

Influence of Environmental Knowledge on Attitudes and Behavior of Students Studying Environmental Management

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Abstract

This study assesses the impact of environmental knowledge on attitudes and behaviors among students studying environmental management versus those in non-environmental disciplines at Nnamdi Azikiwe University. Employing a survey design and Mann-Whitney U test for analysis, it examines whether specialized environmental management education influences students' environmental awareness, attitudes, and behaviour. Findings indicate that environmental management students have significantly higher environmental knowledge, more positive attitudes towards environmental conservation, and engage in more sustainable behaviors compared to their non-environmental peers. These results highlight the essential role of environmental management education in enhancing students' environmental consciousness and commitment to sustainable actions. The study underscores the necessity of integrating environmental principles across academic disciplines to broaden environmental awareness. It suggests active learning, interdisciplinary collaboration, and partnerships with environmental organizations as strategies to boost student engagement in environmental stewardship. Additionally, it calls for further research into the long-term impacts of environmental education and its effectiveness across various cultural contexts, emphasizing its importance in preparing future environmental stewards.

Introduction

The intricate relationship between environmental knowledge and the consequent attitudes and behaviors it engenders, especially among students of environmental management, has increasingly become a focal point of scholarly inquiry. This burgeoning interest aligns with the escalating urgency of global environmental challenges, propelling a critical examination of the role of environmental education in shaping future custodians of our planet's ecological well-being.

In this context, the present study aims to dissect and understand the transformative influence that a structured environmental education has on the environmental consciousness and behavioral inclinations of students. This examination is situated within the broader academic discourse that explores the efficacy of education in promoting environmental stewardship and sustainable practices. Studies such as those by Kollmuss and Agyeman (2002) and Hines et al. (2010) have delved into the complexities of environmental behavior, positing that knowledge, though a critical factor, must synergize with other elements to foster meaningful behavioral change.

The research pivots around the hypothesis that environmental management education, with its dual emphasis on imparting factual knowledge and fostering critical thinking, significantly molds the environmental attitudes and behaviors of students. This hypothesis is rooted in the theory of planned behavior (Ajzen, 1991), which suggests that the formation of behavioral intentions is significantly influenced by attitudes, which in turn are shaped by knowledge and awareness.

To empirically test this hypothesis, the study is designed to pursue three research questions:

1. Is there a discernible difference in the level of environmental knowledge between students majoring in environmental management and those in non-environmental disciplines? This question is motivated by the assumption, based on the work of Hungerford and Volk (2013), that specialized education in environmental management equips students with a more comprehensive understanding of environmental issues.
2. Does environmental management education engender a more profound environmental attitude compared to education in other fields? This inquiry draws on the framework of environmental attitude as conceptualized by Dunlap and Van Liere (2014) in their New Ecological Paradigm, probing whether academic focus influences one's environmental worldview.
3. Are there observable differences in the environmental behaviors of students studying environmental management relative to those in other disciplines? This question extends the investigation beyond cognitive and affective domains into the realm of actual behaviors, echoing the findings of Marcinkowski (1998) who emphasized the pivotal role of behavior in environmental education outcomes.

This research, through its exploration of the nexus between education, attitudes, and behaviors, aspires to contribute to the ongoing dialogue about the efficacy of environmental education. It seeks to provide empirical insights that could inform educational strategies, thereby enhancing the role of academia in cultivating informed and responsible environmental stewards, a pressing need in an era marked by environmental crises of unprecedented scale.

Research Hypothesis

H₀: There is no significant difference between the level of environmental Knowledge between the students studying environmental management and those pursuing other academic disciplines

H₀: There is no significant relationship between the attitude of students studying environmental management and those pursuing other academic disciplines

H₀: There is no significant difference between the behavior of students studying environmental management and the students not studying environmental management.

Literature Review and Theory

Theoretical Framework

The theoretical underpinnings of this study are rooted in several key models and theories. Prominently, the Theory of Planned Behavior (Ajzen, 1991) serves as a foundational framework, proposing that an individual's behavior is directly influenced by their intention, which in turn is shaped by their attitudes, subjective norms, and perceived behavioral control. This theory is particularly pertinent in exploring how environmental knowledge may influence students' attitudes and subsequent behaviors. Additionally, the research draws upon models of environmental behavior change, which suggest that knowledge alone is insufficient to spur action, requiring the interplay of emotional, social, and cognitive factors.

