

## ERRONEOUS STATISTICAL ANALYSES IN EDUCATION STUDENTS' RESEARCH PROJECTS IN IMO STATE UNIVERSITY, OWERRI

***Chidera Emmanuel Amaechi***

*Department Of Science Education (Measurement and Evaluation),  
Faculty of Education,  
Michael Okpara University of Agriculture, Umudike,  
Abia State.*

***Dr. Ifeoma R. Ezechukwu***

*Department Of Physical Science Education (Measurement and Evaluation),  
Faculty of Education,  
Imo State University, Owerri,  
Imo State.*

***And***

***Prof. P.M.C. Ogomaka***

*Department Of Physical Science Education (Measurement and Evaluation),  
Faculty of Education,  
Imo State University, Owerri,  
Imo State.*

### **Abstract**

This study identified incorrect statistical analysis among B.Sc.Ed./B.A.Ed., M.Ed. and Ph.D. research projects in Imo State. The design for this study is evaluation research as well as a case study. This evaluation is based on 75% for quality evaluation in Universities in Nigeria. The population of this study consists of the entire 1208 (1025 B.Sc.Ed./B.A.Ed., 122 M.Ed. and 61 Ph.D.) final projects in the Faculty of Education Library of 2014/2015 academic session. The instrument for data collection is a researcher made checklist. The research questions were answered using frequency counts and proportion, while the hypotheses were tested using t-test of proportion statistic at 0.05 level of significance. It was revealed among others that there is high statistical analysis errors found among B.Sc.Ed./B.A.Ed. projects, but low statistical analysis errors found among M.Ed. theses and Ph.D. Dissertations in Imo State University, Owerri. The study further established that the proportion of B.Sc.Ed./B.A.Ed. projects that have errors in their statistical analysis is significantly greater than 0.75, while the proportion of M.Ed. theses and Ph.D. dissertations in Imo State University, Owerri that have errors in their statistical analysis are not significantly greater than 0.75. It was therefore recommended among others that the lecturers teaching statistics in tertiary institutions should endeavour to take time and teach the undergraduate students how to apply statistics and its models to research writing, so that they can be acquainted with its usage on time.

**Keywords:** Statistics, Analysis, Errors, Research, Evaluation

The roles of educational research in knowledge contribution and societal development cannot be ignored. Educational research is a systematic and a set of coordinated activities which is used to expose the issues concerned with teaching and learning, which invariably helps to improve its immediate practice for national development. On another definition of educational research, Amaechi, Amaechi and Emerole (2015), defines it as a systematically controlled investigation of an event, place, individual or object associated with education and its practices with the aim of understanding or verifying knowledge that will help to solve academic and societal problems. Also, the definition implies that every research study has a goal or purpose.

Research represents logic of inquiry geared toward obtaining information about an event, project place, individual or object. At the final year of university programme, students conduct researches and report them in writing. For B.Sc.Ed./B.A.Ed. students the research is called projects, M.Ed. students write theses while the Ph.D.s are called dissertations. Educational research writing in universities or colleges of education consists of five chapters, beginning from introduction to the summary. In the chapter four, the analysis of data collected for the study are done either in tabular or graphical forms. In the same chapter, statistical analyses are used to represent the ideas the researcher intends to expose for easy understanding by answering the research questions and testing the hypotheses.

Sulaiman (1997), sees statistics and its analysis as a branch of applied mathematics, which is employed in analysis of data to facilitate meaningful decision making. Statistical analysis is seen by Olaewe and Kareem (2009), as analyzing collected data for the purpose of summarizing information to make it more usable and/or making generalizations about a population based on a sample drawn from that population. It is the application of probability theory to quantify descriptive data. It is a way of using mathematical formula/formulae to make predictions. Statistical analysis involves computing test scores on a profile. It can therefore be inferred in this study that educational statistics and its analysis is seen as the theory and methods of analyzing obtained educational data from samples of observation in order to compare the data from different empirical observations using hypothesized relationships in order to make meaningful decisions for the improvement of educational practices. Even then, the methods of data analysis in educational research depend on the aims and objectives of the study and the nature of the data gathered.

