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Environmental Literacy in Education: A Literature Study to Support Sustainable Development

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Abstract

Environmental literacy is an essential competence in addressing increasingly complex global environmental challenges, including climate change, ecosystem degradation, and sustainability crises. This study aims to examine the concept of environmental literacy and the role of education in its development through a literature study approach. Data sources were obtained from relevant scholarly articles and academic publications focusing on environmental literacy and environmental education. The findings indicate that environmental literacy encompasses knowledge, awareness, attitudes, critical thinking skills, and active participation in pro-environmental actions. Education plays a strategic role in strengthening environmental literacy through the implementation of active, contextual, and experience-based learning approaches. However, a gap remains between the urgency of environmental issues and existing educational practices. Therefore, the development of systematic and sustainable learning strategies is necessary to enhance environmental literacy. This study is expected to contribute both theoretically and practically to the advancement of education oriented toward sustainability.

1. Introduction

Today's global environmental challenges show an increasing level of complexity, characterized by climate change, ecosystem degradation, environmental pollution, and declining biodiversity. These problems not only have an impact on natural conditions, but also directly affect the quality of human life and the sustainability of development. In this context, the involvement of individuals and communities in protecting the environment is a key factor for realizing sustainable development. However, such engagement is highly dependent on the individual's level of understanding, awareness, and ability to respond to environmental issues critically and responsibly (Idris et al., 2020).

One of the important competencies needed to face environmental challenges in the 21st century is literacy. Literacy is no longer understood as limited to reading and writing skills, but rather includes the ability of individuals to understand, interpret, and use information to make the right decisions. In the context of environmental issues, literacy serves as a foundation for individuals to think critically, solve problems, and determine attitudes and actions that are oriented towards sustainability (Nasution, 2021).

Environmental literacy is a specific form of literacy related to the ability of individuals to understand environmental concepts, principles, and problems, and apply them in daily life. Environmental literacy includes the dimensions of environmental knowledge, awareness and attitudes towards the environment, the skills to analyze environmental issues, and active participation in pro-environmental actions. Individuals with good environmental literacy are expected to be able to make

decisions based on scientific knowledge and have responsibility for environmental sustainability (Putra, 2022).

Education has a strategic role in developing environmental literacy. Through a planned learning process, education can be a means to instill understanding, form attitudes, and encourage behaviors that care about the environment. Various studies show that an active, contextual, and experiential-based learning approach can increase the effectiveness of environmental education and strengthen students' environmental literacy (Hayati, 2020). Learning models such as project-based learning and problem-based learning are considered to be able to directly involve students in the process of understanding and solving environmental problems (Kamil et al., 2020).

However, various studies show that the level of environmental literacy is still not optimal and the implementation of environmental literacy learning still faces a number of challenges. The gap between the urgency of global environmental problems and applied learning practices is one of the issues that need further attention (Anggraini & Nazip, 2022). In addition, the results of the latest literature review also show the need to strengthen a systematic and sustainable environmental literacy learning framework (Fakhriyah & Masfuah, 2024). Based on these conditions, research on environmental literacy and the implementation of learning that supports its development is very relevant. This study is expected to make a theoretical contribution in enriching the understanding of environmental literacy as well as a practical contribution in the development of learning oriented towards

increasing environmental awareness and responsibility to support sustainable development in the future.

2. Methods

This research uses a literature study method that aims to study, analyze, and synthesize various scientific sources relevant to the topic of environmental literacy and its role in the context of education. Literature studies were chosen because this method allows researchers to gain a comprehensive understanding of the development of concepts, research findings, and trends in the latest scientific studies without collecting field data directly. Through this approach, researchers can map out the theoretical and empirical frameworks that have been developed by previous researchers.

The research process begins with the determination of the focus of the study that is tailored to the research objectives, namely environmental literacy, environmental education, and learning that supports strengthening awareness and pro-environmental behavior. Furthermore, a search of relevant literature sources was carried out in the form of scientific journal articles, conference proceedings, and other academic publications. These sources are selected based on the suitability of the topic, the year of publication relatively up-to-date, and the credibility of the publisher or publication media. This stage aims to ensure that the literature used is able to represent the development of current knowledge and practice in the field of study.

After the literature sources are collected, a selection process is carried out to determine the literature that is most relevant to the research focus. The selected literature is then analyzed in depth by identifying the main concepts, important findings, and relationships between the ideas discussed. The analysis was carried out systematically to find patterns, similarities, and differences in views between studies. The results of the analysis are then synthesized into a structured description so that it can provide a comprehensive picture of environmental literacy and the role of education in its development.

The final stage of this literature study method is the preparation of study results in the form of a coherent and logical scientific narrative. Literature synthesis is used to strengthen the theoretical foundation of research, identify study gaps, and formulate conceptual and practical implications. Thus, the literature study method is expected to be able to make a meaningful contribution in understanding environmental literacy as an important issue in supporting sustainable development.

