The Effect Of Educational Practices On Nigerian Tertiary Students' Performance In Statistics

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ABSTRACT

The study focused on effects of educational practices on tertiary students' performance in statistics. The study aimed at examining the existing relationships between educational activities and affairs, which affects performance of students in statistics. The study adopted a case study research design. The population of the study comprised students of Obafemi Awolowo University, Ile-Ife. The sample of the study was 100 students from five Faculties in Obafemi Awolowo University, Ile-Ife. The sampling technique used was simple random sampling. A self-designed questionnaire was developed and administered to the randomly selected departments for the data collection. The research instrument used for this research was validated by the researcher's supervisor. The questionnaire was personally administered by the researcher. The data obtained was analyzed using descriptive statistics. The findings revealed that majority of the students 90(90%) agreed that there is relationship between teaching method and tertiary students' performance in statistics, 89(89%) of the respondents agreed that correlation exists between outcome of assessment using distributed practice homework and massed practice homework. The study also revealed that majority of the students 82(82.0%) believed that teacher's characteristics affect students' performance in statistics. It was also discovered that a good number of students 74(74%) attested to it that there is significant effect of institutional constraint on performance of students in statistics. The study concluded that there are significant effects of educational practices on the performance of tertiary students in Statistics.

Keywords: Tertiary Students; Educational Practices; Statistics Education; Performance; Statistics.

INTRODUCTION

In a nation with dynamic growing population, the knowledge of Statistics is not only important but applicable in every spheres of the nation. The application of the any acquired knowledge generates commensurate changes which can help improve the quality of the people, society or organization in which it is applied. This is why Statistics is very germane to be studied as a discipline. But compared with other disciplines like Physics, Chemistry, Biology, Agricultural Sciences, Law, among others, Statistics Education is more recent in Nigeria. But it is a reputed discipline in some of the developed nations of the world. According to [1], Statistics Education emerged from two main disciplines: Statistics and Mathematics Education.

However, there is a wide discrepancy in its relevance popularity in some developed countries of the world when compared with its current low standard value in Nigeria. Nigeria is a developing country statistics education in Nigeria is also in its developing stage. The adaptation of statistics education to national needs is inadequate   poor, which consequently leads to employment problems for statistics graduates. This problem could be traced to inability of the custodians in the field of Statistics Education distinctly from Mathematics Education.

In 2002, Garfield and her colleagues in the University of Minnesota, USA began to offer a new area of concentration in Statistics Education that includes course work on teaching Statistics as well as on current research on teaching and learning Statistics. As a matter of fact, Statistical learning should start at earlier stages especially at the secondary school level. In other words, an excellent Statistics educator must not only teach students what Statistics does, but also what it means how it can be applied. Major Universities in Nigeria now offer Master degrees in Statistics, but Statistics is taught at a theoretical level, rarely connected to real world applications unlike in the developed countries. The most important challenge in Statistics Education is to connect Statistical thinking with real-world applications at every level.

Statistics Education is more a recent discipline with peculiar features ([2] in [1]). The knowledge of Statistics Education its multifaceted relevance in human enterprises is a widespread phenomenon in the 1st and 2nd World countries. But in most of the developing countries of the world, including Nigeria, the discipline under study is at its developing stage. Similar to disciplines like Physics, Law, Geology, Accounting, among others, Statistics Education is affected by some educational practices which in turn influences the teaching learning of Statistics, consequently affects the performances of the students.

[3] cites "exponential increases in the amount data the need for graduates and undergraduates to be able to make inferences about the world from data". The report also pointed out questions on whether Calculus is a relevant prerequisite course for STEM undergraduates.

There are several findings which show that several factors affect the academic performance of students at all levels of formal education. These factors could be learners' family background, socio-economic status of the parents, genetic endowment, classroom environment, influence of ICT, instructional materials among others. Little emphasis is placed at present on the influence of educational practices which immensely influence the academic performance of students in their academic affairs.

STATEMENT OF THE PROBLEM
Various works have been carried out by scholars in the field of Statistics and Mathematics education to examine the existing relationships between various factors affecting the effective learning of Statistics. For instance, researchers have found out that some teachers find it difficult to change their teaching beliefs ([4]). It was discovered in some studies on the relationship between teaching beliefs practice that instructors' beliefs often drive their teaching practices. The need to critically examine the effects of some practices in education which affects performances of tertiary students in the discipline of Statistics, hence the study.

