Attitudes of Undergraduate Teachers Towards the Application of Statistical Package for Social Science When Teaching Statistics in Social Studies

by

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Abstract

Attitude of the students towards teaching and learning of Statistics in Social Studies has always been at low ebb. Students have in most cases continued to struggle in Statistics related courses in Social Studies because of their perception and tagging of Statistics as a difficult course. This study assessed the attitude of pre-service Social Studies teachers on the application of Statistical Package for Social Sciences (SPSS) in teaching Statistics. The study employed descriptive research design. The population for the study consisted of 200 level Social Studies pre-service teachers in the Faculty of Education of a public tertiary institution in Ogun state. Two hundred and thirty-two (232) students were selected to form the sample for the study using stratified sampling technique. The main instrument used to collect data for the study was a sixteen (16) item questionnaire titled "Attitude of Pre-service Social Studies Teachers. Towards the Application of SPSS Questionnaire" (APSSTASQ) (R=0.80). Data Collected were coded and analysed using descriptive and inferential Statistics. Findings showed a moderate positive attitude of pre-service teachers towards the application of SPSS package in teaching Statistics and no gender influence was found in the attitude of pre-service teachers towards the application of SPSS package. It was recommended that SPSS packages should be used in the teaching of Statistics in Social Studies classes to leverage the anxiety ascribed to manual calculation and all students must be given equal opportunity during the statistics classes.

Key words: Undergraduates, Statistical Package for Social Science, Statistics, Teaching, Social Studies

Introduction

The teaching and learning of Statistics form an integral part of the tertiary institutions' curriculum and cuts across all levels of education in Nigeria. Social Science education requires students to develop the skills of collecting, organising, interpreting, and evaluating research findings. Introduction to Statistics is an important course students are exposed to in most of the Social Sciences at the tertiary education level. However, majority of students find the course difficult to cope with. This has been traced to factors such as attitude, perception, interest, expectation motivation and anxiety (Soluade, 2019). Social Studies students that are interested in analyzing issues that will involve various opinions must be ready to have

adequate knowledge of Statistics that will equip them with the skills of collecting, organising, analysing, and interpreting relevant statistical data in the field of Social Studies. This is supported by the views of Jatnika (2016) who stated that Statistics courses are a valuable component to many courses, if not most courses of study.

Social Studies students often perceive introduction to Statistics in Social Studies as one of the biggest challenges they face before they can graduate in the Department. Results of the students over a period showed that most of the students scored below average in statistical related courses in Social Studies and this has become a major issue during the College meetings for results consideration. High level of students' absentees had been recorded over the years, this might be due to the technical nature of the subject, the students who missed classes have a risk of failing to understand the topics which are mostly related to each other(Ashaari, et al., 2011). In addition, through some observations by the academic staff teaching the subject, student absentees throughout the course is something of quite a concern.

This recurring poor performance of learners calls for concerted efforts by Statistics lecturers in the tertiary institutions of learning to adopt teaching and learning approaches that will help to improve learners' performance. This persistence in poor performance of learners may mean that apart from looking at factors such as anxiety, students' perception, attitude, interest, and motivation factors such as method of teaching needs to also be given attention by researchers. It was based on the above assumption that the study examined the effects of using SPSS in teaching Statistics in Social Studies on students' academic performance over time. Various factors have been highlighted as the reason behind the student's low performance in Statistics. Factors such as quality of teachers, instructional methods, lack of reasonable background in Mathematics, students' interests, feelings, beliefs, expectations, motivations and engagement, student self-efficacy, phobia for mathematics have been identified as having a relationship with students' attitude towards statistical related courses (Everson, et al., 2008 & Soluade, 2019). Therefore, in response to the needs that the teacher must try to adopt methods of teaching that will encourage students to change their perception about Statistics made the course tutors to adopt method of teaching Statistics using Statistical Packages for Social Sciences (SPSS) in teaching Statistics in Social Studies.

Attitudes are a good predictor of content assimilation, its uses, and the motivation for learning and of performance (Biens, 1985). Generally, attitude is defined as a settled way of thinking or feeling about something. It can also be referred to the belief or feelings towards an individual, idea, object, matter, or event (Saidi et al., 2019). Attitude can be positive or

negative. Thus, attitudes may determine the extent to which students will develop and apply statistical skills and the students' academic achievement. Positive attitude built at this level will influence the students' statistical thinking and encourage students to take this course at a higher level; understand the Statistics concepts, improve their skills in Statistics and appreciate the knowledge in their daily lives (Gal et al., 1997). Students' attitudes towards Statistics can influence Statistics teaching-learning and performance in statistical related courses. Attitudes towards Statistics is the disposition of the students' and their tendency to respond positively or negatively to the learning of Statistics. Ghulam, Ab Hamid and Zakaria (2015), are of the opinion that it is important for the students to have a positive attitude towards learning since it enables the students to master the learning subjects. Ghulam et al., (2015) concluded that many Statistics instructors and students also believe that positive attitudes towards Statistics are crucial in the statistical learning process.

