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Implementation of Green Campus and Students' Awareness of Higher Education Sustainability

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Abstract

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This study analyzes the role and contribution of the green campus concept in achieving sustainable higher education through a literature review of academic publications. The analysis explores how institutional policies, green infrastructure, and student awareness interrelate to foster a sustainability-oriented academic culture. The findings suggest that the success of green campus initiatives relies heavily on the synergy between institutional commitment, leadership engagement, and the active participation of the academic community, particularly students as key agents of change. Integrating environmental education into the curriculum and campus-based activities has been shown to increase ecological awareness, encourage responsible resource use, and promote sustainable behavior. Furthermore, universities that adopt a participatory and collaborative approach in their sustainability strategies tend to achieve better outcomes in innovation, resource management, and community engagement. This study highlights that the green campus concept should not be viewed solely as an administrative framework but as a transformative cultural process that fosters ecological responsibility, social awareness, and long-term resilience within the academic environment, meaningfully contributing to global sustainability goals.

1. Introduction

Awareness of environmental sustainability issues has grown rapidly in the last two decades, and higher education plays an important role in shaping sustainability behaviors and paradigms in society. Universities not only function as learning centers, but also as agents of social transformation that are able to instill sustainability values through tangible environmental policies, curricula, and practices. The concept of green campus emerged as a comprehensive strategy to realize environmentally friendly and sustainable educational institutions, with a focus on resource efficiency, technological innovation, and changes in the behavior of the academic community towards environmental conservation (Anthony, 2021).

In the global context, many universities have implemented integrated sustainable university policies through various indicators such as energy, water, waste, transportation, and sustainable education and research. The implementation of these principles is often measured through international rankings such as the UI GreenMetric World University Rankings which provide a global reference on the achievement of green campuses (Safarkhani & Örnek, 2022). However, various studies show that even though infrastructure and policies have been well designed, the level of student awareness and participation in green campus programs still varies (Bautista-Puig & Sanz-Casado, 2021). Therefore, it is important to explore how the perceptions of students and other academic communities can contribute to the successful implementation of the policy.

Students have a strategic role as agents of change in creating a sustainable university environment. They are the main target in environmental education

because their behavior and attitudes will determine the effectiveness of implementing sustainability values in the future (Amin et al., 2022). Several studies have shown that project-based learning and problem-based hybrid learning approaches can increase students' ecological sensitivity and social responsibility to environmental issues. Education that is integrated with sustainability practices has been proven to be more effective in fostering awareness and motivating students to be actively involved in green campus programs (Wibowo et al., 2023).

In addition to educational factors, social and cultural aspects also affect the success of the implementation of green campuses. Environmental awareness is often directly proportional to students' daily behaviors, such as waste management, energy efficiency, and sustainable transportation use (Chairani et al., 2023). Another study found that the better students' understanding of the importance of natural resource management, the more likely they are to support green campus policies and sustainability practices (Wibowo et al., 2023). Therefore, an approach is needed that not only emphasizes the infrastructure aspect, but also builds an ecological culture in the academic environment.

In recent years, a new trend has emerged that integrates the concept of sustainability with technological innovation and green architecture on campus. The implementation of green buildings, low-emission transportation systems, and water and energy conservation are concrete steps in supporting smart green campuses that are efficient and adaptive to climate change (Golbazi et al., 2020). However, the success of the strategy is highly dependent on the support of the entire academic community as well as long-term institutional policies.

Empirically, recent research shows that students' perceptions of green campuses are still a key factor that determines the effectiveness of sustainability programs. Students who have a high level of understanding of the concept of a green campus tend to be more active in environmentally friendly practices such as waste management, energy conservation, and ecological-themed social activities (Rachmadian et al., 2024). However, there are still many universities that face challenges in building collective awareness among their citizens. This indicates the need for more effective learning and communication strategies to strengthen the value of sustainability at the individual and institutional levels.

Thus, the establishment of a green campus does not only depend on physical infrastructure, but also on the transformation of the values, awareness, and behavior of the campus community. The study of students' perceptions of sustainable campus programs is important because it can provide an overview of the extent to which sustainability values have been embedded in academic life. This research is expected to contribute to the development of environmental education strategies and sustainable campus management that are adaptive, participatory, and relevant to global challenges towards a greener and more ecologically responsible future.

2. Methods

This study uses a descriptive analytical literature study approach. Literature studies were chosen because they were able to provide an in-depth understanding of concepts, theories, and results of previous research that are relevant to the topic of green campus and its implementation in the context of higher education. Through

this method, researchers search various scientific sources such as accredited international and national journals, research reports, and other academic publications published between the last five years. The main focus of this method is to identify, review, and synthesize scientific findings related to student perceptions, institutional policies, and sustainability practices in the university environment.

