as observations, experiments in the field, and related activities. This awareness then forms a responsible attitude towards the environment, encouraging students to take positive action in maintaining the sustainability of nature. The research results provide empirical support for the effectiveness of this approach in creating students who are not only scientifically educated, but also have relevant life skills and are ready to play a role in preserving the global environment.

1. INTRODUCTION

Environmental challenges are currently the main focus in Indonesia, especially in our environment. The face of this problem cannot be separated from the role of humans as economic and consumer creatures. The emerging symptoms include various problems that haunt this country, ranging from river pollution, forest destruction, flooding, abrasion, air pollution, decline in biodiversity, problems with piles of rubbish, damage to marine ecosystems, groundwater pollution, to global warming (Herlambang, 2021).

Polluted rivers are a reflection of the ecological imbalance caused by human activities. Forest conditions that continue to experience damage exacerbate the risk of flood and abrasion disasters. Air pollution, as a result of industry and transportation, increasingly threatens human health and ecosystems (Suryaningsih, 2018). The decline in biodiversity is a sign of danger to the sustainability of the ecosystem, while the waste problem is a big challenge with its disturbing ecological and social impacts. Damaged marine ecosystems and groundwater pollution also damage the sustainability of marine ecosystems, fish resources and groundwater balance. All of this, together with climate change and global warming, indicates the urgency of the need for concrete and holistic action to respond to and overcome environmental problems that are increasingly pervasive in various levels of society (Adinugraha, 2018).

With this basis, understanding the interrelated relationship between humans and the environment becomes very essential. As living creatures that have privileges compared to other forms of life, humans have the ability to exploit nature, allowing them to utilize natural resources according to their desires and needs. Although humans have the freedom to take advantage of what nature has to offer, it is important to remember that nature does not have the active ability to interact. As a result, human actions in utilizing the environment can have a significant impact on human life (Sari et al, 2023).

The importance of environmental education in early childhood is a necessity in efforts to manage and protect the surrounding environment. During the Golden Age or early age, children show extraordinary intelligence and high memory abilities (Maghfur, 2010). Therefore, as parents, we have the responsibility to provide environmental education at this important phase, teaching and encouraging environmental awareness. Although the process of forming environmentally responsible behavior takes time and the results are not always visible as quickly as technical solutions,

environmental education in early childhood strategically contributes to behavior change towards more responsible environmental management (Nurulloh, 2019).

Thus, environmental problems cannot be solved purely technically, but what is more important is a solution that can change the mentality and awareness of environmental management. This is a challenge for the development of environmental education to be able to contribute to the formation of environmentally responsible behavior. Even though it requires a long process, and the results cannot be seen immediately like technical solutions, through fostering behavior change towards being more responsible in environmental management is a strategy (Cahyaningrum et al, 2017).

Therefore, environmental problems cannot be solved only with a technical approach alone. More than that, what is the main key is a solution that can change mindsets and increase awareness of environmental management. This is a crucial challenge in the development of environmental education, where these efforts are expected to make a significant contribution in shaping environmentally responsible behavior. Although this process takes time and the results are not always visible as quickly as technical solutions, through fostering behavioral change towards greater responsibility in environmental management, this is considered a very important strategy (Tulalessy, 2016).

Biology, as a branch of science, has unique characteristics that differentiate it from other natural sciences. In studying Biology, efforts are made to understand living creatures and their life processes in the environment, so special approaches and methods are needed that provide a working basis and characteristics in developing biological concepts. This learning aims to enable students to explore for themselves concepts about the natural surroundings through scientific process activities, so that they can gain a deeper understanding (Irawati & Saifuddin, 2018).

Consequently, Biology learning patterns become very relevant to achieving these goals. Involving students in scientific exploration activities will increase their understanding of the material, while providing more meaningful educational values. Thus, a learning approach that emphasizes active participation and direct experience can be the key to success in developing understanding of biological concepts and increasing student involvement in the learning process (Surakusumah, 2009).