On the importance of statistics, Ogomaka (2002), pointed out that knowledge of statistics helps an individual to have a meaningful contribution to local, national and international debates on topical issues. It becomes clear from the above, that statistical analysis could be useful for reducing quantities of data to manageable and understandable form, decision making, summarizing samples

from which they are calculated and making reliable reference and decisions from hypothesis. Statistics thus serves as a tool used in collecting organizing, analysing and interpreting data (Abdulwahab, 2016).

Generally speaking, statistical methods are categorized into broad classes of Descriptive and Inferential Statistics. Descriptive Statistics are often used to summarise the data collected numerically or graphically. Basic examples of numerical description include the mean and standard deviation. Graphical summarization includes various kinds of charts and graphs. Inferential Statistics are used for generalization of findings arrived at, through the analysis of a sample, to the larger population. These inferences may take the form of hypothesis testing by estimating numerical characteristics (estimation), prediction of observations, description of association (correlation) or modelling of relationship (regression), using statistical tools like t-test, F-test like ANOVA, MANOVA, ANCOVA and time series bearing in mind their different assumptions.

Some statistical errors could exist in analysis of research works. These errors could be as a result of carelessness of the researcher, ignorance of appropriate statistical methods to employ or employed, poor knowledge of statistics etc. It is common to see some research works which aim to correlate the relationship between dependent and independent variables, but ending up finding differences. Some researchers use some inappropriate statistical methods

which could invalidate their findings, while some make wrong decisions based on wrong analysis of data. If this is allowed to continue, the aim of educational research may be defeated.

Empirically, Amaechi, Amaechi and Emerole (2015), found out that post graduate students perceived that they find it difficult to identify the best method for analysis, best statistics to answer the research questions and suitable statistics to test the research hypotheses. However, Ibe (2008), revealed that majority of the first degree students and researchers make their efforts less rewarding and of less consequence because of the way and manner results of data analysis are interpreted. The above studies failed to do a comprehensive study particularly on erroneous statistical analyses in education students'

Experts in Educational research and statistics are worried over the manner at which current researchers statistically analyse the data in their research works. A close observation of some research works will reveal that some research reports in tertiary institution libraries have errors in their analyses. If this practice is allowed to persist, the generalization of research findings will be doubtful. But the existence of statistical errors in research reports of first degree, master's and doctorate degree of Imo State University, Owerri is not yet known. This study posed as a question is: what proportion of B.Sc.Ed./B.A.Ed., M.Ed. and Ph.D. final projects in Imo State University, Owerri has errors in their statistical analyses? This

is the thrust of this study. This evaluation is based on 75% for quality assessment.

The main purpose of this study is to evaluate erroneous statistical analyses in education students' research projects in Imo State University, Owerri. Specifically, the study sought to examine:-

1. the proportion of B.Sc.Ed./B.A.Ed. research projects in Imo State University, Owerri that have errors in their statistical analyses,
2. the proportion of M.Ed. theses in Imo State University, Owerri that have errors in their statistical analyses, and
3. the proportion of Ph.D. dissertations in Imo State University, Owerri that has errors in their statistical analyses.

The following research questions are posed to guide the study:

- 1) What is the proportion of B.Sc.Ed./B.A.Ed. research projects in Imo State University, Owerri that have errors in their statistical analyses?
- 2) What is the proportion of M.Ed. theses in Imo State University, Owerri that have errors in their statistical analyses?
- 3) What is the proportion of Ph.D. dissertations in Imo State University, Owerri that have errors in their statistical analyses?

The following hypotheses are formulated and were tested at 5% level of significance.

**Ho<sub>1</sub>:** The proportion of B.Sc.Ed./B.A.Ed. research projects in Imo State University, Owerri that have errors in their statistical analyses is not significantly greater than 0.75.