PURPOSE OF THE STUDY
The aim of this study is to examine the effects of educational practices on student's performances in Statistics as a discipline of study in Obafemi Awolowo University, Ile-Ife. To ensure this, it will be of utmost importance to find out if there is any correlation between educational practices the students' performance in Statistics. The specific purpose of this study is to
- establish the bond of relationship between teaching students' performance in Statistics;
- examine the correlation between outcome of assessment in Statistics using Distributed Practice Mass Practice homework;
- determine teacher Institutional characteristics constraints on students' on students' performance in Statistics;

- discover the significance of teaching belief on learning, consequently, on students' performance in Statistics.

RESEARCH QUESTIONS

1. Is there a relationship between teaching method the performance of students in Statistics?
2. Does correlation exist between outcome of assessment using Distributed Practice homework Mass Practice homework?
3. Does the teacher's characteristic affect the students' performance in Statistics?
4. Is there any significant effect of institutional constraints on the performance of students in Statistics?

RESEARCH METHODOLOGY

The study employed a cluster sampling method. The population comprised students of the Obafemi Awolowo University, Ile-Ife. The sample involved one hundred students from Departments of Mathematics, Demography and Social Statistics, Computer Science, Accounting, among others. They were selected using simple random method. The research made use of questionnaire. Each section of the questionnaire has 10 items each, which constitutes 40 items in total. The respondents are implored to respond to each item using the Likert method of Strongly Agree (S.A), Agree (A), Strongly Disagree (S.D), Disagree (D) Undecided (U). All the data gathered for this study were obtained primarily using questionnaires which were stratified into 5 sub-units. The data collected for the study is analyzed using frequency counts and simple percentage.

RESULTS AND DISCUSSION

This section presents the results drawn from the data collected. The socio-demographic characteristic of the respondents is provided in Table I:

Table I revealed that 44(44%) of the respondents were within the age bracket of 19-22 years, 36(36%) were within the age bracket of 23-26, 12(12%) were within the age bracket of 27-30 years, 5 were within the age bracket of 15-18 years while 3 were within the age bracket of 31-33 years. Also from the table above, 46(46%) of the respondents were in 300 Level, 39(39%) were in 400 Level, 12(12%) were in 200 Level while 3(3%) were in 100 Level. On departmental level, the table showed that 44(44%) respondents were from Demography and Social Statistics, 31(31%) of the respondent were from Mathematics, 6(6%) were from Accounting, 4(4%) of the respondents were from Computer Engineering, 3(3%) were from Mathematics/Integrated Science while 12(12%) of the respondents were from other departments. It was also revealed that 66(66%) male respondents 34(34%) female used in the study.

Table I: Socio-Demography Characteristics of the Respondents (n=100)

SN	VARIABLES	F	%
1	AGE		
	15-18	5	5
	19-22	44	44
	23-26	36	36
	27-30	12	12
	31-33	3	3
2	LEVEL		
	100	3	3
	200	12	12
	300	46	46
	400	39	39
3	DEPARTMENT		
	Mathematics	31	31
	Demography Social Statistics	44	44
	Mathematics/Integrated Science	3	3
	Computer Engineering	4	4
	Accounting	6	6
	Others	12	12
4	SEX		
	Male	66	66
	Female	34	34

Research Question 1: Is there a relationship between teaching methods the students' performance in Statistics?

Table II: Teaching methods Students' Performance

− `Items	Strongly Agree		Agree		Disagree −		Strongly Disagree		Undecided	
	F	%	F	%	F	%	F	%	F	%
Students do not learn well when teacher does not give room for students' participation.	42	42	48	48	7	7	1	1	2	2
Effective learning will be fostered when teacher utilizes most of the time stipulated for instruction	27	27	53	53	12	12	8	8	-	-
Statistics is difficult to learn because I don't always have time to ask question in areas of difficulty during teaching/learning process	21	21	29	29	26	26	21	21	3	3
My knowledge is widened when i have privilege to interact meaningfully with the teacher of Statistics during teaching/learning process	57	57	32	32	4	4	7	7	-	-
My performance in past statistics courses are traceable to opportunity i have to actively participate during statistics class	39	39	42	42	11	11	6	6	2	2
There is no difficulty learning statistics when students are carried along during teaching/learning process	46	46	43	43	7	7	3	3	1	1
Most of the average performances had in Statistics courses were due to poor teaching methods	32	32	28	28	18	18	15	15	7	7
Methods used by the teacher, to great extent determines the performance of tertiary students in Statistics	49	49	40	40	4	4	7	7	-	-

Table II is the descriptive analysis result to research question one. From the Table, 42(42%) of the respondent strongly agreed, 48(48%) respondents agreed, 7(7%) of the respondents disagreed, 1(1%) respondent strongly disagreed, while 2(2%) of the respondents were undecided to item one on the Table. To item 2 on Table II, 27(27%) of the respondents strongly agreed, 53(53%) agreed, 12(12%) disagreed, while 8(8%) of the respondents agreed. To the third item, 21(21%) of the respondents strongly agreed, 29(29%) of the respondents agreed, 26(26%) of the respondents disagreed, 21(21%) of the respondents strongly disagreed while 3(3%) of the respondents were undecided. 57(57%) of the respondents strongly agreed that their knowledge is widened when they were given privilege to interact meaningfully with the teacher of Statistics during teaching/learning process.

