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Assessment of the Use of Statistics in First Degree Educational Research Projects in Nigerian Universities

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Abstract

The study analyzed first degree research projects submitted to the faculties of education in five universities in Nigeria. The primary aim of the analysis was to ascertain the most frequently used statistical method, how adequate the statistical methods have been used as well as establishing if there is a significant difference in the use of statistical methods by the three departments in the facilities of Educations (Arts, social science and science education). A total of 700 projects were randomly selected from the faculties of education in 5 universities. It was observed that undergraduate students in Education frequently use the percentage statistical method to analyze data collected. However, other descriptive statistics were also favoured such as mean, standard deviation and chi-square but the inferential statistics such as Analysis of Variance, Analysis of covariance and Regression were often neglected. Most of the statistical method were also wrongly presented and analyzed. Education (science) student showed a greater skill in statistical analysis than those in Education (Arts). Various recommendations were made to be able give statistical analysis her pride of place in research report in Education.

In most first degree educational research projects, the chapter four deals with the analysis and interpretation of data and this constitute the quantitative aspect of the research. Best (2001) described statistics as a branch of study that is concerned with the gathering organizing and interpreting data to make decision. When questionnaires are administered, interviews and observations are conducted, the end result is that the data collected from the field must be analyzed and interpreted by the researcher so that he can come out with meaningful findings which can be generalized to the

population of study Kerlinger (2004) summarized the purpose of statistics in research as:

1. A means of reducing large quantities of data to manageable and understanding form.
2. A means of making decision based on data collected and analyzed
3. A means of making inferences from the data.

However, statistics can be grouped into the descriptive and inferential forms. The descriptive statistics is a description of data collected on a group. The data is limited to a group and generalization is based on members of that group alone, it cannot be extended beyond that group. This form of data analysis can be represented in adequate mathematical models such as numerical forms, which is, describing data through numerical data in form of measures of central tendencies. Mean, median, mode, etc or measures of variability such as deviations, variance standard deviation, quintile range etc. The descriptive statistics can also be represented in graphs or diagrammatical representations such as charts, histogram, frequency curve, pie chart, bar chart etc.

Inferential statistics on the other hand, is when selected representation of the population is drawn and the data collected are analyzed in such a way that conclusion can be drawn from the sampled population and generalized to the entire population. Igho (2000) pointed out that inferential statistics provides the means for evaluating relationships that exist within the data collected from a sample of the population. The types of data collected can be grouped into parametric and non parametric data. The parametric data are data that have been measured at the interval or ratio levels while the non parametric are data that are either counted or ranked.

The National Policy on Education (2004) stated clearly that the aim of tertiary education is to contribute to national development through high level relevant manpower training and this goal can only be achieved through teaching, research development, generation and dissemination of knowledge. Research acting as the key, becomes very essential for every undergraduate and postgraduate student. Research in this sense, is a scientific enterprise that entails systematic, carefully controlled observation and experimentation about some hypothesized relations among a number of variables (Kerlinger 2004). The process of systematically testing ideas that grow out of observation of natural processes, events or phenomena can be said to be research. So it is expected that every tertiary institution in Nigeria must encourage its students to carry out such projects. It is expected that such institutions are to disseminate such research results to both government and other relevant stakeholders for proper utilization.

In the faculties of education, students are made to undertake educational researches. These are researches aimed at finding solution to problems in education using the scientific method of investigation. The rationales for educational research according to Otuka (2001) and Okafor (2004) are:

- (i) Existing educational problem can be solved through research
- (ii) Most educational policies are guided through research
- (iii) Educational research results are important for Educational planning, development and for identifying new problem areas
- (iv) Educational research helps to test soundness of theories and assumptions upon which to acquire systematic problem solving
- (v) Educational research provides opportunities for educators to study relationship among various educational factors and thus, be able to improve the efficiency of the teaching-learning process
- (vi) Educational research provides relevant information that help education decision makers and curriculum planners to plan appropriate programmes, implement curriculum effectively and evaluate educational outcomes objectively by using valid and reliable instrument. The place of quantitative analysis cannot therefore be underestimated.

The quantitative analysis would provide standard language of analytical tool and the adequacy of information in a research can be judged from quantitative analysis. However, Olatinnji (2003) noted that several criticisms were put up with regards to quantitative analysis of education research,

- (i) It is quite irrational to quantify all aspects of human belief e.g. anxiety, fear, hunger etc
- (ii) Human characteristics and characteristics of groups and organization cannot be measured
- (iii) In a frantic attempt to achieve objectivity, it could lead to remoteness and inhumanity as it is believed that there is no statistical analysis that could accurately measure the intelligence of the child using achievement test alone as generalizing on the intelligence of the child using achievement test alone may be inhuman
- (iv) There is distortion of truth in over-reliance on quantification
- (v) It is overly reductionism. Not minding these arrays of criticism as well as the unique characteristics of educational research which includes the complexity of the subject matter (man), difficulties in controlling situations involving man, the place of quantitative analysis cannot be left out as this remains the only instrument upon which most results and findings of educational research can be guided.