How to encourage and develop a positive attitude towards Statistics among the students has been one of the main goals in statistical teaching over time, scholars have postulated that students with positive attitude towards Statistics would perform better in the statistical performances (Chiesi&Primi, 2015; Naccache, 2012). Students should not be allowed to build negative attitude towards statistics as this may affect effective learning. The Statistical Package for Social Sciences (SPSS) is a software package used in statistical analysis of data, case selection, create derived data and file reshaping. SPSS is used to run data for Frequencies, cross tabulation, Descriptive Ratio Statistics, Bivariate Statistics, Analysis of variance - ANOVA, means, correlation, nonparametric tests, Numeral outcome prediction (Linear regression), Prediction for identifying groups (Cluster analysis (K-means, two-step, hierarchical) and factor analysis. It is a full package software programme which can provide a simple solution for the researcher to explore the complex statistical data in a descriptive method through the presentation of data in numerical forms such as scatter plots, pie diagrams, histograms etc. (Bala, 2016). To run the SPSS programme requires some technicalities, these include coding of the data, recoding in the data and variable views, proper labeling of the variables and running of the analysis.

.   Statistics helps the students in making predictions and generalising about phenomena represented by the data; summarising and exploring data and planning and carrying out research studies(Mohamed et al., 2012). SPSS supports students understanding of data coding, inputing and exploiting of both descriptive and inferential Statistics suing statistical software; graphs and figures creation and manipulation ; handle statistical data analysis and export the results of analyses (Noraidah, et al., 2011). Introducing SPSS in the

teaching and learning of Statistics will reduce the needs for hand calculation and overstretch of the brain, help the students to move from theory to practical, enhance the potentials of the students to acquire statistical skills within a very short period of time, enhance the performance of the lower percentile students, provides hands on activities, support cooperative learning, provide active learning, constructive learning experiences and produce greater peer interaction and increase the students' motivation and understanding.

Critics of this method are of the opinion that it wastes students time while trying to master the steps involved in running the package(Lancaster & Tishkovskaya, 2012). . Sometimes, the processes involved in the package are just too many and students with phobia for computer might not find the usage of SPSS in teaching Statistics very interesting. Despite this, some researchers are of the opinion that using a statistical package such as SPSS can overcome some of the difficulties faced by the students in understanding of statistical concepts. Over time, the traditional methods of teaching Introductory Statistics generally have been viewed as being ineffective because some students have not been able to link the knowledge gain in the Statistics class to practice in the real world. Also, the level of anxiety developed by the students and students fail ratio have been of concern to many academics and makes researchers to call for adoption of a method that will reduce students' anxiety, students' failure rate and as well establish a clear link between Statistics and its uses in the real world this SPSS has potentials of filling. Teaching Statistics in Social Studies using SPSS would be one of the ways of enhancing student's knowledge about Statistics (Larwin & Larwin, 2011).

The result of the students taking Statistics in Social Studies could improve using Statistical Packages for Social Sciences (SPSS). The results of 200 level Social Studies students at Tai Solarin University of Education, Ijebu-Ode showed that in 2015/2016, 40% of 263 second year Social Studies students obtained B or lower, while 45.63% failed the course. This raised a lot of concern among the lecturers who taught the course Introduction to Statistics in Social studies. Several questions were raised on the unsatisfactory results obtained by the students in Statistics in Social Studies over time despite the fact that one of the entry requirements for students' admission is a credit in mathematics and their exposure to introduction to Statistics in their first year as a social science student. This study was carried out to assess the attitude of second year social studies students in 2018/2019 and 2019/2020 session towards the application of SPSS in teaching Statistics as a course in social studies.