Also, 39(39%) of the respondents strongly agreed that their performance in past statistics courses were traceable to opportunity they have to actively participate during statistics class, 42(42%)of the respondents agreed to it, 11(11%) of the respondents disagreed, 6(6%) of the respondents strongly disagreed while 2(2%) of the respondents were undecided. 46(46%) of the respondents strongly agreed that there is no difficulty learning statistics when students are carried along during teaching/learning process, 43(43%) of the respondents agreed, 7(7%) of the respondents disagreed, 3(3%) of the respondents strongly agreed, while 1(1%) of the respondents was undecided.

The table also revealed that 32(32%) of the respondents strongly agreed that Most of the average performances had in Statistics courses were due to poor teaching methods., 28(28%) of the respondents agreed, 18(18%) of the respondents disagreed, 15(15%) of the respondents strongly disagreed while 7(7%) of the respondents were undecided. 49(49%) of the respondents strongly agreed that the methods used by the teacher, to great extent determines the performance of tertiary students in Statistics, 40(40%) of the respondents agreed, 4(4%) of the respondents disagreed, while 7(7%) of the respondents strongly agreed.

Research Question 2: Does correlation exist between outcome of assessment using Distributed Practice homework Mass Practice homework?

Table III is the descriptive analysis of the response to the research question 2. 33(33%) of the respondents strongly agreed that they do better solving questions on a topic at a go, 56(56%) of the respondents agreed, 4(4%) of the respondents disagreed, while 3(3%) of the respondents were undecided. Also, 36(36%) of the respondents strongly agreed that they like to the problems on similar concepts within a topic, 54(54%) agreed, 5(5%) of the respondents disagreed, 4(4%) of them strongly agreed, while 1(1%) of the respondents was undecided. Furthermore, 34(34%) of the respondents strongly agreed that they master the concepts if the practices on it are spread across wide range of topics, 52(52%0 of the respondents agreed, 7(7%) of the respondents disagreed, 5(5%) of the respondents strongly disagreed, while 2(2%) of the respondents were undecided. Also from the table, 20(20%) of the respondents strongly agreed that their performance is invariant in any form of practice used in assessment in Statistics, 42(42%) of the respondents agreed, 14(14%) of them disagreed, 17(17%) of the respondents strongly disagreed, while 7(7%) of the respondents were undecided.

Table III: Correlation between outcome of assessment of Distributed Practice homework and Mass Practice homework?

− `Items	Strongly Agree		Agree		Disagree		Strongly Disagree		Undecided	
	F	%	F	%	F	%	F	%	F	%
I do better solving questions on a topic at a go	33	33	56	56	4	4	4	4	3	3
I like to the several problems on similar concepts within a topics	36	36	54	54	5	5	4	4	1	1
I master the concept better if the practices on it are spread across wide range of topics	34	34	52	52	7	7	5	5	2	2
My performance is invariant in any form of practice used in assessment in Statistics	20	20	42	42	14	14	17	17	7	7
I tend to forget Statistical concept once i have been assessed	22	22	26	26	24	24	25	25	3	3
Both of the method of assessment should promote students performance in statistics	28	28	49	49	16	16	4	4	3	3

In addition, 22(22%) of the respondents strongly agreed that they tend to forget Statistical concept once they have been assessed, 26(26%) of the respondents agreed, 24(24%) of the respondents disagreed, 25(25%) of the respondents strongly disagreed, while 3(3%) of the respondents were undecided. Likewise, 28(28%) of the respondents strongly agreed that both of the method of assessment should promote students' performance in statistics, 49(49%) of the respondents agreed, 16(16%) of the respondents disagreed, 4(4%) of strongly disagreed, while 3(3%) of them were undecided.

Research Question 3: Does the teacher's characteristic affect the students' performance in Statistics?

From Table IV, 89(89%) of the respondents supported that educational level of teacher contributes to students' performance in statistics while 11(11%) said it is false. Majority of the respondent also ticked "true" supporting that the teaching experience of the teacher contributes significantly to tertiary students' statistics performance while 11 respondents ticked "false". 79(79%) of the respondents said it is true that allocated time for Statistics examination is too small while 21(21%) of the respondents said it is false. On teacher's mastery of the subject matter, 44(44%) of the respondents ticked "true" while 56(56%) of the respondents do not support the statement.