Olatunji (2008) noted that in the universities faculties of Education, although the undergraduate students are beginners and inexperienced researchers in various subject areas, they are expected to contribute, at least, the "basic minimum" to the overall goals of scientific research. Research at this level serves to prepare students for related challenges in their subsequent career. Otuke (2001) lamented that it has been alleged that the quality of research reports in Nigeria tertiary institutions have continued to worsen with the passage of time. Namidu (2001) however refuted the allegation and stated that most research findings are treated cosmetically as they end up in dusty shelves in various offices or libraries.

Quantitative analysis in research reports in education has remained a problem especially at the undergraduate level. A researcher is guided by the research design in choosing the appropriate statistics to be used in analyzing the data collected. Okafor (2004) observed that most students are quite oblivious of the fact that the research design dictates the appropriate statistics to be used in analyzing and evaluating NCE research project in Anambra State College of Education. It was discovered that correlation, descriptive and experimental research designs were almost analyzed in the same way irrespective of the types of research questions or hypotheses raised for the study. The statistical representation differs as the research question or hypotheses may also differ. In testing for significant difference, the researcher may use a different statistical method when testing for significant relationships. Okpala (2004) noted that most undergraduate researchers do not take this into consideration.

The measurement scale may also determine if a descriptive or an inferential statistics is to be used. It is necessary to note if the data collected fall within the ordinal, nominal, or ratio scales. Berliner (2002) believed that if the measurement scale is not determined by the research, it will be difficult to analyze the data correctly.

Levin (2004) observed that the number of groups under study could give a positive insight into the types of quantitative analysis to be used in a study.

Labaree (2008) added that the nature of the group is also important but lamented that most analysis do not recognize the effect of groups.

The sample size to some extent, dictates the form of statistical tool to be used in analyzing a particular data. Adepoju (2000) noted that most often, the questionnaire are not administered. Since the sample size is small, it becomes very easy for the researcher to guess. Likely answers are provided to questions without reaching out to the respondents. The variables used are necessary in determining the form of statistical tool to be used; the dependent and independent variable are essential. Mouley (2008) observed that most undergraduate research work are

guided using research questions in place of testing of hypotheses. This to some extent, do affect the form of statistical tool to be used.

As part of the requirement for fulfillment for the award of a degree in Education in Nigeria, a research project must be submitted for assessment by the student. It is expected that an empirical study be backed with relevant statistical tools to analyze data collected.

Objective of the Study

The objectives of the study are:

1. To find out the most frequently used statistical method by undergraduate students in the faculty of education in their research projects.
2. To find out if there is any significant difference among undergraduate researchers in the various departments of the faculty of education in the use of statistics in their research projects.
3. To find out how adequate the statistical method used by the undergraduate researchers in education is relevant to the topic under investigation.

Research Questions

The following research questions are raised:

1. What is the most frequently used statistical method by undergraduate students in the faculty of Education in their research project?
2. How adequate is the statistical method used by undergraduates in the Faculties of education relevant to the topic under investigation?

Hypothesis

There is no significant difference in the use of statistical methods by undergraduates in the various departments of the faculty of education in their research projects.

Methodology

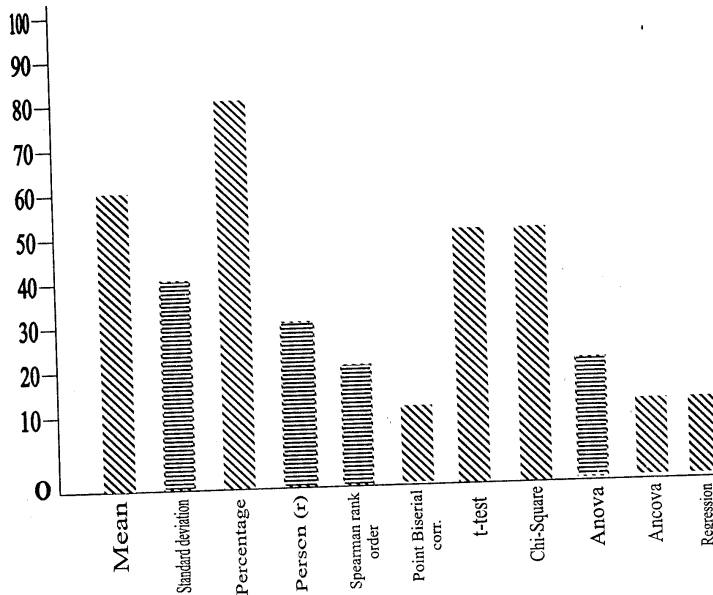
The population of the study includes all Bachelor of Education (B. Ed. B.A. Ed, B.Sc Ed) students who had submitted complete project reports to the faculty of education in 5 selected universities from 2006 to 2010. The sample for the study included a purposive sampling of 700 already completed and submitted project works in the faculties of education. 140 projects reports were randomly selected from each university. The completed project reports form the basis of the analysis of data. The data gathered from the study were analyzed using the descriptive statistics as well as the Analysis Of Variance (ANOVA). The sample size was randomly selected from the faculties of education in the following universities.

