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Environmental Education in College: The Gap between Student Knowledge, Attitudes, and Behaviors

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Abstract

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Global environmental issues, such as climate change, pollution, and ecosystem degradation, demand a real response from the world of education, especially universities. Students are seen as agents of change who play a strategic role in realizing sustainable development. This study uses a literature study method by analyzing academic literature, international reports. The purpose of the research is to examine the level of knowledge, attitudes, and behaviors of students towards environmental issues, as well as to review the implementation of environmental education in universities. The results of the study showed that students have a fairly high level of knowledge about environmental issues, but there is a significant gap between knowledge and real behavior. Cultural factors, social norms, and lack of institutional support reinforce the phenomenon of the attitude-behavior gap. In addition, the implementation of environmental education in higher education is not yet uniform and tends to be partial, with the dominance of additional approaches without thorough integration in the curriculum. Thus, universities can play a more effective role in forming students who not only understand environmental issues, but are also committed to real action for global sustainability.

1. Introduction

Global environmental issues are increasingly urgent, marked by the increasing frequency of climate disasters, pollution, and degradation of natural resources. The Intergovernmental Panel on Climate Change (IPCC, 2021; 2023) report confirms that a 1.1°C increase in global temperatures compared to the pre-industrial era has triggered widespread impacts, ranging from extreme heat waves, melting polar ice, to declining agricultural productivity. This condition is exacerbated by excessive consumption patterns, plastic pollution, and clean water crises reported in the UN Environment Programme (UNEP, 2022) and the Sustainable Development Goals Progress Report (United Nations, 2023). These facts show that environmental challenges are not just local problems, but global problems that demand a systematic response across countries.

One of the solutions that is now seen as strategic is through Education for Sustainable Development (ESD). UNESCO in the document Education for Sustainable Development: A Roadmap 2020–2030 emphasizes that education must be the driving force for transformation towards sustainability, not just the transfer of knowledge, but also the formation of values, attitudes and skills to act (UNESCO, 2020). This is in line with the Sustainable Development Goals (SDG 4.7) which emphasizes education for sustainable development as well as SDG 13 which calls for climate action. Thus, education plays a central role in responding to the global crisis through the younger generation.

Students, as a group of young intellectuals, have a strategic position as agents of change. They are not only recipients of education, but also future future leaders

and decision-makers. Recent studies show that although students have a relatively high level of knowledge regarding sustainability issues, their awareness and pro-environmental behavior are often low (Radwan & Khalil, 2021; Bertossi & Marangon, 2022). This phenomenon indicates a gap between knowing and doing, which is a significant difference between what students know and what is done in daily practice.

Furthermore, sustainability policies in universities are not yet completely uniform. Junior et al. (2020) found that the implementation of environmental education is strongly influenced by institutional support, including the availability of environmentally friendly facilities, curriculum integration, and green campus policies. Without this support, it is difficult for students to internalize pro-environmental attitudes consistently. Therefore, it is important to conduct research that examines the relationship between student knowledge, attitudes, and behaviors towards sustainability, as well as the extent to which environmental education in higher education is implemented.

With this background, this research aims to: (1) analyze the level of knowledge, attitudes, and behaviors of students related to sustainability issues; (2) evaluate the implementation of environmental education in higher education; and (3) identify effective strategies to increase environmental awareness and action. This research is expected to make an academic contribution in bridging the gap in previous research and support the strengthening of the role of students as agents of change in realizing sustainable development.

2. Literature Review

A literature review on environmental education at the university level shows significant developments in the last five years. Many studies focus on students knowledge levels, awareness, and consistency of pro-environmental behavior. However, the results obtained tend to show a gap between knowledge and real practice. Radwan & Khalil's (2021) study shows that students have a fairly good understanding of the Sustainable Development Goals (SDGs), especially the issue of climate change and sustainability of consumption. However, this knowledge has not been fully implemented in daily behavior, for example in reducing plastic use or energy efficiency. This research emphasizes the need for a more applicable pedagogical approach so that students not only know the concept of sustainability, but also be able to internalize it.