**Ho<sub>2</sub>:** The proportion of M.Ed. theses in Imo State University, Owerri that have errors in their statistical analyses is not significantly greater than 0.75.

**Ho<sub>3</sub>:** The proportion of Ph.D. dissertations in Imo State University, Owerri that have errors in their statistical analyses is not significantly greater than 0.75.

### **Method**

The design for this study is evaluation as well as a case study research design. This evaluation is based on 75% for quality assessment. The population of this study consists of the entire 1208 (1025 B.Sc.Ed/B.A.Ed., 122 Med. and 61 Ph.D.) final projects in the Faculty of Education Library of 2014/2015 academic session. The sample for this study is a census study of all the 1208 documented projects/theses/dissertations since their number is handy, hence no sampling. The instrument for data collection is library records by observation. The researchers made use of direct observation with a self prepared format to record the observed record from the faculty library. The observation was done so as to record down the proportion of research projects and their contents which met the criteria under study. The format of the observation was validated by three experts in the area of measurement and evaluation. Since the research instrument was based on an already existing record, therefore the records are believed to be accurate and hence reliable for the study. The researchers sought permission from the faculty authorities and faculty librarian to

collect the data for this study. The research questions were answered using frequency counts and proportion while the hypotheses were tested using t-test of proportion statistic at 0.05 level of significance.

## Results

### Research Question One

What is the proportion of B.Sc.Ed./B.A.Ed. Projects in Imo State University, Owerri that have errors in their statistical analyses?

**Table 1:** Proportion of B.Sc.Ed./B.A.Ed. Projects in Imo State University, Owerri with errors in their statistical analyses

No. of Projects	With Errors	Without Errors	Proportion with Errors	Proportion Without Errors
1025	892	133	0.87	0.13

Table 1 shows the proportion of B.Sc.Ed./B.A.Ed. projects in Imo State University, Owerri with errors in their statistical analyses. It was indicated in the table that out of the 1025 projects in Imo State University, Owerri, 892 had errors in their statistical analysis while the rest 133 had no statistical errors. The conclusion is that the proportion of B.Sc.Ed./B.A.Ed. projects in Imo State University, Owerri with errors in their statistical analyses is 0.87.

### Research Question Two

What is the proportion of M.Ed. Theses in Imo State University, Owerri that have errors in their statistical analyses?

**Table 2:** Proportion of M.Ed. Theses in Imo State University, Owerri with errors in their statistical analyses

No. of These	With Errors	Without Errors	Proportion with Errors	Proportion Without Errors
122	39	83	0.32	0.68

Table 2 shows the proportion of M.Ed. Theses in Imo State University, Owerri with errors in their statistical analysis. It was indicated in the table that out of the 122 theses, 39 had errors in their statistical analysis while the rest 83 had no statistical error. The conclusion is that the proportion of M.Ed. thesis in Imo State University, Owerri with errors in their statistical analysis is 0.32.

### Research Question Three

What is the proportion of Ph.D. Dissertations in Imo State University, Owerri that have errors in their statistical analyses?

**Table 3:** Proportion of Ph.D. Dissertations in Imo State University, Owerri with errors in their statistical analyses

No. of Dissertation	With Error	Without Errors	Proportion with Errors	Proportion Without Errors
61	7	54	0.11	0.89

Table 3 shows the proportion of Ph.D. Dissertations in Imo State University, Owerri with errors in their statistical analyses. It was indicated in the table that out of the 61 Dissertations, only 7 had errors in their statistical analysis

while the rest 54 had no statistical errors. The conclusion is that the proportion of Ph.D. Dissertations in Imo State University, Owerri with errors in their statistical analyses is 0.11.

### Test of Hypotheses

#### Hypothesis One

**Ho<sub>1</sub>:** The proportion of B.Sc.Ed./B.A.Ed. projects in Imo State University, Owerri that have errors in their statistical analyses is not significantly greater than 0.75.