The aim of this research is to investigate the impact of integrating environmental education in biology learning on increasing students' awareness of protecting the environment. This research aims to identify the effectiveness of environmental education programs in shaping students' understanding, attitudes and behavior regarding environmental conservation. It is hoped that the benefits of this research will provide deeper insight into the role of environmental education in the context of biology learning, as well as provide an empirical basis for developing more effective educational strategies in increasing students' awareness and responsibility for the environment. It is hoped that the implications of this research finding can make a positive contribution to the development of curriculum and educational practices that support the formation of a generation that cares about environmental sustainability.

2. METHOD

In this research, a qualitative approach with descriptive methods was used. According to Moleong (2014), the aim of descriptive research is to describe phenomena using descriptive words without including data in the form of numbers, so that narrative explanations become the main focus. Meanwhile, the definition of qualitative methods by Bogdan & Taylor in Moleong (2014) illustrates that this approach produces descriptive data in the form of written or spoken words originating from direct observation of individuals and behavior. The choice to use this type of descriptive research with a qualitative approach was chosen because it is believed to be more supportive in exploring issues that are relevant to the research focus. The data collection method is carried out through interviews and documentation. In data analysis, an interactive model is applied where the collected data is analyzed, abstracted, structured and validated for its validity. The final step involves interpreting the data to gain an in-depth understanding of the research topic.

3. RESULTS AND DISCUSSION

Biology Learning

Biology education places emphasis on direct experience as the main means in the learning process. Therefore, it is important for students to be guided in developing a number of process skills to empower them to explore and understand the natural environment. These skills include the ability to observe using all the senses, formulate hypotheses, use tools and materials correctly and always pay attention to work safety, formulate questions, group information, interpret data, and convey various findings. Meanwhile, the ability to explore and sort relevant factual information is an important key in testing ideas or solving everyday problems (Surata et al, 2020).

The importance of developing process skills in biology education is not only limited to academic aspects, but also forms students' scientific mindset and responsibility towards the environment. By applying these skills, students not only become recipients of information, but also become active agents in the learning process. A learning process that emphasizes direct experience helps students build a deeper and more relevant understanding of biological concepts.

In the teaching context, biology educators have a crucial role in guiding students through a comprehensive learning experience. Therefore, learning methods that involve practicums, experiments and field observations are effective instruments in helping students develop these process skills. In this way, students not only become skilled students in applying biological concepts, but also become individuals who are aware of the environment and are able to take responsible action towards the natural environment (Sudarisman, 2015).

If biology learning only focuses on memorization, then students who already have initial knowledge about various biological phenomena may have difficulty applying their knowledge during the learning process implemented by the teacher. A learning approach that is too rote tends to limit students' ability to develop a deeper understanding and apply biological concepts in real situations. In this case, biology learning should be designed in such a way that it can create a learning experience that provides pleasure and intellectual satisfaction for students. This is important so that students are encouraged to be active in dismantling and correcting various concepts that may still be wrong, so that they are able to develop a more holistic biological understanding.

The importance of building pleasure and intellectual satisfaction in learning biology was also emphasized by Saptono (2003), who pointed out that learning biology should be more than just a process of memorizing and regurgitating information. Furthermore, meaningful biology learning allows students to undergo changes in conception. In this context, changes in conception reflect the transformation of students' understanding from a shallower level to a deeper and more contextual understanding. This process provides added value to biology learning, considering that students can develop their concepts dynamically through reflection and problem solving, thereby strengthening their scientific foundation.

The basic principle in learning biology is to give students the ability to know and understand concepts and facts in depth. This subject aims to equip students with research, analysis and problem-solving skills that encourage them to delve deeper into aspects of life and biodiversity. In this way, it is hoped that learning biology can go beyond simply memorizing biological facts, but rather open the door to the exploration of more complex concepts, such as ecological relationships, evolutionary processes and adaptations of living things (Rustaman, 2011).

Biology subjects are also considered a vehicle for students to understand themselves and explore the natural surroundings. By providing broad insight into the environment, students can develop a more holistic understanding of their role in the ecosystem. The importance of exploring aspects of life and undergoing in-depth exploration of nature can shape students' attitudes and awareness of the environment. Therefore, learning biology is not only about understanding theories and concepts, but also becomes a means to foster students' awareness of sustainability and environmental preservation. In this way, students can become agents of change who are responsible for maintaining the sustainability of nature.

