



# Assessing Students' Interpretation of Statistical Data and Tools in Nigeria Tertiary Institution

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## General Note

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## ABSTRACT

This study assessed students' interpretation of data in Adeyemi College of Education Ondo, Ondo State, Nigeria. One hundred and fifty (150) questionnaire were administered in the four selected faculties in the institution. The data collected was analyzed with t-test analysis at 5% level of significance. The finding indicated that many students had negative attitude towards statistical tools, and they also had low interpretation skill of statistical data. It is therefore suggested that statistics instructor and the curriculum planner should frequently offer orientation programmes on data interpretation to promote positive thinking towards interpretation of modern statistical packages.

## 1. INTRODUCTION

Statistics is a dynamic course which needs scientific approach. It is the bedrock for our national economical development, therefore, there is need to critically look at the purpose, content and process of the whole curriculum in terms of the statistical education. Ridgway (2007) opined that statistics is the central science used in social science and education, and concept involves statistics literacy, reasoning and thinking of statistics education. Statistics is a methodological course that is required by a fairly number of

undergraduate idea and tools used to work with data. The statistics course often represents one of the few required courses in many social science and educational oriented majors and serves as a foundation for understanding how research is conducted.

The teaching of statistics as a course started from elementary stage, and this is why the researcher is interested in the teaching of statistics. With appropriate analysis and interpretation of data, educator can make informed decisions that positively affect student academic performance. Researcher has showed that using data in instruction decision can lead to improved students performance (Wayman, 2000). No single assessment can tell educators all they need to know to make well informed instructional decision, so, researcher stress the use of multiple data source. It is known that many students who involved in mathematics related courses have a great successful statistical achievement. It is therefore expected that students with positive attitudes toward mathematics and statistics generally had better statistical achievement. Roberts and Saxe (1982) found that students with positive attitude generally had better statistical achievement. Schau (2003) emphasizes that positive attitude of teacher in statistics would help them to understand that statistics is useful in their student's professional and personal lives and that their students can be trained to understand and use statistics to process solution. Gal (1994) emphasized that statistical teachers would be more likely to transmit to their students and an appreciation for the potential uses of statistics in future personal and professional life.

Several excellent approaches to the assessment of statistical proficiency have been put forward. These approaches are inherently problematic. For example, Garfield (1998) presents an instrument for assessing statistical reasoning, but this instrument only measure a small subset of reasoning skills. It is focused on data, graphics, statistical measure, uncertainty, sample, and associations. It does not measure the application of reasoning skills on more advanced statistical techniques. So it is not suited as an instrument to measure whether a person is able to fully interpret statistical result of these more advance techniques. Chance (2002) presents examples of how statistical thinking could be assessed. However, she put it that it is not suited as an instrument to measure whether a person is able to fully interpret statistical result of these more advance techniques. It is suggested that, assessment should be directed at students' ability to construct or interprets statistical arguments and understanding of the logic. Method of assessment should gain the assimilation of students' skill, knowledge, dispositions, and their ability to manage meaningful realistic questions, problem or situations. This recommendation is not directly related to statistical literacy, reasoning or thinking. Probably this fact reflect how ineffective there concept are as learning outcomes.

Dunn (2000) noted that most students view a required statistics course as a formidable obstacle. Students are ultimately concerned with the successful completion of the statistics course as they aim to fulfill the necessary requirement of their major prior research has identified cognitive and demographic factors related to students' performance in statistics courses including gender, prior knowledge, Mathematical ability, spatial ability and pedagogical approaches (Bassok, 2003; Campione and Brown, 1990; Mayer, 1997).

Few studies have considered the challenges of developing statistical literacy, reasoning and thinking in higher institutions. It is on this note that the researcher seeks to assess student interpretation of data (Ben-zvi and Gerfield, 2004; Chance, 2002; Dunn, 2002; Gardner, 2004; Gottfield, 2000; Schau, 2003).