The major theory that supports this study is found in experiential learning theory. Experiential learning is the process whereby knowledge or skills is obtained through transformation experience and this learning is acquired through action, experience, discovery, and exploration (Kolb, 1984; Northern Illinois University, 2011; Salandanan, 2012). Dewey popularized the concept of Experiential Education which focuses on problem solving and critical thinking rather than memorization and rote learning. Instruction in experiential learning is designed to engage students in direct experiences which are tied to real world problems and situations in which the instructor facilitates rather than directs student progress (University of California, 2011). When students are engaged in activities such as using computer packages in solving statically, they will be more motivated to learn when they have a personal stake in the subject rather than the teacher using manual method to teach them. Effective learning package should be able to transfers abstract teaching and learning into more meaningful learning situations this where the using of Statistical Package for Social Science and experiential learning meets. Experiential learning changes the role of the teacher from being a transmitter of knowledge to being a facilitator of knowledge acquisition to achieve more systematic, effective learning outcome (Gross & Rutland, 2017).

Several studies on attitudes of students towards learning statistics have revealed that students showed a highly positive attitude in making necessary efforts to understand the subject better (Mohamed et al., 2012); majority of students had moderately positive attitudes towards learning statistics (Nimehchisalem, Ashari & Jahedi, 2018) and a significant increase in the cognitive aspects of learning statistics after using SPSS but there is a significant decrease in achievements and (Jatnika, 2015). León-Mantero et al., 2020) examined the analysis of attitudinal components towards Statistics among students from different academic degrees. The results showed higher scores, in instrumental components (cognitive and social components). Peiro-signes, Segarra-ona and Garcia-Diaz, (2020) assessed attitudes towards statistics in secondary education. Finding indicated that self-confidence and motivation are important factors in these recipes, but there are no single necessary conditions that ensures lower level of anxiety.

Attitude of the students towards teaching Statistics in Social Studies has always been on low web. Students have in most cases continued to struggle in Statistics related courses in social studies because of their perception and tagging of Statistics as a difficult course. Over the years, the teaching of Statistics related courses in social studies has been based on theoretical approach –manual calculation with the lecturer calculating manually on the chalk board and students watching him. The introduction of Statistical Package for Social Sciences and its adoption in many academic fields has made the teaching and learning of Statistics in

social science related courses less strenuous. Despite the adoption of SPSS in other fields not much has been done in adopting SPSS for teaching by social studies teachers and assessing social studies student's attitudes towards its adoption in social studies classroom in Nigeria. This study examined the attitude of pre-service social studies teachers towards the adoption of SPSS in teaching statistical related courses in social studies in teachers' education institution.

Objectives

The study sought to address the following objectives;

1. Examine the attitudes of Social Studies students towards the adoption of SPSS packages in teaching Statistics.
2. Assess the perceptions of Social Studies students towards the adoption of SPSS packages in teaching Statistics based on gender.

Research Questions

The research questions were as follows;

1. What were the attitudes of pre-service social studies teachers towards the adoption of SPSS packages in teaching Statistics in Social Studies?
2. What effect does gender have on Pre-service Social Studies teachers attitudes towards the adoption of SPSS packages in teaching Statistics in Social Studies?

Method

The study employed descriptive survey research design. The population for the study consisted of 200 level Social Studies pre-service teachers in faculty of education of a public tertiary institution in Ogun state. Two hundred and thirty-three (233) students were selected to form the sample for the study using stratified sampling technique. The main instrument used to obtain information for the study was a sixteen (16) items questionnaire titled "Attitude of Pre-service Social Studies Teachers Towards the Application of SPSS Questionnaire" (APSSTASQ). The content and face validity of the questionnaire was established by presenting two copies of the draft questionnaire to two experts in the field of test and measurement for further scrutiny and modification. This was to ascertain the suitability of the instrument in terms of language, presentation, clarity, and applicability. Based on their comments necessary modifications were made. Also, a field trial of the instruments was trial tested among the randomly selected faculty of education students outside the area of study. Cronbach Alpha was used to determine the reliability coefficient of the instrument which was found to be 0.80. Data collected were coded and analysed using descriptive and inferential Statistics.

Results and Discussion

Research Question 1: What are the attitudes of pre-service social studies teachers towards the adoption of SPSS packages in teaching Statistics in Social Studies?

Table 1: Distributions on the opinion of the respondents on attitudes of pre-service social studies teachers towards the adoption of SPSS packages in teaching introduction to Statistics in Social Studies.