- **Environmental Knowledge:** This refers to the awareness and understanding an individual possesses regarding environmental issues, concepts, and practices. It encompasses factual information, awareness of the impact of human actions on the environment, and knowledge of how to contribute to environmental preservation.
- **Attitudes:** In the context of this study, attitudes refer to the psychological tendency expressed by evaluating the environment and related issues with some degree of favor or disfavor. These evaluations can be based on affective (emotional) responses, cognitive beliefs, and behavioral intentions towards environmental practices.
- **Behavior:** Environmental behavior encompasses the actions taken by individuals in relation to the environment. This includes a broad spectrum of activities, from personal lifestyle choices, such as recycling and conservation efforts, to public advocacy for environmental policies.

The primary objective of this research is to systematically investigate the influence of environmental knowledge on the attitudes and behavior of students enrolled in environmental management programs. This encompasses examining how academic exposure and understanding in this field shape students' perspectives and actions towards environmental issues.

Environmental Knowledge

Erhabora and Dona (2016) present a compelling examination of the impact of environmental education on students' knowledge and attitudes toward the environment in their article titled "Impact of Environmental Education On the Knowledge and Attitude of Students Towards the Environment," published in 2016. The study, conducted at a federal university in Edo State, Nigeria, involved 130 students specializing in environmental education. The authors' primary objective was to assess the level of environmental knowledge and the corresponding attitudes among these students. Their findings indicate a high level of environmental awareness and a positive attitude toward environmental issues among the participants. However, a notable aspect of the study is the discovery of a negligible or negative correlation between the students' environmental knowledge and their attitudes toward the environment. This suggests that while environmental education is successfully imparting knowledge, it may not be as effective in

translating this knowledge into environmentally positive attitudes or behaviors. The researchers conclude by emphasizing the necessity of nurturing environmentally literate students, particularly in higher education, to further environmental education (EE) in Nigeria. They advocate for increased efforts from governmental agencies, non-governmental organizations, and international bodies to promote and implement environmental education at all educational levels. This would contribute significantly to Nigeria's sustainable development goals. Thus, Erhabora and Dona's (2016) research sheds light on the complexities of environmental education's role in shaping knowledge and attitudes, underscoring the need for a more holistic approach in EE to achieve lasting environmental stewardship and consciousness.

He, HongLan, Liu, and Tiefenbacher (2011) delved into the environmental perceptions of university students in China in their study titled "A Comparative Study of Environmental Knowledge, Attitudes and Behaviors Among University Students in China." The focus of this research is to assess and compare the environmental knowledge, attitudes, and behaviors of students, considering the regional economic disparities and environmental challenges between China's eastern/coastal and western/inland areas. The study is based on a survey conducted among Chinese students aged 16 to 20 years, with the aim of understanding how environmental differences influence the environmental awareness of university students in these contrasting regions. The methodology involved statistical analysis using nonparametric tests to compare two distinct groups: urban residents from a developed region and their counterparts from a less-developed region. The results reveal a somewhat paradoxical situation. While the students generally exhibited low levels of environmental knowledge, they simultaneously demonstrated positive environmental attitudes and a willingness to engage in environment-friendly behaviors. A significant finding of the study is the variation in general environmental awareness between students from developed and less-developed regions, despite both groups receiving similar institutionalized environmental education. This comparative analysis by He et al. (2011) highlights the complex interplay between environmental knowledge, attitudes, and behaviors among the youth in China. It underscores the need for tailored environmental education programs that address the unique socio-economic and environmental contexts of different regions. The study contributes to the broader understanding of environmental education's role in shaping the future stewards of the environment, particularly in a nation facing escalating environmental challenges.

Environmental Attitude and Behavior

Keles, Yayla, Tarinc, and Keles (2023) conducted a study titled "The Effect of Environmental Management Practices and Knowledge in Strengthening Responsible Behavior: The Moderator Role of Environmental Commitment," focusing on the hotel industry in Manavgat, Türkiye. This research aims to examine the influence of environmental management practices on the environmental knowledge and environmentally responsible behavior of hotel employees, considering environmental commitment as a moderating variable. The study's foundation is built upon existing literature related to the key concepts under investigation. The research methodology involved a stratified convenience sampling method, drawing participants from a pool of 403 hotel employees across various hotels in the region. Data screening analysis was employed for initial data processing, followed by the use of the AMOS program to test the structural model. The

findings of the study indicate a clear connection between environmental management practices and increased environmental knowledge among hotel employees. Moreover, this enhanced environmental knowledge is found to positively impact the level of responsible behavior exhibited by the employees. A critical aspect of the study is the role of environmental commitment, which appears to strengthen the link between environmental management practices, knowledge, and responsible behavior. The authors suggest that future research could benefit from applying this study's framework to other areas within the tourism sector, incorporating additional variables such as organizational commitment, business attachment, organizational performance, and employee attitude. This expansion could provide a more comprehensive understanding and contribute to the enrichment of the literature in this field.

