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.

Thank you for writing and submitting your manuscript titled 'Impact of Environmental Education on the Knowledge and Attitude of University of Benin Students towards Waste Segregation' to Qeios. I am not an expert in environmental education. However, education speaks to me a lot and is a field of research in which I am active. Additionally, I am a specialist in experimental methods in education. Upon reading your manuscript, I had some reflections and observations which I summarize here. I approach these points according to the structure of your document.

I hope they will assist you in your further work on this manuscript.

Introduction

Comment #1. Usually, it is desirable for a good introduction to engage the reader, clearly define the problem (theoretical or practical), and indicate what the study will add to our knowledge (Grant & Pollock, 2011). You address some aspects related to the problem motivating your research. However, it remains limited. Your introduction is more like a literature review. I suggest restructuring it. In the introduction, we would like to see why studying this topic is important for researchers and the world of education? Would there be a problem if this environmental education is not offered to students? Why should it be relevant to address by an empirical study? What would happen if no research is conducted on the topic?

Comment #2. Furthermore, I notice that your introduction focuses more on what is happening in Nigeria while your study field is Benin. It would be desirable to present the situation in Benin to help better understand the research problem.

Comment #3. The first sentence of paragraph 8 should be supported by a reference "Human behaviour is complex and humans will change their behaviors when sufficiently enlightened."

Comment #4. Ideas should be presented in a logical sequence. For example, paragraph 9 deals primarily with the work of Babayemi (2010). What is mentioned there is identical to what is covered in paragraph 5 with the work of Ovoh (2015). I suggest that similar ideas be dealt with in the same places to avoid back-and-forth in the development.

Comment #5. I notice that definitions are provided in several places in the introduction. I strongly suggest that this be addressed in the theoretical framework. Furthermore, this must be supported by references.

Comment #6. I strongly suggest that the research hypotheses stem from a theoretical development. It's true that you have presented empirical studies that support the relationships you tested in your research. However, the presentation should be such that the hypotheses stem from a theoretically solid argument. It's true that you briefly discussed the theory of planned behavior. However, the discussion proposed for this purpose is limited. It would have been necessary to present the theory starting from its source while indicating the relationships it conjectures between the different concepts. Then, you can show how other empirical studies have tested these relationships similar to those you are testing. It's curious to talk about the theory of planned behavior without citing Azjen (1991).

Methodology

Comment #7. I am a bit confused about the research design used. You indicate in the abstract having used a quasi-experimental design whereas in the methodology section, you talk about experimental research design with posttest only.

Comment #8. Furthermore, I want to point out here that an experimental or quasi-experimental design requires at least one experimental control (Shadish, Cook, and Campbell, 2002). In other words, there should be an intervention over which the researcher has control in one of the two studied groups (Robson and McCartan, 2016). In your case, it would be environmental education. In such a condition, you should describe your intervention in detail so that the reader understands what is being tested. My impression here is that there was no specific intervention controlled by the researcher. You might have assumed that a student being enrolled in the HSE program is de facto exposed to environmental education while a student in another program would not be exposed. Proceeding like this does not allow determining the experimental nature of the study.

Comment #9. Furthermore, are these two groups comparable? To estimate that an intervention is significantly effective through the comparison of two groups, they must be comparable. Otherwise, an initial difference could be the real reason for the difference in results found subsequently. I'll give a simple example in this regard. Starting with the choice of programs already. If students have chosen the HSE program, wouldn't that be a sign of marked ecological consciousness? On this point, they may therefore differ from those who enroll in other programs. This situation introduces a selection bias and alters the ability of the experiment or quasi-experiment to establish a causal relationship excluding any alternative explanation.

Comment #10. I suggest being more transparent about the measurement of your different variables. It's good to have explained how your questionnaire (data collection instrument) is structured. However, it is good practice to specify how each variable is measured in your research. This ensures construct validity. Earlier you defined your different concepts (attitudes, behavior, environmental education, waste segregation, etc.). Now you need to show how concretely these concepts are operationalized in your research and what scale do you use for this? Did you use a measure developed by other researchers for this purpose? Did you develop your own measure for your variables? Furthermore, are your measures nominal? ordinal? interval? or ratio? The answer to all these questions will ultimately allow judging the adequacy of the methods used to process the data.

Results

Comment #11. Why did you decide to transform the variable "level of knowledge" into a categorical variable when it is initially measured from a score? Furthermore, you test the subsequent hypothesis using a mean score comparison test (see Table 3). Therefore, I think that Tables 1 and 2 should rather present descriptive statistics (mean, standard deviations, etc.) instead of a frequency distribution. The same observations apply to Tables 4 and 5.

Comment #12. What do the values in the Pre Mean column of Table 3 correspond to? Is it the average knowledge level score of students before enrolling in one of the two programs (HSE and HKS)? If yes, why do you say above that your experimental plan is of the posttest-only type? This remains to be clarified. The same observations apply to Table 6.

Comment #13. You have presented and discussed the significance of the comparison test. If the Pre Mean value is the score before, one might wonder how the difference is calculated? Is it a comparison between the two groups on the score at the posttest? Is it a comparison of the pretest/posttest evolution gap between the two groups? If it is a comparison of the scores at the posttest between the two groups, how did you control the initial difference between the two groups? Furthermore, is the initial difference between the two groups on this variable significant? I strongly recommend that you provide the result of the comparison test on the different variables of interest at the pretest. If there are statistically significant differences, it would be desirable to use more appropriate tests to control this difference. For example, if you have data at both times of measurement, you should use an ANCOVA test.

Comment #14. It is good practice in a (quasi)experimental study to present the sociodemographic characteristics of the participants in the groups. In this process, tests should be carried out to ensure that the two groups are comparable. Otherwise, take measures to control this initial difference. I strongly recommend this approach.

Discussion of results

Comment #15. From my point of view, what is presented in this section looks more like a conclusion than a discussion. In the discussion, we expect you to explain to us how your results relate to your question or your research objectives. We also want to have your interpretation of the results of your research. Likewise, a good discussion should allow us to relate your findings to other research. How do your findings agree and in what ways? On what plans are there divergences? If so, why these divergences? (see LaPlaca et al., 2018).

Comment #16. The discussion should allow us to see the theoretical implications of your research (see LaPlaca et al., 2018). What new insights do you bring to our theoretical knowledge of the subject studied? It is also important to specify the limitations of your research while showing how your research remains relevant despite everything. Moreover, it is desirable to open a path for future research (see LaPlaca et al., 2018).

Other considerations

I suggest that the problem (introduction) be supported with recent references. Usually, we use the last three years to be relevant.

References

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