S/N	Items	N	Mean	SD	Remarks
1.	Using SPSS make Statistics to be very easy.	233	3.31*	.595	Agree
2.	Adoption of SPSS changes my view about Statistics.	233	3.10	.621	Agree
3.	I always want to attend class when SPSS package is used for Statistics lesson.	231	3.06	.680	Agree
4.	Adoption of SPSS made Statistics class to very Interesting	233	3.07	.675	Agree
5.	My phobia for computer did not make me to enjoy SPSS classes	233	2.04	.733	Disagree
6.	Class is always very dull during Statistics when using SPSS	233	1.96*	.675	Disagree
7.	The steps in SPSS package make it very difficult and uninteresting	232	2.25	.766	Disagree
8.	SPSS adoption will not allow for deep knowledge of Statistics as the students won't know how the package arrives at the end points.	229	2.20	.684	Disagree
9.	Using manual calculation will be more beneficial to the students than adopting SPSS packages.	214	1.77*	.979	Disagree
10.	SPSS helps to break gender barrier in learning Statistics.	229	3.00	.719	Agree
11.	Knowledge of Statistics using SPSS gives me self confidence	232	3.07	.620	Agree
12.	SPSS helps in covering a lot of course outline at a very short period	233	3.19*	.669	Agree
13.	Adoption of SPSS has reduced my anxiety about Statistics	232	2.94	.691	Agree
14.	Learning Statistics using manual calculation is better than using SPSS package	232	2.08	.740	Disagree

15. The steps in SPSS are too many and sometimes confusing	233	2.54	.809	Agree
16. I prefer SPSS packages for Statistics class than manual calculation	233	3.13	.714	Agree
Average grand total		2.65		

Table one above shows the opinion of the respondents on the attitude of pre-service Social Studies teachers in the application of SPSS package in teaching Statistics. The highest mean score in the distribution above was recorded by item 1 which stated that using SPSS makes Statistics to be very easy mean = 3.31 (SD = .595). This is followed by item 12 which stated that SPSS helps in covering a lot of course outline with the mean score of 3.19 (SD .669) and item 16 which stated that I prefer SPSS packages for Statistics class than manual calculation with the mean score of 3.13 (SD = .714). The lowest mean score in the distribution is recorded by item 9 which stated that using manual calculation will be more beneficial to the students than adopting SPSS packages with the mean score of 1.77(SD=.979). followed by item 6 which stated that class are always very dull during Statistics when using SPSS with the mean score of 1.96 (SD = .675). The average mean score of 2.65 showed an average attitude of Social Studies pre-service teachers towards the adoption of SPSS packages in teaching Statistics.

Research Question 2:

What effect does gender have Pre-service Social Studies teachers attitudes towards the adoption of SPSS packages in teaching Statistics in Social Studies?

able 2: Distributions on gender effects on the attitude of pre-service Social Studies teachers towards the adoption of SPSS packages in teaching Statistics in Social Studies?

Gender	N	Mean	SD	t	df	Sig
Male	61	43.66	3.932	3.059	228	.002
Female	169	41.93	3.705			

The result of the t-test showed no gender influence in the attitude of students towards Statistics using SPSS. The outcome is significant at (.002 < .05) (t =3.059, P < .005).

Discussion

The results of the respondent's opinion on the pre-service Social Studies teachers attitude towards the adoption of SPSS packages in teaching Statistics in Social Studies showed that students demonstrated positive posture towards the teaching of Statistics in Social Studies using SPSS. This finding is supported by the findings of Mohamed et al., (2012)

and Jahedi (2018) who found positive attitude of students toward learning of Statistics using SPSS.   This finding might be due to the fact that the students are used to using computer in teaching and learning as they have been doing examination using Computer Based Test (CBT) and interacting with computer is very interesting to them. The slight mean average might also be due to the fact that teaching Statistics through SPSS package is new to the students, and they needed time to change their perception about the advantages of using SPSS package in teaching Statistics.

The result of research question two on gender influence on pre-service Social Studies teachers' attitude to the adoption of SPSS package in teaching Social Studies showed no significant influence based on gender.   This finding agrees with the findings of Simutenda and Allan (2018) who found no gender difference in the performance of students using SPSS to teach Statistics. This might be due to the fact that the students are given equal opportunity and application of computer software in learning which leveled initial anxiety the female have for Statistics.

Recommendation

1. Teachers of Statistics in Social Studies should endeavor to introduce the use of Statistical Packages for Social Science in teaching Statistics.
2. Students should be given equal opportunity such application of computer and other instructional packages to reduce the gender phobia ascribed to Statistics.
3. Schools should encourage students to engage in constant practice by providing necessary infrastructure needed to incorporate new technology to teaching and learning.
4. Institutions of learning should have adequate facilities such as computer with different instructional packages that can help to improve the performance of students in different field of learning.

Conclusion

Learning is undergoing different dimension of changes and the introduction of digital equipment and software in teaching and learning is the current trends in the field of education. Application of Statistical Package for Social Sciences will help to reduce anxiety that is attached to learning of Statistics, improves the attitude of students towards learning of Statistics and help to enhance learning outcome of the students in Statistics.

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