Environmental education

According to Notohadiprawiro T. (1998), environmental education aims to provide training to students so they can think comprehensively about various aspects of human life. This subject also focuses on developing systemic thinking skills which involve the use of a complete time frame, including the past, present and future, and involving the spatial dimension. The time aspect is considered important because the environment is dynamic, both naturally and in relation to human interaction. Events that occurred in the past have an impact on the current situation, and that impact will influence events that may occur in the future. The spatial dimension is also considered important because the environment is a geographical reality. The consequences of an action in one location do not always apply to another location, depending on the geographical context and the action taken.

Environmental education (PLH) is defined as an effort to change people's behavior and attitudes with the aim of increasing knowledge, skills and awareness of environmental values and environmental issues. PLH aims to mobilize the community to play an active role in environmental preservation and safety for the benefit of current and future generations. Within its scope, PLH focuses on understanding environmental problems, including pollution, environmental damage, as well as resources and conservation.

Environmental education is an educational process that aims to shape behavior, values and habits so that individuals can respect the environment. The aim of environmental education is to provide learning to students so that they can understand the environment and ultimately lead to increased protection and development of a responsible attitude towards the environment. The Environmental Education Program is directed at developing children or students to have understanding, awareness, attitudes and rational behavior as well as responsibility for the complex interactions between the population and the environment in various aspects of human life, as explained by Miranto, (2017).

The aim of Environmental Education is to form individuals who have responsible behavior in interacting with the environment. This education is also the basis for the process of solving problems related to the environment on an overall philosophical basis, sustainability, improvement and maintenance to achieve better conditions. Specifically, the objectives of Environmental Education include several aspects: first, awareness, which aims to help students have awareness and sensitivity towards the environment and its problems as a whole. Second, knowledge, which aims to help students understand the basics of environmental functions and human interactions with their environment. Third, attitude, which aims to help students develop values and feelings of responsibility towards the natural environment, as well as motivation and commitment to participate in efforts to preserve and develop the environment. Fourth, skills, which aim to help students develop the ability to identify, investigate and contribute to solving and overcoming environmental issues and problems. Lastly, participation, which aims to help students gain practical experience and use their knowledge and thinking skills in an effort to solve and overcome environmental issues (Barlia, 2008).

Environmental education involves understanding culture and seeing the world from diverse perspectives. The interdisciplinary nature of this education reflects a holistic approach that brings together various scientific disciplines to examine environmental issues through a variety of learning methods. Environmental education has great potential to establish connections with society, and through this interaction, it is hoped that it will be able to increase understanding of basic environmental concepts and the problems that surround them (Widiawati et al, 2022).

Environmental Education activities can be implemented through two approaches, namely a monolithic approach and an integrative approach. In a monolithic approach, learning is carried out through one separate subject, so that Environmental Education becomes its own focus. In contrast, an integrative approach includes combining Environmental Education into one particular field of study, such as intracurricular activities.

Integration of Environmental Education with extracurricular activities can be carried out in the context of Natural Sciences (IPA) subjects, especially Biology. In this case, learning activities can involve observing and measuring the environment, studying the habitat and distribution of organisms

in the environment, as well as the practice of making recycled products (Noverita et al, 2022). Thus, students not only understand environmental concepts through a theoretical approach, but also through direct experience and practical application in the classroom. The integration of environmental education with intracurricular activities like this can enrich learning and stimulate students' awareness of environmental issues more comprehensively.

The importance of environmental education in biology learning to increase environmental awareness for students

Environmental education has an important role in the context of biology learning, and its presence can increase environmental awareness for students. The following are several points that explain the importance of environmental education in biology learning:

