

# Review of: "Impact of Environmental Education on the Knowledge and Attitude of University of Benin Students towards Waste Segregation"

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Potential competing interests: No potential competing interests to declare.

This study is exploratory and mostly descriptive. While the topic is interesting and important, the study could benefit in other ways:

1) while the research question is clear (how environmental education impacts students' knowledge and attitudes towards waste segregation at the University of Benin) it is not clear why this is important, or novel, or related to waste management processes in a systemic or specific way. The research problem could be expanded to articulate the long-term goals and details of educational interventions. Is the aim solely to *increase* knowledge, or also to *instigate* long-term behavioral changes in waste management practices? Waste segregation is one aspect of environmental behavior. The research problem could be clearer on how this specific behavior was chosen and its significance in the broader context of environmental sustainability (complexity of environmental attitudes and behaviors).

The problem statement could elaborate more on how cultural and social factors at the University of Benin and in Nigeria might influence students' attitudes and practices related to waste segregation (cultural and social factors). Each of which will bring novelty to the study.

2) while the problem is framed within the context of increasing municipal waste and the need for effective waste management strategies (particularly in developing countries like Nigeria), it is not clear how changes in "environmental education" will benefit "municipal waste management" in Benin. The detail context and process in which waste disposal is studied is not detailed, or explained. This context matters to evoke novelty and purpose for the study. Secondly, while the study focuses on the University of Benin, it could articulate more clearly how its findings might apply to other universities, regions, or countries, especially those with similar socio-economic and educational contexts, or waste management practices.

3) while the study mentions environmental education, it does not detail the specific nature of this education. Are there particular curricula, teaching methods, or materials used? Clarifying this could help understand what aspects of environmental education are most effective or not. Similarly, the study doesn't detail the human or organizational waste management practices at the present moment in the population sample or geography.

4) The research could be clearer on the existing level of knowledge and attitudes towards waste segregation among the student population. This would help to gauge the impact of environmental education more accurately. The post-test only result is not helpful.

5) Research Design + Methods: The study primarily uses basic statistical methods like frequency tables, simple

percentages, and t-tests. These methods, while useful, are quite basic and may not sufficiently capture the complexities and nuances of the data. There is no mention of more other standard statistical analyses such as multivariate analysis, regression models, or factor analysis (shortcoming in the research design), which could provide deeper insights into the relationships between variables and control for potential confounding factors. The analysis does not explicitly account for confounding variables that could influence the results. The study does not sufficiently consider how cultural, social, and institutional factors or processes at the university and in Nigeria might influence the effectiveness of environmental education and the practice of waste segregation. Factors such as prior *environmental awareness*, *personal interest in environmental issues*, *socio-economic background*, and other demographic variables can significantly impact the outcomes but are not controlled for in the analysis. While the study compares the experimental and control groups, it's unclear if the analysis sufficiently accounts for inherent differences between these groups that might exist independently of the environmental education intervention. The use of t-tests to compare means between two groups is a standard approach, but it assumes that the data are normally distributed and that the groups have similar variances. If these assumptions are not met, the results of the t-test might not be valid.

The methodology suggests a post-test only design without a pre-test comparison. This approach limits the ability to measure the actual change in knowledge and attitudes as a direct result of the environmental education intervention. Without pre-test data, it's challenging to establish a baseline for comparison, making it difficult to attribute observed changes solely to the intervention. This makes it difficult to ascertain changes in knowledge and attitudes as a direct result of the environmental education intervention.

The study does not mention whether assumptions for the t-test, such as normality and homogeneity of variance, were checked and met. The study seems to rely heavily on the statistical significance (p-values) without delving into the practical significance of the findings. A statistically significant result may not always translate into a practically significant or meaningful impact in real-world scenarios. The manner in which data is presented in the results section could potentially be improved for clarity. Better visualization of data, like using graphs or charts, could aid in understanding the distribution and differences between groups more intuitively.

Hope this helps, would love to see the update!