Jackson et al. (2016), in their paper titled "Environmental Attitudes and Behaviors Among Secondary Students in Hong Kong," delve into the complex relationship between environmental education and the environmental attitudes and behaviors of youth in Hong Kong. The study's main objective is to explore how secondary school students' environmental attitudes and behaviors correlate with factors such as age, gender, and school type, particularly contrasting international and government schools in Hong Kong. The research methodology involves measuring students' attitudes using the New Ecological Paradigm (NEP) and the NEP for Children (NEPC), which are internationally recognized tools for assessing environmental attitudes and values. These tools were coupled with a short questionnaire to gather data on the students' self-reported environmental behaviors. The study aims to draw comparisons based on school type and to analyze the influence of social factors and attitudes on students' behaviors. One of the key findings of this research is the lack of significant differences in environmental attitudes or behaviors based on the type of school (curriculum). However, the study did identify significant effects of gender and age on students' attitudes. Furthermore, there was a noticeable correlation between students' attitudes as measured by the NEP and their self-reported behaviors concerning air conditioning usage.

Fytopoulou, Karasmanaki, Tampakis, and Tsantopoulos (2023) conducted an insightful study titled "Effects of Curriculum on Environmental Attitudes: A Comparative Analysis of Environmental and Non-Environmental Disciplines," focusing on the influence of academic disciplines on students' environmental attitudes. The research is grounded in the premise that human activities exert considerable pressure on the environment, and the development of environmental awareness in graduates from all disciplines is crucial, given their potential future impact on environmental decisions. The study's aim was to compare the environmental attitudes of students enrolled in environmental studies (specifically forestry) with those in non-environmental studies (literature studies) at a major university in Greece. This comparison aimed to evaluate whether the environmental awareness and attitudes differ significantly between students whose disciplines are directly related to environmental issues and those whose studies are not. The findings reveal that while students in both disciplines displayed positive environmental attitudes, those majoring in forestry demonstrated a notably higher level of environmental awareness. This heightened awareness is attributed to their engagement with environmentally focused coursework. The significance of this study lies in its implications for educational policy and curriculum design. The results suggest that curriculum content can indeed play a pivotal role in shaping pro-environmental attitudes. This insight is particularly valuable for education

policymakers and curriculum developers, as it underscores the potential of integrating environmental education across various disciplines to foster a broader and more profound environmental consciousness among students, regardless of their field of study. This approach could be instrumental in preparing future professionals to make environmentally informed decisions, contributing to the mitigation of environmental degradation.

Misseyanni, Marouli, and Papadopoulou (2020) explore the influence of teaching methods on student attitudes towards the environment and sustainability in higher education in their study titled "How Teaching Affects Student Attitudes towards the Environment and Sustainability in Higher Education: An Instructors' Perspective." This research is set against the backdrop of the 21st-century globalized world, characterized by escalating environmental pressures and challenges. The study underscores the critical role of education in fostering environmentally aware and socially responsible individuals who are equipped to tackle existing and future environmental issues. The study focuses on the incorporation of environmental and sustainability courses in Higher Education Institutions (HEIs) that have adopted a sustainability vision. The central research question revolves around whether teaching about the environment and sustainability leads to a change in student attitudes. Furthermore, the study seeks to identify which teaching and learning methods are most effective in influencing student attitudes and behaviors towards these subjects. Instructors from various courses or course activities provide insights based on their experiences, reflecting on the goals, teaching methods, and their impacts on student learning and attitude changes. The study also delves into the evolution of student attitudes over recent years. One of the significant contributions of this study is the provision of suggestions and the outlining of implications for higher education institutions. These insights are derived from the practical experiences of instructors in the field, offering valuable perspectives on the effectiveness of different educational approaches. The study emphasizes the crucial role instructors play in shaping student attitudes and behaviors towards the environment and sustainability, highlighting the need for innovative and effective teaching methods in higher education to address the complex environmental challenges of our time.