**Table 4:** t-test proportion of the significant difference between the proportion of B.Sc.Ed./B.A.Ed. projects in Imo State University, Owerri that have errors in their statistical analyses and the expected 0.75 of the population.

N	n	P	p	q	$\alpha$	t <sub>ca</sub> 1	t <sub>ta</sub> b	Decision
10	10	0.	0.	0.	0.	8.	1.	Reje
25	25	8	7	2	0	8	6	ct H <sub>0</sub>
		7	5	5	5	7	5	

Table 4 shows the t-test proportion of the significant difference between the proportion of B.Sc.Ed./B.A.Ed. projects in Imo State University, Owerri that have errors in their statistical analyses and the expected 0.75 of the population. From the population of 1025, proportion of 0.87, and expected decision of 0.75, with 0.05 level of significance, the t-calculated of 8.87 is greater than the t-tabulated of 1.65. This led to the rejection of the null hypothesis and concluding that the proportion of B.Sc.Ed./B.A.Ed. projects in Imo State

University, Owerri that have errors in their statistical analyses is significantly greater than 0.75.

#### Hypothesis Two

**Ho<sub>2</sub>:** The proportion of M.Ed. theses in Imo State University, Owerri that have errors in their statistical analyses is not significantly greater than 0.75.

**Table 5:** t-test proportion of the significant difference between the proportion of M.Ed. theses in Imo State University, Owerri that have errors in their statistical analyses and the expected 0.75 of the population.

N	n	P	p	q	$\alpha$	t <sub>ca</sub> 1	t <sub>ta</sub> b	Decision
1	1	0.	0.	0.	0.	-	1.	Acce
2	2	32	75	25	05	6.	65	pt H <sub>0</sub>
2	2					69		

Table 5 shows the t-test proportion of the significant difference between the proportion of M.Ed. theses in Imo State University, Owerri that have errors in their statistical analyses and the expected 0.75 of the population. From the population of 122, proportion of 0.32, and expected decision of 0.75, with 0.05 level of significance, the t-calculated of -6.69 is less than the t-tabulated of 1.65. This led to the acceptance of the null hypothesis and concluding that the proportion of M.Ed. theses in Imo State University, Owerri that have errors in their statistical analyses is not significantly greater than 0.75.

### Hypothesis Three

**Ho<sub>3</sub>:** The proportion of Ph.D. dissertations in Imo State University, Owerri that have errors in their statistical analyses is not significantly greater than 0.75.

**Table 6:** t-test proportion of the significant difference between the proportion of Ph.D. dissertations in Imo State University, Owerri that have errors in their statistical analyses and the expected 0.75 of the population.

N	n	P	P	q	$\alpha$	t <sub>cal</sub>	t <sub>ta</sub> <sub>b</sub>	Decision
61	6	0.11	0.75	0.05	0.05	-11.45	1.65	Accept H <sub>0</sub>

Table 6 shows the t-test proportion of the significant difference between the proportion of Ph.D. dissertations in Imo State University, Owerri that have errors in their statistical analyses and the expected 0.75 of the population. From the population of 61, proportion of 0.11, and expected decision of 0.75, with 0.05 level of significance, the t-calculated of -11.45 is less than the t-tabulated of 1.65. This led to the acceptance of the null hypothesis and concluding that the proportion of Ph.D. dissertations in Imo State University, Owerri that have errors in their statistical analyses is not significantly greater than 0.75.