Table IV: Teacher's Characteristics on Students' Performance in Statistics

– `Items	– True		– False	
	F	%	F	%
Education level of teacher contributes to students' performance in statistics	89	89	11	11
The teaching experience of the teacher contributes significantly to tertiary students' statistics performance	89	89	11	11
The time allocated for Statistics examination is too small	79	79	21	21
Teacher's mastery of the subject has nothing to do with student's performance in Statistics	44	44	56	56
Teacher's behaviour contributes significantly to performance statistics	89	89	11	11
Good teaching skill promotes performance of students in Statistics	95	95	5	5
Teacher's competence confidence enhances good performance in Statistics	95	95	5	5

Moreover, 89(89%) of the respondents supported the statement that teacher's behaviour contributes significantly to performance statistics, 11(11%) said it is false. 95(95%) of the respondents believed that good teaching skill promotes performance of students in Statistics but minutes percentage of the respondents do not. Lastly from the table, it is shown that 95(95%) of the respondents agreed that teacher's competence and confidence enhance good performance in Statistics but 5(5%) of the respondents said it is false.

Research Question 4: Is there any significant effect of institutional constraints on the performance of students in Statistics?

Table V is the descriptive analysis of the responses obtained to the research question 4. From the table, is it revealed that 93(93%) of the respondents ticked "yes" to the statement that tertiary institution students should have broader knowledge in Statistics than secondary school student but 5(5%) said no. 84(84%) of the respondents choose "yes" supporting the expression, "Statistics in University level is tougher than Colleges and Polytechnic Statistics level" while 16(16%) did not. Also, 80(80%) believed that policies on duration of time for Statistics do not give what Statistics demands while the remaining percentage did not. 71(71%) of the respondents supported the statement that there are no adequate materials for effective teaching of Statistics, however, 29(29%) of the respondents did not.

The table also revealed that 69(69%) of the respondents agreed that the facility available is not good enough for Statistics teaching, but 31(31%) of the respondents did not.

Table V: Institutional Constraints on Performance in Statistics

− `Items	− Yes		− No	
	F	%	F	%
Tertiary institution students should have broader knowledge in Statistics than secondary school student	93	93	7	7
Statistics in University level is tougher than Colleges Polytechnic Statistics level	84	84	16	16
Policies on duration of time for Statistics do not give what Statistics demands	80	80	20	20
There is no adequate materials for effective teaching of Statistics	71	71	29	29
The facility available is not good enough for Statistics teaching	69	69	31	31
Students are put under undue pressure during Statistics teaching evaluation session	76	76	24	24
Classroom configuration does not affect the teaching performance in Statistics	45	45	55	55

76(76%) of the respondents choose "yes" to the statement, "Students are put under undue pressure during Statistics teaching evaluation session" while 24(24%) choose "no". Table 4.5 also revealed that 45(45%) of the respondents supported the expression that classroom configuration does not affect the teaching performance in Statistics while 55(55%) of the respondents did not.

CONCLUSION

As a conclusion to this study, it is revealed that the majority of the respondents said there is relationship between teaching method and the performance of students in Statistics. This implies that teachers of statistics at various educational levels should be mindful of selecting appropriate teaching method to facilitate effective teaching/learning process. It can be also concluded that correlation exist between outcome of assessment using Distributed Practice homework Mass Practice homework. The teacher should employ both methods of assessments. Furthermore, it was concluded that the teacher's characteristic affects the students' performance in Statistics. Finally, the study concluded that there are significant effects of institutional constraints on the performance of tertiary students in Statistics.

RECOMMENDATIONS

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

- First, the curriculum for teaching Statistics should be reviewed to cater for teaching learning of Statistics from secondary school levels of our educational institutions.
- The Colleges of Education Faculties of Education I all our tertiary institutions should intensify their efforts on imparting the trainee teachers of Statistics on effective methods for teaching Statistics.
- Teachers should make room for effective participation of the learners during Statistics teaching/learning session.
- Teachers should employ both various forms of assessment to enhance mastery of Statistical concepts.
- The student performance will be improving if the administration of the college provides proper leaning facilities to the students also improve the environment of the college.
- Government should have statistics education separately from Mathematics give it due recognition, in fund allocation budget planning.
- There should be in-service training to Statistics teachers' lecturers to foster improvement teachers' proficiencies.
- The University management should provide conducive learning environment provide more lecture rooms.

- The time allocation for Statistics examination should be commensurate to the difficulty level of the problems.

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