Furthermore, research by Jumior et al. (2020) found that institutional factors greatly influence student behavior. Campuses with a clear "green campus" policy and providing environmentally friendly facilities tend to be more successful in encouraging changes in student behavior. Conversely, in universities that do not have strong sustainability policies, it is more difficult for students to integrate sustainability values into their daily lives. This shows the importance of the role of the learning environment and policy support in strengthening the impact of environmental education. Bertossi and Marangon (2022) also highlight the existence of cultural barriers and lifestyle habits that make it difficult for students to switch to pro-environmental behavior consistently. Although they are aware of the importance of reducing excessive consumption or recycling, these practices often

clash with social norms, comfort, and limited facilities. These findings emphasize that environmental education in higher education must be able to go beyond just imparting knowledge, but also need to present hands-on experiences that encourage behavior change. The current literature indicates that students knowledge of sustainability is relatively high, but critical awareness and real behavior are still inconsistent. Institutional, policy, and cultural context factors play a major role in bridging the gap between knowledge and practice. Therefore, this research is important to deepen understanding of the extent to which environmental education in higher education can truly result in a transformation of student attitudes and behaviors.

3. Method

This research uses the library research method, which is an approach that relies on critical analysis of various scientific literature, policy reports, and official documents relevant to environmental education issues in higher education. The selection of this method is based on the purpose of research which focuses on exploring theoretical and conceptual information about the level of knowledge, attitudes, and behaviors of students in dealing with sustainability issues, as well as analyzing the implementation of environmental education in supporting sustainable development. Through a literature study, this research seeks to synthesize various academic views and global policies to gain a more comprehensive understanding of the issues being studied.

The main sources of research come from scientific journal articles, international reports, as well as policy documents published by global institutions, especially those published in the last 5 years. Academic articles are obtained through the Google Scholar database using relevant keywords such as environmental education, sustainability awareness among university students, and Education for Sustainable Development. Meanwhile, policy documents and official reports are obtained from international organizations such as UNESCO, the Intergovernmental Panel on Climate Change (IPCC), the United Nations Environment Programme (UNEP), and the annual United Nations Sustainable Development Goals Progress report. All sources used are strictly selected based on relevance to the research topic, the quality of the publication, and the freshness of the information.

The data collection process is carried out through three continuous stages, namely literature identification, selection, and analysis. At the identification stage, the researcher searched various sources using a combination of keywords that included aspects of knowledge, attitudes, student behavior, and environmental education policies. Furthermore, at the selection stage, literature that does not meet the criteria, either because it is outside the research time span or is less relevant to the context of higher education, is excluded from the analysis list. After that, the selected literature is read thoroughly to examine the ideas, findings, and recommendations contained in it.

Data analysis is carried out using a content analysis approach, where researchers compare findings from various sources to identify research patterns, trends, and gaps. This approach allows researchers to not only present existing data,

but also synthesize information critically, resulting in a new understanding of the relationship between student knowledge and sustainability practices in college. The validity of the research is maintained by using only sources published in reputable journals as well as official reports of international institutions that have high credibility. Thus, the literature study method in this study does not solely function to collect data, but also as a means of critical reflection on the existing literature. Through a systematic analysis, this study seeks to present a comprehensive picture of the current condition of environmental education at the student level, as well as affirm the urgency of integrating sustainability education in the university curriculum as a strategic step in responding to the global challenges of climate change and environmental crises.

4. Results and Discussion

4.1. Students Level of Knowledge, Attitudes, and Behaviors on Environmental Issues

The results of the literature review show that students in general have a fairly high level of knowledge about global environmental issues, especially related to climate change, natural resource degradation, and plastic pollution. These findings are consistent with the research of Radwan & Khalil (2021) which confirms that the majority of students have understood the basic concept of sustainability and are able to identify the main causes of the environmental crisis. This knowledge is mostly obtained through digital media, academic literature, and international campaigns that emphasize the urgency of action on climate change.

Nevertheless, there is a clear gap between knowledge and real behavior. Bertossi and Marangon (2022) found that although students have a high awareness of the importance of reducing single-use plastic consumption, actual practices in daily life are still limited. College students tend to be more likely to adopt eco-friendly behaviors that are symbolic, such as the use of tote bags or participation in green campaigns, compared to fundamental lifestyle changes, such as reducing the use of private vehicles or changing energy consumption patterns.