The initial step in this research began with the collection of references through online academic databases such as Google Scholar, Elsevier, and ResearchGate. The selection process is carried out systematically by paying attention to certain criteria, namely: (1) research published in the last five-year period, (2) having topics relevant to the implementation of green campus and university sustainability, and (3) presenting empirical or conceptual findings that support the development of a theoretical framework for research. After the selection process, each article is analyzed qualitatively to assess the relevance of the content, methods used, and research results that can be adapted in a general context without mentioning a specific location or institution.

The data obtained from the literature is then categorized into several main themes, such as green campus indicators, student participation, institutional policies, and sustainable education innovation. The analysis was carried out by tracing the pattern of inter-thematic relationships to identify research gaps and potential contributions to the development of the concept of sustainable university. The entire analysis process is carried out systematically to ensure inter-source integration and interpretation accuracy. The final results of this literature study method are expected to be able to present a comprehensive picture of the development, challenges, and

future research directions related to the implementation of green campuses in universities.

3. Results and Discussion

The results of a literature review from various studies published between 2020 and 2024 show that the concept of green campus has become an important paradigm in the development of sustainable higher education around the world. Higher education plays a role as the main driving force in shaping community environmental awareness through education, research, and community service. The implementation of green campus covers various aspects ranging from institutional governance, energy efficiency, water management, waste reduction, to the formation of an environmentally friendly academic culture. The study conducted emphasizes that the successful implementation of this concept does not only depend on the physical infrastructure and institutional policies, but also on the active involvement of the academic community, especially students, in sustainability practices (Anthony, 2021).

Research shows that the success of green campus programs is closely related to the level of student awareness and participation. Students who have a deep understanding of environmental issues tend to be actively involved in natural resource conservation activities and campus waste management. A study in Spain revealed that institutions that implemented a comprehensive sustainability system showed a significant increase in students' eco-friendly behavior (Bautista-Puig & Sanz-Casado, 2021). This reinforces the view that sustainability on campus cannot be achieved without changes in individual behavior. Environmental awareness

should be fostered through formal and non-formal education, including extracurricular activities, training, and community-based collaborative projects.

Student involvement as agents of change is a crucial factor in instilling sustainability values in the academic environment. Amin et al. (2022) emphasized that a problem-based learning approach combined with a hybrid method is able to significantly increase students' ecological sensitivity. The results of the study show that when students are faced with real problems related to the environment, they are encouraged to think critically and look for innovative solutions that can be applied in their daily lives. Contextual, interactive, and participatory learning has been shown to be effective in building higher environmental awareness. Thus, green campus is not just an institutional policy, but also an integral part of the learning process that forms a sustainable character.

In addition, a study by Correia et al. (2020) shows that students' perceptions of sustainability in higher education institutions are influenced by the social, economic, and cultural context of each campus. Colleges with strong sustainability policy support and structured environmental education programs tend to have students with higher levels of awareness. On the other hand, on campuses that still consider environmental issues as secondary, students show lower participation rates. This shows that institutional policies play a big role in shaping the ecological behavior of students.

Infrastructure and architectural factors also affect students' perception of the campus environment. According to Golbazi et al. (2020), the application of energy-friendly green building design in the university environment not only provides

ecological benefits, but also increases learning comfort and a sense of responsibility for environmental conservation. The learning environment designed with the principles of energy efficiency and natural air circulation in mind has been proven to encourage students to behave more concerned about the preservation of resources. This research reinforces the argument that the physical aspects of the campus should be an integral part of a university's sustainability strategy.

The implementation of green campuses is also greatly influenced by the commitment of institutional leaders and the university's strategic policies. Safarkhani and Örnek (2022) explained that universities involved in the UI GreenMetric rating system tend to show significant improvements in data transparency, energy efficiency, and natural resource management. This ranking not only serves as a performance measurement tool, but also as a driver for universities to improve sustainability governance. However, they also caution that excessive focus on ratings can shift the orientation of sustainability from substantive goals to purely administrative interests.

Studies in Indonesia show a similar phenomenon. Rachmadian et al. (2024) found that students' perceptions of the green campus program are still diverse. Most students show a positive attitude towards the concept of a green campus, but their involvement in real activities is still limited. The causative factors include a lack of socialization, a lack of supporting facilities, and a weak integration of sustainability values in the curriculum. These results suggest that increased awareness needs to be balanced with the provision of facilities that enable students to actively participate in sustainable activities.

In another context, Chairani et al. (2023) highlight student behavior in managing food waste as part of the implementation of sustainability in the campus environment. The results of their research show that there are still many students who do not understand the impact of waste on the environment, even though they have an awareness of the importance of environmentally friendly behavior. These findings indicate a gap between knowledge and real action on the ground. Therefore, a more applicable and experience-based educational approach is needed to narrow the distance between awareness and action.

Wibowo et al. (2023) added that the success of continuing education at universities is largely determined by the synergy between curriculum, student activities, and institutional policies. Environmental education should be seen as an integral part of the university's mission, not just an additional program. Through a transdisciplinary approach, colleges can create learning systems that incorporate environmental theory, practice, and ethical values. This is in line with the idea of Education for Sustainable Development (ESD) which emphasizes that behavior change can only be achieved if awareness and knowledge are formed sustainably through formal education.

