Review of: "Assessing students' attitudes and perceptions towards statistical literacy in a university system in a developing African country"

Inoussa Malgoubri[1]

1 University of Nebraska, Lincoln

Potential competing interests: No potential competing interests to declare.

Dear Authors,

Your manuscript provides a valuable contribution to understanding students' attitudes and perceptions towards statistical literacy at Chinhoyi University of Technology (CUT). The study is particularly relevant in the context of a developing African country, where challenges in statistical education often arise due to limited resources and varying cognitive capabilities among students. Overall, your work has the potential to inform teaching practices and contribute to the broader discourse on improving statistics education in resource-constrained environments. However, there are several areas where improvements could further enhance the clarity and impact of your study.

Streamlining the Results Section for Clarity

While the results section offers detailed insights, it can benefit from some refinement to make the key findings more accessible:

Condense Repetitive Information: In the section on *Statistics Cognitive Competence*, the findings about students' difficulties with statistical concepts could be summarized. For example, instead of separately stating that students reported making "a lot of math errors" and having "no idea of what is going on in statistics courses," you can combine these into a broader observation. A streamlined version might read:

"A significant portion of students reported difficulties with understanding statistical concepts, citing frequent math errors and confusion during lectures."

Use Tables and Visuals: You present a wealth of numerical and thematic data, such as in*Table 2*, where students' attitudes towards statistics are ranked by significance. Consider moving some descriptive text into a visual format for better comprehension. For instance, use a bar graph or summary table to present the most common barriers students face in learning statistics (e.g., math errors, cognitive difficulties), which can replace long descriptive paragraphs.

Shift Detailed Statistical Explanations to the Appendix: You can move the more technical aspects of the regression analyses, like those in *Table 7*, to an appendix. This would allow you to focus the main text on interpreting the key implications of the analysis rather than detailing each statistical outcome.

For example, instead of fully explaining the R-square values and p-values within the main text, you could summarize:

"Regression analyses showed that variables such as fear, stress, and preference for qualitative methods significantly influenced students' enjoyment of statistics (see Appendix A for detailed results)."

This will keep the narrative focused on the most important findings, while the full statistical details remain available for readers interested in deeper analysis.

Practical Steps for Institutions with Limited Resources

The recommendations provided in your study for improving statistics education are thoughtful, but they would benefit from more actionable steps, especially considering the limited resources many African institutions face. Here are some practical ways institutions can implement your suggestions:

Leverage Open Educational Resources (OERs): Instead of relying solely on expensive software like SPSS, institutions can use free alternatives like R or Python for statistical analysis. Open-access tutorials and textbooks are available online, reducing the financial burden on both students and institutions.

For example, Chinhoyi University could introduce R and Python in introductory statistics courses, using free online materials and tutorials to teach statistical analysis, which would alleviate reliance on paid software like SPSS.

Peer-Led Learning Groups: Encourage students to form study groups or peer-led workshops where stronger students support their peers. This approach could help reduce the burden on instructors, especially in large classes, while also fostering a collaborative learning environment.

You could establish peer-support systems where students with higher competence in statistics help those struggling, reducing the load on lecturers and improving overall performance.

Utilize Localized Real-World Data: Instead of focusing on abstract statistical problems, incorporate local and familiar datasets into the curriculum. This makes statistics more relatable to students and demonstrates its real-world relevance. For instance, students could analyze data from local businesses, agriculture, or public health, making the subject more engaging.

At CUT, students could collect and analyze data on local economic activities or environmental factors, thereby connecting statistics with their daily experiences.

Develop Blended Learning Platforms: With limited physical resources, institutions can invest in blended learning platforms where theoretical lessons are delivered online, while in-person sessions focus on practical, hands-on problem-solving.

CUT could develop a basic online platform where students access lectures and resources digitally, while face-to-face time is reserved for practical exercises and problem-solving sessions.

Expanding Recommendations on Pedagogical Approaches

While you recommend a paradigm shift towards collaborative learning and the use of e-learning, it would be helpful to provide concrete examples of how institutions like CUT can implement these changes given their limited resources:

Smaller Class Sizes: Where reducing class sizes isn't feasible due to staffing limitations, consider rotating smaller tutorial groups within a larger class. You can divide the class into smaller groups that meet for tutorials on alternating days.

For example, the School of Business Science and Management could split large lecture groups into smaller tutorial sections that meet weekly, ensuring more personalized attention while maintaining efficient use of teaching resources.

Integrate More Practical Assessments: To reduce stress and anxiety over statistics, consider incorporating more practical assessments, such as project-based assignments, into the curriculum. This can help students see the direct application of statistics to their future careers.

You could introduce project-based assessments where students analyze data from their respective disciplines, such as agricultural statistics for agriculture students, to increase engagement and understanding.

Your paper offers significant insights into the barriers and opportunities for improving statistics education in developing nations. By addressing the limitations related to class size, infrastructure, and teaching methods, your findings could provide a solid foundation for reforming how statistics is taught at institutions like CUT. However, providing more practical and actionable recommendations, particularly for resource-constrained environments, will make your study even more impactful.

I look forward to reading the final version of your paper and seeing how your proposed teaching and learning framework can benefit not only CUT but other institutions facing similar challenges.

Best regards,