Report on quantitative research methods in statistics

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Quantitative Research methods in statistics

The paper focuses on analyzing the use of research methods in Okello's article " learning and Teaching college algebra at University level: Challenges and opportunities- A case study of USIU", published in Journal of Language, Technology &entrepreneurship in Africa. Application of quantitative and qualitative methods in research (experimental and non experimental) studies is crucial for obtaining valid and reliable information. Quantitative methods or techniques lie within the interval estimation and hypothesis testing categories (Nadezhda , 2010). In interval estimation, statistics are used to estimate the interval for which the true parameter of a population lies from a representative sample. On the other hand, hypothesis testing involves the estimating the population parameter with an aim of disputing a given claim. Quantitative methods use computational, statistical,

and mathematical techniques to manipulate data (Nadezhda , 2010).

On the other hand, qualitative methods usually precede quantitative methods for establishing relationship which sets a basis for hypothesis formulation. They use case studies, survey, and interview designs to collect data. Qualitative research methods are useful in studying complex subjects that do not give simple answers.

Aims and objectives of the research

The author clearly states the aim of the research as to establish the reasons behind difficulties encountered in solving mathematical problems in college. Also, the author states the objective of the study as to investigate causes of poor performance in college algebra at USIU. The author states only one objective for the study (Nadezhda , 2010). The objective meets few elements of a standard objective. In this regard, the objectives set for quantitative research should be specific, measurable, achievable, realistic, and bound the time to be achieved. In this case, the set objective is realistic, achievable, and measurable. However, it is not specific and not time bound. The objective should clearly define the target group who are to be investigated, in order to achieve the objective. Moreover, the objective does not span the broad objective or aim of the study. Therefore, more specific objectives ought to be included in the research, such as to establish the level of difficulty students at USIU College encounter while studying algebra (Fotheringham & Brunsdon, 2000)

Research questions

The author outlines two research questions: why do students find learning algebra in college challenging, and why lecturers find teaching algebra in college challenging. These research questions are inconsistent with the research objective " to investigate causes of poor performance in college algebra at USIU". The research questions should cover what is to be achieved guided by the objectives. Lack of the proper research questions would result to invalid and unreliable questioners, consequently, wrong data and results. Therefore, research questions should be guided by the research objectives. This ensures formulation of questionnaires that are consistent with the research objective and the aim of study.

Research Design

The research involved the use of a questionnaire administered to 650 students taking Algebra at USIU for a period of three semesters. A sample of 520 was obtained from the 650 students and the grades in high mathematics final examination noted. Moreover, Algebra results for 56 students were noted (Whitehead, 2008). Also, the author does not reveal the questions contained in the questionnaire. However, a good question should be

The Author does not reveal on how the sample of students taking college algebra were selected. However, for a sample to be a representative of the population, a probabilistic sampling method is preferred. This is because it gives credible and valid results. In this case, a random sample or a stratified sample is preferable. The case presented in the article would have been represented by a stratified sample, when students taking college algebra are

selected, then a random sample is drawn from that group (McCartney, Burchinal & Bub, 2006).

The research methodology requires to be explained step by step in order to allow researchers interested in carrying out a similar study to follow it with ease. These include the steps taken in preparation of the research questionnaire and its administration. Also, it includes the methods and tools used for the data analysis.

Findings and Data analysis

Quantitative methods data is analyzed using statistics and mathematical computations. The application of statistical software is of paramount importance, such as SPSS and Strata. In this case, analysis for sample statistic is carried out. In most studies, the mean and the standard deviation of the distribution are the main statistics used in quantitative methods. Also, correlations and significance between observed variables are tested using statistical parameters, such as ANOVA, chi square or covariance among others (Raudenbush, & Bryk, 2002).

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Descriptive statistics forms an essential part of data analysis. The article by Okello indicates that findings were analyzed for relative frequencies given as percentages for each category. This is part of descriptive statistics. However, other elements of descriptive statistics were not carried out. Descriptive statistics encompasses the mean, the standard error, and the frequencies among other elements. The findings indicate that 33% of students admitted in college algebra had passed well at high school, 49% had passed the

placement exam well, and 23% passed the college algebra well. The author acknowledges that there is a correlation between these events. However, there is no evidence of statistical parameter of correlation was carried out. This would involve the use of the chi-square to test for significance, cross tabulations, ANOVA, and Pearson correlations among other statistical tools for analyzing correlations (Kline, 2004).

The author presents findings for challenges in learning college algebra in this part of the article. The identified challenges were lack of interest, difficulty in relating mathematics to real world, problem with the mathematics language, complex formulas, and poor teacher student's relationships. However, there are no statistics to support the given information. This can be seen as an attempt of ignoring and disregarding important data. This is because the study was a quantitative study in which data was collected by the use of the questionnaire. This data must be analyzed and presented to support claims made by the research. This is a poor way of reporting and it is often regarded as misuse of statistics.

The author presents information on the challenges of teaching algebra in college without providing the statistics obtained in the research. These challenges are stated as lack of practice, lazy students, poor use of learning resources, poor foundation in mathematics, poor methods of teaching, and poor mathematical thinking. The mention findings are not backed by statistics from the research. Discussions of findings must be backed by quantitative statistics from the research (Raudenbush, & Bryk, 2002).

Results presentations

Information is easily articulated when it is presented using proper tools. Methods of data presentations include use of line graphs, pie charts, bar graphs, scatter plots, dot plots, and use of tables and cross tabulations. Bar graphs and line graphs are useful where comparison between or among variables is required. While pie charts are used to represents data that forms portions of a whole for easy comparison. The choice of the graph is dependent on the nature of the data and the purpose for representing the data (Creswell & Creswell, 2009).

The author in the article represents the data by use of tables. However, the message is clearly conveyed multiple bar graphs would be suited to represent the data. In this case, data on performance for the three levels of study (entry, placement, and college algebra) would be easily comparable.

Support for conclusions

Conclusions made from the study must be supported by strong evidence from the research. In this regard, the confidence interval for the conclusion should be given. In the article, the author does not give the confidence interval for the conclusions. However, the author lists conclusions based on statistically unsupported data.

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