### Discussion of Findings

The result of the study revealed that the proportion of B.Sc.Ed./B.A.Ed.

projects in Imo State University, Owerri with errors in their statistical analyses is 0.87. This shows that the proportion is far greater than the proportion criterion of 0.75. The hypothesis further deduced that the proportion of B.Sc.Ed./B.A.Ed. projects in Imo State University, Owerri that have errors in their statistical analyses is significantly greater than 0.75. This implies that the issue of accuracy in statistical analyses of project writing eluded most of the undergraduate students after they are taught research methodology and statistics. It could also mean that the students lack the application of statistical models and methods like how to calculate mean, standard deviations, independent t or Z tests, Chi-Square, F-test etc in their research writing. This finding is in line with Ibe (2008) finding which revealed that majority of the first degree students and researchers make their efforts less rewarding and of less consequence because of the way and manner results of data analysis are interpreted. The similarities in the findings could be attributed to familiar nature of the projects studied.

It was also found in this study that the proportion of M.Ed. thesis in Imo State University, Owerri with errors in their statistical analyses is 0.32. This led to the conclusion that the proportion of M.Ed. theses in Imo State University, Owerri that have errors in their statistical analyses is not significantly greater than 0.75. This shows that the proportion of theses with error in their analyses is far below the criterion proportion of 0.75. This is somehow welcomed, but even at

that, some master's students are still lacking behind in the application of correct statistical analyses in their thesis. The reason for the poor application of statistics to M.Ed. theses could be that some of the students might not have studied statistically related courses during their first degree as some could have done their masters degree through post graduate diploma in education (PGDE). This reason may be why some M.Ed. students still have poor feelings towards statistics. Supporting the above, Amaechi, Amaechi and Emerole (2014), found out that post graduate students perceived that they find it difficult to identify the best method for analysis, best statistics to answer the research questions and suitable statistics to test the research hypotheses. This shows that there is poor perception towards statistics and phobia towards statistics may be possible as well.

The study finally revealed that the proportion of Ph.D. Dissertations in Imo State University, Owerri with errors in their statistical analyses is 0.11. This gave a low error level in statistics analysis of dissertations. This finding led to the inference that the proportion of Ph.D. dissertations in Imo State University, Owerri that have errors in their statistical analyses is not significantly greater than 0.75. The reason for such low error in statistical analysis could be attributed to the fact that the Ph.D. students must have acquired a lot of experience in research writing and the application of statistics to research right from their undergraduate days. Apart from that it can as well be noticed that some of the Ph.D. students

may be lecturers in some tertiary institutions who must have been conversant with statistics and its application to research. Another reason for this could be as a result of the strictness to which the Faculty of Education in IMSU conduct their Ph.D. dissertations, as the students undergo series of defenses right from their supervisors who are professors, even to the extent that they undergo proposal, seminar, mock and final defenses. This is a welcome issue in research writing, as it can be said that the Ph.D. students are aware of the significant role of statistics and research to nation's development. In support of the above point, Ogomaka (2002), concluded that knowledge of statistics help an individual to have a meaningful contribution to local, national and international debates on topical issues. This is also applicable in research writing.



### Appendix I-Checklist

Checklist used in the study

S/N	Item Statements	Present	Absence
1	Erroneous/wrong collation of data		
2	Erroneous/wrong scoring of responses to items of instruments		
3	Erroneous/wrong computation of statistics/parameters		
4	Erroneous/wrong use of statistics/parameters		
5	Use of inappropriate/faulty formula/formulae		
6	Faulty/inappropriate research questions		
7	Faulty/inappropriate hypotheses		
8	Violation of basic assumptions underlying test of hypotheses/statistical tests		
9	Use of wrong units of analyses		
10	Use of wrong/inappropriate statistical tests		
11	Forgery of statistics/data		
12	Faulty/erroneous acceptance/rejection of null hypotheses		

### Recommendations

Based on the findings of this study, the following recommendations were made:

1. The lecturers teaching statistics in tertiary institutions should endeavour to take time and teach the undergraduate students how to apply statistics and its

models to research writing, so that they can be acquainted with its usage on time.

2. The students should be advised to take the learning of statistics serious as it helps them to analyze their data in research writing.

3. Conferences and workshops on how to conduct and analyze research data should be quarterly organized for students, where rudiments and best ways of analyzing research data are taught to them.

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