Wibowo et al.'s (2023) research also reinforces the importance of integrating sustainability values into every aspect of academic activities. They show that students who are involved in environmental activities, such as field research and social projects, have higher levels of ecological care and responsibility compared to students who are not engaged. These findings support the view that direct engagement is a key factor in the formation of sustainable behaviors. Universities

can expand their sustainability impact through collaborative initiatives between students, lecturers, and local communities.

Bautista-Puig & Sanz-Casado (2021) also found that although sustainability policies have been widely adopted in universities, their implementation rates still depend on the support of resources and institutional leadership. Universities with funding support and good governance show significant progress in energy efficiency and waste management. In contrast, institutions with limited budgets tend to focus on symbolic activities with no sustainable results. These findings underscore the need for long-term strategic planning involving all campus stakeholders.

Amin et al. (2022) also highlighted the importance of sustainable character development in students. He emphasized that education that consistently instills the value of environmental responsibility can form a generation of academics who have high ecological awareness. Environmental education not only teaches theory, but also builds empathy for natural and social conditions. Through the integration of environmental ethical values into the learning process, students can be the main drivers of change towards a sustainable society.

The results of this literature study show that the implementation of green campus is a multidimensional process that requires collaboration between policies, infrastructure, education, and individual participation. The success of sustainability programs in higher education is greatly influenced by a combination of institutional support and the collective awareness of the academic community. Rachmadian et al. (2024) conclude that to achieve a true green campus vision, a paradigm shift is needed from just administrative activities to a transformation of academic culture

that is oriented towards long-term sustainability. Thus, efforts to build a green campus are not only about achieving environmental indicators, but also about fostering ecological awareness and social responsibility at all levels of campus society.

4. Conclusion

Based on the results of the literature review, it can be concluded that the application of the green campus concept in higher education has an important role in encouraging the creation of a sustainable higher education system. The success of its implementation is not only determined by environmentally friendly policies and infrastructure, but also by the level of awareness, knowledge, and participation of the entire academic community, especially students. Universities play a strategic role in building ecological awareness through education that is oriented towards sustainability values, character development, and habituation of environmentally friendly behavior in daily life on campus.

The results of the study also show that integration between education, research, and social activities is the main key in strengthening the culture of sustainability. An effective green campus program must be participatory, sustainable, and measurable, by involving all elements of the university collaboratively. These efforts not only support the achievement of sustainable development goals, but also form a young generation that is caring, responsible, and ready to face future global environmental challenges. Thus, green campus is not just a policy concept, but a real movement towards a sustainable transformation of academic culture.

References

Anthony Jnr, B. (2021). Green campus paradigms for sustainability attainment in higher education institutions–a comparative study. *Journal of Science and Technology Policy Management*, *12*(1), 117-148.

Amin, S., Bachri, S., Susilo, S., Mkumbachi, R. L., & Ghozi, A. (2022). Improving Environmental Sensitivity through Problem-Based Hybrid Learning (PBHL): An Experimental Study. *Online Submission*, *11*(3), 387-398.

Bautista-Puig, N., & Sanz-Casado, E. (2021). Sustainability practices in Spanish higher education institutions: An overview of status and implementation. *Journal of cleaner production*, *295*, 126320.

Chairani, C., Ropiah, S., & Hidayatullah, A. F. (2023). Sikap dan pengetahuan Mahasiswa Fakultas Sains dan Teknologi UIN Walisongo Semarang terhadap limbah pangan (food waste). *Jurnal Pengelolaan Lingkungan Berkelanjutan (Journal of Environmental Sustainability Management)*, 165-179.

Correia, E., Conde, F., Nunes, R., & Viseu, C. (2020). Students' perceptions of HEI regarding environmental sustainability–a comparative analysis. *International Journal of Sustainability in Higher Education*, *21*(4), 629-648.

Golbazi, M., El Danaf, A., & Aktas, C. B. (2020). Willingness to pay for green buildings: A survey on students' perception in higher education. *Energy and Buildings*, *216*, 109956.

Rachmadian, R. H., Sumarmi, S., Masruroh, H., Utaya, S., & Suharto, Y. (2024). Persepsi mahasiswa terhadap program Green Campus dalam mewujudkan perguruan tinggi yang berkelanjutan (studi kasus: Universitas Negeri

Malang). *Jurnal Pengelolaan Lingkungan Berkelanjutan (Journal of Environmental Sustainability Management)*, 255-275.

Safarkhani, M., & Örnek, M. A. (2022). The meaning of green campus in UI GreenMetric World University Rankings perspective. *A/Z ITU Journal of the Faculty of Architecture*, *19*(2), 315-334.

Wibowo, N. A., Sumarmi, S., Utaya, S., Bachri, S., & Kodama, Y. (2023). Students' environmental care attitude: a study at adiwiyata public high school based on the New Ecological Paradigm (NEP). *Sustainability*, *15*(11), 8651.