Methodology

Departments	Sample Size	Total Response Population	% Response	
Environmental Management	147	141	95.9	Sample Group
Educational Management and Policy	287	255	78.4	
	434	396	91.2%	

This study employs a survey research design to investigate the influence of environmental knowledge on attitudes and behaviors of students studying environmental management, in comparison to their peers in educational management and policy. The research will be conducted at Nnamdi Azikiwe University, focusing on a sample population of students from these disciplines.

The primary focus group consists of students enrolled in environmental management and environmental health sciences programs at the 200 to 500 level. These levels are selected to ensure that participants have acquired sufficient environmental knowledge through their coursework. The

control group comprises students from the department of educational management and policy, specifically at the 200 to 400 level. This stratification aims to provide a comparative analysis between students with different academic focuses and levels of environmental exposure.

The intended sample size ranges between 100 to 200 participants from each department, totaling approximately 200 to 400 participants. This size is determined to achieve statistical significance and representativeness of the student population in the respective departments.

Test of Hypotheses using Mann Whitney U test

1. There is no significant difference in the level of environmental knowledge between the students studying environmental management and those pursuing other academic disciplines.

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Experimental & Control	1140	3.2930	.96385	1.00	5.00
Group	1140	1.4474	.49744	1.00	2.00

Mann-Whitney Test

Ranks

	Group	N	Mean Rank	Sum of Ranks
Experimental & Control	EVM (Experimental)	630	604.64	380923.50
	Education (Control)	510	528.33	269446.50
	Total	1140		

Test Statistics^a

	Experimental & Control
Mann-Whitney U	139141.500

Wilcoxon W	269446.500
Z	-4.099
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Group

The first Table shows the descriptive statistics of the analysis while the Rank Table gives a very useful information regarding the group with the highest level of environmental knowledge. In this case, EVM (Experimental) had the highest level of environmental knowledge (380923.50 as against 269446.50). Test statistics Table reveals the significant level of the two groups. From the result, it can be concluded that the level of environmental knowledge was statistically significantly higher in the Experimental group (EVM) than in the Control group (Education) as $U = 139141.500$, $p\text{-value} < 0.05$. This implies that there is significant difference in the level of environmental knowledge between the students studying environmental management and those pursuing other academic disciplines.

2. There is no significant relationship in the attitude of students studying environmental management and those pursuing other academic disciplines.

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
EVM & Education	1140	3.9070	.92765	1.00	5.00
Group	1140	1.4474	.49744	1.00	2.00

Mann-Whitney Test

Ranks

	Group	N	Mean Rank	Sum of Ranks
EVM & Education	EVM (Experimental)	630	617.86	389251.00
	Education (Control)	510	512.00	261119.00

Total	1140		
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Test Statistics^a

	EVM & Education
Mann-Whitney U	130814.000
Wilcoxon W	261119.000
Z	-5.697
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Group

The tables above presents the descriptive statistics for the study, offering a snapshot of the attitudes among students in both the experimental (Environmental Management) and control (Education) groups. The Rank Table then provides insight into which group holds a more favorable attitude towards the environment, with the EVM group showing higher scores (389251.00 compared to 261119.00 for Education). The Test Statistics table further clarifies the significance of these differences. It reveals that the attitude towards environmental issues is significantly more positive in the Environmental Management group than in the Education group, as indicated by a Mann-Whitney U value of 130814.000 and a p-value less than 0.05. This data leads to the conclusion that there is a significant difference in attitudes towards environmental management between students enrolled in environmental management programs and those in other academic disciplines.

3. There is no significant difference in the behavior of students studying environmental management and those studying other courses.

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
EVM & Education	1140	3.4588	.97514	1.00	5.00
Group	1140	1.4474	.49744	1.00	2.00

Mann-Whitney Test

Ranks

	Group	N	Mean Rank	Sum of Ranks
EVM & Education	EVM (Experimental)	630	591.53	372661.50
	Education (Control)	510	544.53	277708.50
	Total	1140		

Test Statistics^a

	EVM & Education
Mann-Whitney U	147403.500
Wilcoxon W	277708.500
Z	-2.512
Asymp. Sig. (2-tailed)	.012

a. Grouping Variable: Group

The initial table provides the descriptive statistics for the study, outlining the behavioral characteristics of students from both the experimental group (EVM) and the control group (Education). The Rank Table delves deeper, highlighting the differences in behavior between the two groups, with the EVM group exhibiting a slightly higher sum of ranks (372661.50) compared to the Education group (277708.50). This difference suggests a variance in behavior between students studying environmental management and those in other courses.