Niger Delta University, Wilberforce Island
Ambrose Ali University, Ekpoma
Benue State University, Makurdi
Nasarawa State University, Kaffi
Ibrahim Badamasi Babagida University, Lapai

Findings

Relevant data were subjected to descriptive-bar chart and inferential (ANOVA) statistical analysis. The results are presented in tables 1-3.

Table 1: The Most Frequently Used Statistic by Undergraduate Students in the Faculties of Education.



The bar chart shows the various statistical methods used by undergraduate researchers in the faculties of education. It is evident from the analyzed data that the most frequently used statistical method is the percentage method with a 80% level of usage, the least used are the inferential statistic such as the ANOVA, ANCOVA, Point Biserial corr and regression with 20% users rate.

Table 2: Adequacy of Statistical Methods Used In Analyzing Data

Statistical method	N	Correctly used	Incorrectly used
Mean	230	117	123
Standard deviation	70	52	18
Percentages	300	270	30
Person (r)	20	5	15
Spearman Rank Order	15	5	10
Point Bisenal corr.	10	-	10
t-test	20	17	3
Chi-square	30	15	15
ANOVA	1	-	1
Regression	2	1	1
Total	700	477	223

About 700 complete research projects were collected and analyzed. 477 undergraduate researchers in education used the statistical tools appropriately, while 223 out of the 700' project used the wrong statistics in analyzing the data collected.

Table 3: Analysis Of Variance of the Use of Statistical Methods by the Three Departments (Arts, Sciences, Social Science and Vocational Studies)

Parameters	Of	SS	Ms	F Cal	F crit
SSB	2	»)	5440.4		
SSW	688	37311.6	52.45	101.8	3.85
SST	700				
Groups	Edu/Science	Edu/Arts	Edu/Vocs Social Sc./Industrial		
Mean score	70.28	62.03	67.57		
Significant of 0.05					

The F.cal is 101.8 while the F.crit is 3.85. The F.cal is greater than the F.crit so the hypothesis was rejected. There is a significant different in the use of statistical method by the three department in Education Based on the mean scores Edu/Science has the highest mean score of 70.28.

Discussion

Statistics has remained indispensable in data analysis especially in research report. In the faculties of Education, a greater number of the

researchers conducted are survey design (Olatunji 2008). Most of the student are not gifted in quantitative analysis, they settle mostly for the simple ones such as the descriptive statistics; percentages, means, Deviation and Chi-square. In table, 1, these have the highest level of usage unlike inferential such as ANOVA, ANCOVA and Regression Analysis.

It was observed that despite the fact that most researchers used appropriate statistical methods needed to analyze data, they were wrongly applied, In correlation study, the percentage method was still applied wrongly. The few that applied the mean (\bar{X}) and standard Deviation (SD) statistics interpreted the results wrongly. The inferential statistics lack indepth understanding by most researchers. Okafor (2004) lamented that statistics is yet to be correctly applied by most undergraduate researchers.

The differences among the means scores of Edu/Sciences. Edu/Art and Edu/Vocs were found to be statistically significant in favour of Edu/Science as the students exhibit higher statistical skills in research writing since research writing itself is a scientific inquiry (Oladunjoye, 2009).

Conclusion

The study analyzed 700 research projects submitted to the faculties of Education in 5 Universities that were randomly selected. These was an extensive use of the survey design and the use of questionnaire in the collection of data, the percentage method ranked the highest as well as other descriptive statistical methods. It was also observed that some of the statistical methods were wrongly applied while few could not even interpret the data collected. The Edu/sciences students showed a higher skill in analysis unlike their counterparts in Edu/Arts.

Recommendations

Base on the finding of this study, the following recommendations were made:

1. Research and statistics should be taught from 100 to 300 level to enable undergraduate students have indepth knowledge of research and statistics.,'
2. Statistical methods should be separated from research methods to enable students develop skills in statistics.
3. Periodic in service training should be organized for supervisors in statistics.
4. Edu/Arts students should be given additional training in statistics by qualified teachers.
5. Students should be encouraged to use appropriate statistical methods in analyzing the data collected.
6. Emphasis should be placed also in the use of inferential statistics by undergraduates researchers in the faculty of education.

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