- a) **Awareness of Global Issues:** Biology learning integrated with environmental education plays a key role in broadening students' insight into pressing global environmental issues. In this context, students not only understand biological concepts theoretically, but also understand their practical implications on a global scale. Through this approach, students can explore complex issues such as climate change, biodiversity decline, and other environmental problems that have far-reaching and serious impacts on the planet. This integrated learning gives students the opportunity to reflect on the interconnections between human activities and global challenges, encouraging them to develop a deep and critical understanding of the way the local environment plays within a larger global framework. In this way, students can become agents of change who are more aware and responsible for universal environmental issues.
- b) **Linkage to Biological Concepts:** Environmental Education plays an important role in providing a practical and relevant dimension to biological concepts in classroom learning. By integrating environmental issues in the biology curriculum, students not only gain theoretical knowledge, but can also directly observe how these concepts interact with the reality of the surrounding environment. For example, discussion of food chains in biology can be linked to students' understanding of ecosystem dynamics and the importance of maintaining balance in food chains. This integration provides students with opportunities to experience the practical application of biological concepts in real contexts, develops a deeper understanding, and stimulates their interest in contributing to environmental conservation and management. In this way, students can link biology learning with their responsibility to the surrounding environment, creating a meaningful and relevant learning experience.
- c) **Encouraging Positive Action:** Environmental education integrated into biology learning has great potential to motivate students to take positive action in protecting the environment around them. As students become more aware of environmental issues taught in the context of biology, they become more inclined to respond with concrete actions that support environmental conservation and sustainability. This awareness can create intrinsic motivation for students to engage in environmental activities, such as waste reduction, tree planting, or participation in conservation projects. Thus, Environmental Education in biology learning not only creates a deeper understanding, but also stimulates students' concrete attitudes and actions in maintaining environmental sustainability and balance.
- d) **Formation of Responsible Attitudes:** The central role of Environmental Education in forming responsible attitudes towards the environment is becoming increasingly significant. By instilling a deep understanding of the impact of human activities on the environment, this education opens students' eyes to the consequences of every action taken on the natural environment. This awareness becomes the basis for developing a responsible attitude, where students not only realize their responsibility towards the environment, but also feel they have an active role in maintaining the sustainability of nature. Thus, Environmental Education creates a strong foundation for forming individuals who not only understand, but also act proactively to preserve and protect the environment for the sustainability of our planet .

- e) Practical Experience: Environmental Education in biology learning provides students with a unique opportunity to experience the environment directly through direct observation, field experiments, and various other practical activities. Through this hands-on experience, students not only understand theoretical biological concepts, but are also actively involved in observing and interacting with the environment around them. Direct observation and field experiments allow students to observe and identify various aspects of the environment, understand ecosystem dynamics, and explore complex relationships between organisms and their habitats. This practical experience not only provides a deeper understanding, but also builds direct awareness of the importance of protecting and preserving the environment. Thus, through environmental education, biology learning does not only become abstract, but also becomes a real and relevant experience for students.
- f) Life Skills Development: Environmentally focused biology learning not only provides conceptual understanding, but also helps students develop a variety of essential life skills. In this context, students can practice critical thinking skills through analyzing the impact of human activities on ecosystems and considering sustainable solutions. Observation skills are strengthened through direct observation of flora and fauna and understanding their interactions in the environment. In addition, this learning encourages the development of decision-making skills based on environmental understanding, where students are invited to develop solutions that consider their impact on the ecosystem. Thus, environmentally focused biology learning is not only about scientific concepts, but also teaches students to apply relevant and important life skills in the context of environmental conservation.

Through the integration of environmental education in biology learning, schools play a key role in forming a generation that is more aware of the importance of protecting the environment. This approach creates a deep awareness of the interactions between human life and the surrounding ecosystem. Students not only understand theoretical biological concepts, but also practically feel the urgency to contribute to maintaining the sustainability of the earth. In this way, schools are not only a place for imparting knowledge, but also a place for character formation and social responsibility towards the environment. Through integrated environmental education, schools produce individuals who are ready to actively participate in environmental conservation efforts, bringing hope for a sustainable and balanced future for future generations.

4. CONCLUSION

The integration of environmental education in biology learning has a significant positive impact. Through this approach, students not only gain a deeper understanding of biological concepts, but also directly experience aspects of the environment through observations, experiments, and other practical activities. Awareness about the impact of human activities on the environment becomes more honed, forms a responsible attitude, and motivates students to take positive action in maintaining the sustainability of nature. Thus, this education not only creates an understanding of scientific concepts, but also develops critical and relevant life skills. Furthermore, the integration of Environmental Education helps form a generation that is more environmentally aware, ready to participate in maintaining the sustainability of the earth, and fighting for a sustainable future for future generations. This approach not only creates educated students, but also creates agents of change who are active in global environmental conservation efforts.

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