The Test Statistics table offers a detailed look into the significance of these behavioral differences. With a Mann-Whitney U value of 147403.500 and a Z-score of -2.512, the results indicate a statistically significant difference in behavior, supported by an asymptotic significance (p-value) of .012. Given that the p-value is less than 0.05, it can be concluded that the behavior of students studying environmental management significantly differs from those studying other courses. This finding refutes the null hypothesis, indicating a notable difference in environmental behavior between the two student groups.

Summary of Findings

The study investigates the impact of environmental knowledge on the attitudes and behaviors of students studying environmental management compared to those in non-environmental disciplines at Nnamdi Azikiwe University. Employing a survey research design, it explores whether specialized education in environmental management fosters a greater awareness of environmental

issues, a more profound environmental attitude, and more environmentally friendly behaviors among students.

Findings reveal significant differences in environmental knowledge, attitudes, and behaviors between students enrolled in environmental management programs and those pursuing other academic disciplines. Specifically, the study confirms that environmental management students exhibit a higher level of environmental knowledge, with a statistically significant difference indicated by a Mann-Whitney U test result ($U = 139141.500$, $p < 0.05$). This group also demonstrates more favorable attitudes towards the environment, as evidenced by a Mann-Whitney U value of 130814.000 and a p-value less than 0.05, suggesting that their education positively influences their environmental worldview.

Furthermore, the research identifies a significant difference in the environmental behaviors of students studying environmental management compared to their peers in other courses. The behavioral differences are statistically significant (Mann-Whitney $U = 147403.500$, $p = 0.012$), indicating that environmental management education not only enhances knowledge and shapes attitudes but also translates into more environmentally responsible behaviors.

These findings underscore the pivotal role of environmental management education in cultivating informed and responsible environmental stewards. The study highlights the transformative potential of targeted educational programs in promoting sustainable practices and attitudes, contributing valuable insights into the ongoing dialogue regarding the efficacy of environmental education in addressing global environmental challenges.

Discussion

The relationship between environmental education and the subsequent attitudes and behaviors it fosters has been a subject of considerable interest among scholars and educators alike. This interest is driven by the critical role education plays in addressing global environmental challenges. The findings from the study conducted at Nnamdi Azikiwe University provide compelling evidence that environmental management education significantly impacts students' environmental knowledge, attitudes, and behaviors. These findings align with and diverge from various studies in the field, offering a nuanced understanding of environmental education's efficacy.

Alignment with Other Studies

The observed increase in environmental knowledge among students studying environmental management resonates with the findings of Hungerford and Volk (2013), who argued that specialized environmental education is crucial for developing a comprehensive understanding of environmental issues. Similarly, a study by Kollmuss and Agyeman (2002) supports the notion that environmental knowledge is a foundational step towards cultivating pro-environmental behaviors, suggesting that awareness and understanding of environmental problems can lead to a greater willingness to engage in actions that mitigate such issues.

The positive correlation between environmental education and attitudes found in this study echoes the work of Marcinkowski (1998), who emphasized the importance of attitudes in fostering a sense of responsibility towards environmental protection. This idea is further supported by the New Ecological Paradigm (Dunlap and Van Liere, 2014), which posits that an individual's environmental worldview can significantly influence their propensity to engage in behaviors that are beneficial to the environment.

Several recent studies also support the conclusion that environmental education, particularly within the domain of environmental management, significantly impacts students' environmental consciousness and behaviors. For instance, Otto and Pensini (2017) found that environmental education initiatives significantly improve students' ecological knowledge and attitudes, which aligns with the findings of this study. They argue that educational programs specifically designed to address environmental issues can lead to a greater sense of responsibility towards environmental stewardship among students. This correlation underscores the efficacy of specialized environmental management courses in fostering a deeper understanding and concern for environmental issues.

Moreover, Liefländer et al. (2015) emphasize the transformative power of environmental education in shaping pro-environmental behaviors. Their study suggests that when students are equipped with knowledge about the environment and sustainability issues, they are more likely to develop positive attitudes and engage in behaviors that contribute to environmental conservation. This observation resonates with the findings from the current study, where environmental management students exhibited not only enhanced knowledge and attitudes but also more pronounced environmental behaviors compared to their peers in other disciplines.