One of the causes of the low consistency of pro-environmental behavior is cultural and habituary factors. As revealed by Afroz and Ilham (2020), which was later corroborated by more recent research, students behavior is often influenced by the social norms that apply in their environment. When campuses do not provide adequate institutional support, such as recycling facilities or plastic-free policies, students struggle to maintain environmentally friendly behaviors in the long term. This shows that pro-environmental behavior is not only the result of individual awareness, but is also influenced by social ecosystems and institutional policies.

A recent study by Tofighi and Jackson (2022) also shows a contradiction between positive attitudes towards environmental issues and actual behavior. Students who say they care about the issue of climate change do not always take concrete actions such as energy efficiency or reducing meat consumption. This phenomenon is known as the attitude-behavior gap which is one of the major challenges in efforts to build a young generation that is committed to sustainability. In this context, environmental education in college needs to be designed not only to increase knowledge, but also to build habits and practical skills so that students are

able to translate their awareness into real action. The literature suggests that students are uniquely positioned as agents of change because they have access to the latest scientific knowledge and are in an educational environment that is supposed to support behavior change. However, the gap between knowing and doing is still a major obstacle. Therefore, this study emphasizes that environmental education in higher education must be directed at behavioral transformation, not just the transfer of conceptual knowledge.

4.2. Implementation of Environmental Education in Higher Education and Challenges

The implementation of environmental education in higher education has basically become a global agenda through international policy support. UNESCO in its Education for Sustainable Development (ESD) Roadmap 2020–2030 emphasizes that higher education has a strategic role in preparing young people to face global environmental challenges (UNESCO, 2020). One of the key targets in SDG 4.7 is to ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including through environmental education, gender equality, and the promotion of a culture of peace and non-violence.Although normatively policy support is quite strong, its implementation at the university level is still not uniform.

A study by Lozano et al. (2021) revealed that the integration of sustainability curriculum still tends to be fragmentary. Some universities only adopt an add-on approach, which is by adding one or two courses related to the environment, without touching on the overall change in the learning paradigm. This causes students to gain

sustainability knowledge partially, not as a cross-field competence.In addition, institutional support is also a determining factor for the success of implementation. Research by Shrestha (2025) shows that universities that successfully instill a culture of sustainability usually have clear institutional policies, such as green campus initiatives, waste management programs, and incentives for students to be involved in environmental projects. On the other hand, in universities with minimal supporting policies, students find it difficult to internalize pro-environmental behavior even though they already have adequate knowledge. Another challenge is the gap between theory and practice. Research by Biasutti & Frate (2021) found that although students receive materials related to climate change and sustainability in lectures, they rarely get the opportunity to apply the concept in a real-world context.

This has implications for the low level of practical skills that are supposed to be a bridge between knowledge and behavior. For this reason, an experiential learning approach is needed that allows students to learn through hands-on practice, such as environmental projects in the community, action research, or green campus programs.The literature confirms that environmental education in higher education still faces serious challenges in terms of consistency of implementation, institutional support, and transformation from theory to practice. By strengthening curriculum integration, providing an eco-friendly campus ecosystem, and encouraging student engagement in real action, higher education can play a more significant role in shaping a generation committed to global sustainability.

4.3. Strategies for Increasing Environmental Awareness and Action among Students

Increasing awareness and environmental action among students is one of the important aspects in realizing continuous education in higher education. After understanding the level of knowledge, attitudes, and behaviors of students, as well as observing the implementation of environmental education that is not yet uniform, the next stage is to formulate effective strategies to strengthen the role of students as agents of change. This strategy is not only related to curriculum policy formulation, but also includes pedagogical transformation, strengthening the green campus culture, and collaboration with local and global communities. One strategy that has proven effective is the use of an innovative pedagogical approach that places students as active subjects of learning. For example, project-based learning allows students to solve real environmental problems around them.