3. Results and Discussion

The results of the literature review show that environmental literacy has been positioned as a key competency in facing increasingly complex global environmental challenges. Various studies confirm that environmental literacy is not only related to the mastery of factual knowledge about the environment, but also includes awareness, attitudes, critical thinking skills, and the ability of individuals to actively participate in sustainability-oriented decision-making (Putra, 2022). These findings

reinforce the view that environmental literacy is multidimensional and demands a comprehensive development approach, particularly through education.

A number of studies show that the level of environmental literacy is still in the medium to low category, especially when viewed from the aspect of applying knowledge in real behavior. Nasution (2021) revealed that although individuals have a sufficient conceptual understanding of environmental issues, this is not fully reflected in consistent pro-environmental attitudes and actions. This condition indicates a gap between knowledge and practice, which is a major challenge in the development of environmental literacy.

Education is seen as a strategic means to bridge this gap. Various literature emphasizes that conventionally designed learning tends to be less effective in fostering environmental awareness and responsibility. On the other hand, a learning approach that places students as active subjects is considered to be more able to encourage deep understanding and emotional involvement in environmental issues (Hayati, 2020). Experiential learning allows students to relate theoretical concepts to environmental realities, so that environmental literacy does not stop at the cognitive level.

The project-based learning model is one of the approaches that is widely reported to be effective in improving environmental literacy. Kamil et al. (2020) show that learners' involvement in environmental projects can strengthen conceptual understanding while encouraging active participation in pro-environmental actions. Through the project, students are faced with real problems

that demand the ability to analyze, collaborate, and make decisions, which are important components of environmental literacy.

In addition to project-based learning, problem-based learning is also widely recommended in the literature. This approach is considered to be able to develop critical thinking and problem-solving skills that are relevant to contemporary environmental issues. Suryawati (2020) emphasized that problem-based learning provides space for students to explore various perspectives and solutions to environmental problems, thereby strengthening the skill dimension in environmental literacy (Suryawati, 2020).

The results of the study also show that environmental literacy is closely related to sustainable development goals. Environmental literacy education is seen as the foundation in forming individuals who have global awareness and social responsibility towards the environment. Huang and Te Hsin (2023) emphasized that the integration of environmental literacy in education contributes significantly to the achievement of sustainable development, especially in shaping environmentally friendly behaviors from an early age.

However, a number of studies have also identified various obstacles in the implementation of environmental literacy learning. Anggraini and Nazip (2022) revealed that the limitations of learning design, lack of integration across subjects, and lack of comprehensive evaluation are factors that hinder the optimization of environmental literacy. This shows that the development of environmental literacy requires systemic support, not only at the level of learning practice, but also at educational policy and planning.

The latest literature review also highlights the importance of the role of educators in implementing environmental literacy learning effectively. Fakhriyah and Masfuah (2024) emphasized that educators' competence in understanding the concept of environmental literacy and choosing the right learning strategy is a determining factor for the success of strengthening environmental literacy. Without adequate understanding, learning tends to be informative and has less impact on changing attitudes and behaviors.

From a broader perspective, environmental literacy is also seen as part of 21st century competencies that demand critical, collaborative, and reflective thinking skills. Idris et al. (2020) emphasized that the integration of environmental education in learning can strengthen environmental literacy while forming an individual character that is oriented towards sustainability. These findings are in line with the view that environmental literacy cannot be developed instantly, but rather through a continuous and integrated learning process.

In addition, Rokhmah and Fauziah (2021) show that environmental literacy in the context of science education has great potential to connect scientific concepts with real problems faced by society (Rokhmah & Fauziah, 2021). This approach is considered to be able to increase the relevance of learning while strengthening students' understanding of the impact of human activities on the environment.

Based on the overall results of the literature review, it is shown that environmental literacy is a complex and multidimensional concept, and is greatly influenced by the educational approach used. Although various learning models have been shown to be effective in improving certain aspects of environmental literacy,

there is still a need for the development of more systematic and sustainable learning strategies. The gap between the urgency of global environmental problems and existing educational practices underscores the importance of further research to formulate a more comprehensive and adaptive approach to environmental literacy learning to future challenges.

4. Conclusion

Based on the results of the literature review that has been conducted, it can be concluded that environmental literacy is an important competency that needs to be developed to face various increasingly complex global environmental challenges. Environmental literacy is not only concerned with the mastery of knowledge about the environment, but also includes awareness, attitudes, critical thinking skills, as well as the ability of individuals to actively participate in sustainability-oriented decision-making and actions. Therefore, the development of environmental literacy requires a comprehensive and sustainable approach. Education has a strategic role in shaping and strengthening environmental literacy. Through a systematically designed learning process, education can be a means to integrate environmental knowledge with the formation of pro-environmental attitudes and behaviors.

Active, contextual, and experiential-based learning approaches have been shown to be more effective in encouraging students' deep understanding and engagement with environmental issues. This shows that environmental literacy cannot be developed optimally through learning that is purely informative. However, strengthening environmental literacy still faces various challenges, especially related

to the consistency of implementation and integration of learning strategies. Therefore, continuous efforts are needed to develop learning models that are adaptive, systematic, and relevant to future needs. Thus, environmental literacy is expected to be able to be the foundation in forming individuals and communities who are responsible for environmental sustainability.

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