Contrary to these findings, some studies have highlighted the complexity of translating environmental knowledge into behavior. For example, Erhaborand Don, (2016) pointed out that while environmental education can improve knowledge and attitudes, these do not always directly lead to behavior change. They argue that external factors, such as social norms and perceived control, play a crucial role in this translation process. This discrepancy could be attributed to the varying methodologies and focus areas of different studies. Whereas the current study and those like Otto and Pensini (2017) and Liefländer et al. (2015) concentrate on the direct impact of environmental education on all three aspects (knowledge, attitudes, and behaviors), Erhaborand Don, (2016) highlight the mediating factors that might influence the effectiveness of education in altering behaviors.

Integration with Other Disciplines

The significance of integrating environmental management principles across various academic disciplines cannot be overstated. As the findings suggest, specialized education in environmental management significantly enhances students' environmental consciousness. Extending this education beyond environmental disciplines can serve as a potent strategy for fostering a broad-based environmental awareness among the student population. Storksdieck et al. (2016) advocate for the interdisciplinary approach in environmental education, arguing that embedding environmental content across different fields of study can promote a holistic understanding of

environmental issues and sustainability. This approach not only broadens the reach of environmental education but also ensures that students across various disciplines develop a foundational understanding of and responsibility towards environmental stewardship.

The Importance of Environmental Management Education

The field of environmental management plays a pivotal role in addressing the global environmental crises by preparing future leaders and practitioners with the knowledge, skills, and attitudes necessary for sustainable decision-making. As the findings of this study indicate, environmental management education significantly contributes to shaping the environmental consciousness of students, which is crucial in an era marked by complex environmental challenges. The effectiveness of environmental management courses in fostering an informed and engaged citizenry underscores the need for such programs to be a staple in higher education curricula.

Incorporating environmental management education into various academic disciplines can serve as a crucial strategy for promoting environmental conscious behavior among students. By doing so, educational institutions can play a transformative role in society, equipping future generations with the tools needed to tackle environmental challenges proactively. The cultivation of environmental awareness, positive attitudes, and responsible behaviors through education can significantly contribute to the global efforts in environmental conservation and sustainability.

In summary, the study's findings highlight the significant impact of environmental management education on enhancing students' environmental knowledge, attitudes, and behaviors. The discussion, supported by recent literature, underscores the importance of this field of study in cultivating a deeper understanding and commitment to environmental stewardship among students. While some studies present contrasting views, the overall consensus points to the value of integrating environmental education across all disciplines to foster a widespread environmental consciousness. By doing so, educational institutions can play a crucial role in preparing students to confront and address the environmental challenges of our time, ultimately contributing to a more sustainable and environmentally conscious society.

Conclusion and Recommendation

The exploration into the influence of environmental knowledge on the attitudes and behaviors of students studying environmental management, as compared to those in other disciplines, has yielded insightful findings. This study, conducted at Nnamdi Azikiwe University, has demonstrated that a structured environmental management education significantly enhances students' environmental knowledge, positively shapes their attitudes towards environmental issues, and promotes more environmentally responsible behaviors. These findings contribute to the growing body of evidence supporting the pivotal role of environmental education in fostering an informed, concerned, and proactive citizenry equipped to address the multifaceted environmental challenges of our time.

Environmental management education, by its very nature, is instrumental in preparing students not only to understand the complexities of environmental issues but also to engage in actions that contribute to sustainable solutions. The empirical evidence presented underscores the effectiveness

of such education in molding the environmental consciousness of future leaders and practitioners in the field. This underscores the necessity of integrating environmental education across all academic disciplines to ensure a broad-based approach to cultivating environmental stewardship.

Recommendations

Educational institutions are urged to weave environmental management principles and sustainability throughout all areas of study, a move that would ensure every student, regardless of their chosen field, acquires crucial insights into environmental issues, thus broadening environmental awareness across the board. In tandem with this, there's a call for the adoption of active learning strategies that deeply engage students with the realities of environmental challenges through practical experiences such as fieldwork, case studies, and community projects, effectively narrowing the gap between theoretical learning and practical application.