## 1.2. Research Question

- a. Do students have negative attitude towards statistical analysis
- b. Do students have the necessary interpretation skill of some statistical packages?

## 1.3. Research Hypothesis

**H<sub>0</sub>:** There is no significant difference between mean response of students who used manual calculation and statistical package in the research data analysis.

**H<sub>1</sub>:** There is significant difference between mean response of students who used manual calculation and statistical package in the research data analysis.

## 2. MATERIALS AND METHODS

One hundred and fifty (150) questionnaire were administered in the four selected faculties in Adeyemi College of Education in Ondo West Local Government Area of Ondo State. Four of the faculties were selected randomly to prevent clumsiness and make it manageable. The questionnaire were distributed to the student in the various departments which was based on four rating scale, the reliability of the questionnaire estimated using cronbach coefficient method and value was 0.86. This value confirmed that the instrument was reliable in achieving the study objective. Data obtained were subjected to statistical analysis using the mean, standard deviation and population t-test

### 3. RESULT AND DISCUSSION

**Research Question One:** Do students have negative attitude toward statistical analysis?

**Table 1** Mean and standard deviation rating of the negative attitude of students towards statistical analysis

S/N	Item	Mean	Standard deviation	Remark
1.	Quantitative research are relevant to my career	3.06	0.72	Agreed
2.	I do not have access to research	2.86	0.48	Agreed
3.	I used analyst for my research analysis	3.16	0.61	Agreed
4.	I would like to make more research using tools	2.96	0.83	Agreed
5.	Time factor is a barrier to making good quantitative research	3.16	0.80	Agreed
6.	I would like to make more quantitative research	2.56	0.70	Agreed
7.	I feel inadequate in reading and interpreting published research	2.76	0.70	Agreed
8.	Research is not relevant to my career	3.76	0.88	Agreed

Table 1 was measure the influence of negative attitude of students towards statistical analysis. Item 1 which is the first item on this table showed a mean of 3.06 and standard deviation of 1.72 which is above the decision point of 2.50 mean. The implication is that quantitative reasons are relevant to career of the students. Item 2, the second item on this table showed a mean of 3.06 and a standard deviation of 1.48 which is above the decision point of 2.50 mean. It means that many students have no access to research. Item 3, the third item showed a mean of 3.06 and a standard deviation of 1.61 which is above the decision point of 2.50 mean. It followed that many students pay analyst for their research work. Item 4 showed a mean of 3.06 and a standard deviation of 1.83 which is above the decision point of 2.50 mean. This means that many students are interesting in making more research. Item 5 showed a mean of 3.06 and a standard deviation of 1.80 which is above the decision point of 2.50 mean. This showed that time factor is a barrier to making good quantitative research. Item 6 showed a mean of 3.06 and a standard deviation of 1.70 which is above the decision point of 2.50 this implies that many students are interesting in making more quantitative research. Item 7 showed a mean of 3.06 and a standard deviation of 1.70 which is above the decision point of 2.50 mean. This implies that students find it difficult in reading and interpreting published research. Item 8 showed a mean of 3.06 and a standard deviation of 1.88 which is above the decision point of 2.50 mean. This means that many students believed that research is not relevant to their career.

**Research Question Two:- Do students have the necessary interpretation skill of some statistical packages?**

**Table 2** Mean and standard deviation rating of students' necessary interpretation skill of some statistical packages

S/N	Item	Mean	Standard deviation	Remark
1.	Anytime I write a research I do the analysis myself	3.06	1.63	Agreed
2.	My research are majorly quantitative therefore I don't need a quantitative analysis	3.06	1.83	Agreed
3.	Being up to date with quantitative research aid career progression	3.06	1.86	Agreed
4.	Quantitative research is valuable improving teaching quality and experience	3.06	1.98	Agreed
5.	I have feeling of inadequacy to do a task which seems to involve scientific approach	3.06	1.59	Agreed
6.	Keeping up- to-date with current research is an essential part of professional development	3.06	1.77	Agreed
7.	I feel fairly confident about my ability to work on a quantitative research	3.06	1.70	Agreed
8.	I do not see the value of quantitative research on a practice	3.06	1.77	Agreed
9.	I feel inadequate in barrier to making good quantitative research	3.06	1.52	Agreed