Thus, knowledge does not just stop at theoretical understanding, but is translated into real, impactful action. This approach is in line with the idea that service learning the combination of academic learning with social engagement can foster students critical awareness and ecological responsibility. Recent research shows that this kind of participatory pedagogical model is more successful in building pro-environmental behaviors than traditional methods that emphasize only knowledge transfer (Cavicchi, 2021). In addition to the pedagogical approach, another important strategy is to strengthen eco-campus initiatives or green campuses. Many universities in different parts of the world have implemented policies to reduce the carbon footprint of campuses, such as better waste

management, energy conservation, and the development of green spaces. However, this policy will only be successful if students are actively involved, both through student organizations and community movements. Student involvement in green campus programs creates a sense of ownership and responsibility, so sustainability becomes part of the shared identity. Furthermore, environmental awareness promotion strategies also need to adopt a community-based approach. Students can be involved in collaborations with local communities to solve environmental issues such as plastic waste management, water conservation, and sustainable agriculture. This kind of collaboration strengthens students understanding that environmental issues are not just academic concepts, but real problems that touch people's daily lives. In this way, students can develop social empathy as well as practical competence to design solutions based on local contexts.

Another strategy that is increasingly relevant is the use of digital technology in environmental education. Online platforms, social media, and eco-tracking applications allow students to monitor their energy consumption, carbon footprint, or personal consumption patterns. Not only does this digital data increase individual awareness, but it can also be used as a collective reflection tool to drive behavior change at the campus community level. In the post-pandemic era, this kind of technology integration has become increasingly important to reach students across locations and backgrounds. However, awareness raising strategies cannot be separated from challenges. One of them is the attitude-behavior gap – the gap between positive attitudes towards the environment and real practices in daily life. This is often influenced by cultural factors, habits, and limited institutional support.

For example, students may have a high awareness of the dangers of single-use plastics, but it is still difficult to change usage habits due to the limitations of campus facilities. In this context, awareness-raising strategies should always be followed by the creation of a supportive environment that facilitates sustainability practices.

In addition, research also shows that awareness-raising strategies will be more effective if supported by consistent integration of university policies. A comprehensive institutional approach includes the integration of sustainability in a cross-disciplinary curriculum, the provision of incentives for environmental research, and the development of green campus infrastructure. Sebire and Isabeles-Flores (2023) affirm that only with a combination of curriculum reform, student participation, and structural support, education for sustainable development can truly produce significant change. Thus, the strategy of increasing environmental awareness and action among students needs to be pursued through a combination of pedagogical innovation, strengthening the green campus movement, community involvement, the use of digital technology, and institutional policy consistency. The combination of these strategies will form a generation of students who not only have knowledge, but also attitudes and behaviors that are in line with the principles of sustainability.

5. Conclusion

This literature research confirms that environmental issues are a global problem that requires serious attention from the world of education, especially higher education. Data from the IPCC (2021, 2023) as well as UNEP and UNESCO

reports show that the climate crisis, environmental degradation, and overconsumption have become universal challenges that have a direct impact on human survival. In this context, students are seen as agents of change who have a strategic role in driving transformation towards sustainability. The results of the literature review show that there is a gap between student knowledge and behavior. In general, students have a fairly good understanding of environmental issues, but are not fully able to translate them into real actions. Factors such as culture, social norms, lack of institutional support, and lack of opportunities for real practice become obstacles in the formation of pro-environmental behavior.

This attitude-behavior gap phenomenon shows that environmental education is not enough to focus only on improving knowledge, but must also be directed at the formation of habits, skills, and commitment to real action. In addition, the implementation of environmental education in higher education still faces serious challenges. Although global policies such as SDG 4.7 and the UNESCO ESD Roadmap 2020–2030 have emphasized their urgency, the integration of sustainability curricula is still partial and has not touched on a paradigm shift in learning. Institutional support through green campus policies, waste management, and experiential learning has been proven to increase student involvement in sustainability actions.

Thus, this research contributes to emphasizing the urgency of integrating environmental education in higher education in a more systematic and transformative manner. This effort is important not only to improve students'

environmental literacy, but also to form behaviors that are consistent with the principles of sustainable development.

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