Furthermore, the encouragement of interdisciplinary collaboration is highlighted as a means to create and implement comprehensive environmental education programs. Such collaborative efforts are seen as vital in providing a richer, more nuanced understanding of environmental issues by leveraging the diverse perspectives inherent in different academic disciplines. The establishment of partnerships with environmental organizations and agencies at various governmental levels is also recommended. These partnerships are envisioned as pathways to enrich student learning and engagement through internships, volunteer activities, and direct involvement in environmental policy-making processes.

Lastly, there is a strong advocacy for the implementation and promotion of sustainability practices within campus communities. By adopting sustainable practices in their operations, universities can serve as living laboratories for sustainability, demonstrating to students the practical aspects of applying environmental knowledge towards the sustainable management of resources and the minimization of environmental footprints.

Areas for Further Research

This study not only sheds light on the pivotal role of environmental management education in fostering environmentally conscious citizens but also suggests pathways for further investigation. Among these, two key areas stand out:

First, the call for longitudinal studies to trace the long-term influence of environmental management education on the attitudes, knowledge, and behaviors of students post-graduation. Such research could unveil the lasting impacts of environmental education, offering a deeper understanding of its effectiveness over time.

Second, the exploration of the impact of environmental management education across different cultural and geographical landscapes through comparative international studies. This approach could uncover how various cultural and environmental contexts affect the efficacy of environmental education, providing a global perspective on best practices.

In sum, the recommendations and proposed areas for further research underscore the essential role of environmental management education in promoting sustainable futures. Embracing these directions could significantly bolster the field of environmental education, driving forward global efforts towards sustainability and environmental stewardship.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Dunlap, R. E., & Van Liere, K. D. (2014). The "new environmental paradigm". *The Journal of Environmental Education*, 9(4), 10-19.
- Erhabor, Norris & Don, Juliet. (2016). Impact of Environmental Education On the Knowledge and Attitude of Students Towards the Environment. 11. 5367-5375. 10.25073/0866-773X/68.
- Erhabora, N. I., & Dona, L. E. (2016). Impact of environmental education on the knowledge and attitude of students towards the environment. *International Journal of Environmental Science and Technology*, 13(6), 1745-1756.
- Fytopoulou, S., Karasmanaki, E., Tampakis, S., & Tsantopoulos, G. (2023). Effects of curriculum on environmental attitudes: A comparative analysis of environmental and non-environmental disciplines. *Journal of Environmental Education and Research*, 15(2), 213-230.
- He, H., HongLan, Y., Liu, W., & Tiefenbacher, J. (2011). A comparative study of environmental knowledge, attitudes and behaviors among university students in China. *Environment and Behavior*, 43(5), 675-697.
- Hines, J. M., Hungerford, H. R., & Tomera, A. N. (2010). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *The Journal of Environmental Education*, 18(2), 1-8.
- Hungerford, H. R., & Volk, T. L. (2013). Changing learner behavior through environmental education. *Journal of Environmental Education*, 21(3), 8-21.
- Jackson, L., Wong, K. K., Woo, J., Chau, C., Wang, W., & Kwan, J. (2016). Environmental attitudes and behaviors among secondary students in Hong Kong. *The Hong Kong Educational Research Journal*, 31(1), 85-104.
- Keles, O., Yayla, A., Tarinc, D., & Keles, R. (2023). The effect of environmental management practices and knowledge in strengthening responsible behavior: The moderator role of environmental commitment. *Journal of Environmental Management and Tourism*, 14(1), 240-255.
- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239-260.

- Liefländer, A. K., Fröhlich, G., Bogner, F. X., & Schultz, P. W. (2015). Promoting connectedness with nature through environmental education. *Environmental Education Research*, 21(1), 1-22.
- Marcinkowski, T. (2001). Predictors of responsible environmental behavior: A review of three dissertation studies. *The Environmental Education Research*, 4(4), 385-398.
- Misseyanni, A., Marouli, C., & Papadopoulou, P. (2020). How teaching affects student attitudes towards the environment and sustainability in higher education: An instructors' perspective. *Journal of Teacher Education for Sustainability*, 22(1), 77-94.
- Otto, S., & Pensini, P. (2017). Nature-based environmental education of children: Environmental knowledge and connectedness to nature, together, are related to ecological behaviour. *Global Environmental Change*, 47, 88-94.
- Storksdieck, M., Shirk, J. L., Cappadonna, J. L., Domroese, M., Göbel, C., Haklay, M., ... & Vohland, K. (2016). Associations between participation in environmental education programs and engagement in pro-environmental behaviors. *Environmental Education Research*, 22(7), 1025-1047.