Table 2 was measures the rate of students' necessary interpretation skill of some statistical packages. Item 9 showed a mean of 3.06 and a standard deviation of 1.63 which is above the decision points of 2.50 mean. This implies that many students do their research on their own. Item 10 showed a mean of 3.06 and standard deviation of 1.83 which is above the decision point of 2.50 mean. This means most students' research is quantitative. Item 11 showed a mean of 3.06 and standard deviation of 1.86 which is above the decision point of 2.50 mean. It means being up-to-date with quantitative research aids career progression. Items 12 showed a mean of 3.06 and standard deviation 1.98 which is above the decision point of 2.50 mean. This means quantitative research is valuable. Item 13 showed a mean of 3.06 and a standard deviation of 1.59 which is above the decision point of 2.50 mean. This means many students have feeling of inadequacy to do a task which seems to involve scientific approach. Item 14 showed a mean of 3.06 which is above the decision point of 2.50 mean. This means keeping up-to-date with current research is an essential part of professional development. Item 15 showed a mean of 3.06 and a standard deviation of 1.70 which is above the decision point of 2.50 mean. This implies that students feel fairly confident above their ability to work on a quantitative research. Item 16 showed a mean of 3.06 and standard deviation of 1.77 which is above the decision point of 2.50 mean. This implies that students do not appreciate the value of quantitative research for practice. Item 17 showed a mean of 3.06 and a standard deviation of 1.52 which is above the decision point of 2.50 mean. This implies that students feel inadequate in barrier to making good quantitative research.

### Research Hypothesis

**H<sub>0</sub>:** There is no significant difference between mean response of students who used manual calculation and statistical package in the research data analysis.

**H<sub>1</sub>:** There is significant difference between mean response of students who used manual calculation and statistical package in the research data analysis.

**Table 3** Mean response of students who used manual calculation and statistical packages in research data analysis

Items	Mean	SD	Df	T-cal	T-table	Remark
Statistical packages	3.06	11.89	98	2.801	2.774	Significant
Manual	2.47	9.08				

From the Table 3 above, the T-calculated value was greater than T-table at 5% level of significance; therefore null hypothesis was rejected why alternative hypothesis was accepted this implies that there was significant difference between mean response of students who used manual calculation and statistical packages in the research data analysis. This implies that student do not have the basic statistics knowledge of data interpretation and modern statistical packages. The difference in the result may stems from the negative attitude of the students towards learning of statistics which will determine their level of data interpretation. As Gal et al. (1997) stressed, student attitude and belief play a major role in the students' success or failure in statistics.

## 4. CONCLUSION

From the finding of this study, it can be concluded that Adeyemi College of Education students possess low data interpretation skill and low basic statistical awareness to explain statistical concept. It could be argued that high technicality and mathematical involvement of data interpretation and students negative attitude towards data interpretation are some of the factor responsible for the students low possession data interpretation skills.

From the findings of the study, the following recommendations are made: Statistics instructors should gave more orientation programme on data interpretation to: create awareness of its relevance, stimulate the interest of the students towards data interpretation and other statistical related concepts. There should be provision for statistical material for learning which will promote student possession of basic interpretation skill and ability to explain statistical concept. The school authorities should provide quantitative and qualitative statistics text-books which contain the contemporary statistical information which are relevant to statistical instruction and its application in the society at large. The statistician should look into how brain and mouth twisting statistical terminologies can be broken down from its complex to simple, for proper understanding of statistical concepts and consumption. The curriculum planners and education policy maker should break down the mathematical aspect of statistics to avoid trouble in understanding of its massive computation, high technically and mathematical complication, most especially in tertiary institution. Statistics courses should be promoted without causing any difficulty in students of lower abilities in both statistics and data interpretation.

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