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

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Potential competing interests: No potential competing interests to declare.

The study seeks to determine the attitudes of students toward statistics education, factors influencing these attitudes, and to develop a possible framework for improved modes of delivery in statistics education at a university in Zimbabwe, with the hope of generalisation to other universities in the African continent. This is highly relevant work in the African context, where phobia for numbers and calculations is well known.

The article is fairly well written, but there are a couple of major problems that do have a big influence on the question of whether this study is publishable or not. Some of these critical problems are:

i. The number of students in the different faculties is obviously not the same – how was proportionality ensured? This was not indicated in the data collection section, as is to be expected. There is an attempt to "explain" it when the problem shows up in the results section as being a matter of "skewedness of enrolment". Further, how was proportionality between the undergraduate and the graduate students ensured for each faculty/school? Also, does it make sense to compare the students' attitudes toward statistics education when researching undergraduate and graduate students, or is no difference to be expected?
ii. What sampling technique was used for the quantitative part of the study to ensure that each unit would have a normal distribution of the students included in the study? Normality is a basic requirement when conducting factor analysis. To the extent that normality fails, the solution is degraded. Multivariate normality is assumed when statistical inference is used to determine the number of factors. (Multivariate normality is the assumption that all variables, and all linear combinations of variables, are normally distributed.)

I want to suggest that the methodology section needs to be re-written and expanded to capture these. If normality is not ensured, it would drastically reduce the reliability of the data generated.

The statistical analysis is relatively well handled, but keep in mind that when we give a *p*-value, it is assumed that each unit/student had an equal or near-equal chance of being recruited.

Conclusion: The analysis used statistical methods (T-test, *p*-values, and standard errors) that do not meet the criteria of random sampling. The survey included 220 respondents (was this the population?), and only 185 were included in the analysis. There is no information on what basis these 220 students were invited for participation; therefore, the assumption of not being randomly selected is strong. By using this non-random sample and the implemented techniques,

the analysis and the subsequent findings are distorted.

Recommendation: The authors should strengthen the methodology section and re-submit the article for assessment.