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THE USE OF PROCESS SKILLS IN TEACHING BIOLOGY CONCEPTS ON ACADEMIC PERFORMANCE AMONG SENIOR SECONDARY SCHOOLS STUDENTS WITHIN KANO METROPOLITANT

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ABSTRACT

This study investigated the use of process skill strategy on academic performance of Senior Secondary School II Biology Students in Kano metropolitan. One Research question and one null hypothesis guided the study. A Quasi-Experimental Design with pre and posttests, experimental and control groups were adopted. One Hundred and Sixty (160) students were randomly selected from four secondary schools within the research site. An instrument known as Biology Achievement Test (BAT) with reliability coefficient of 0.87 was used for data collection. The experimental group was exposed to teaching of biology concept using a particular process skill teaching method as Practical-oriented Instructional Strategy (PIS), where every lesson is accompanied with practical activities, while the control group was exposed to traditional method of teaching. The data collected were analyzed using mean, standard deviation and t-test statistics at $P \leq 0.05$ levels of significance. The result showed that students exposed to process skill using practical-oriented instructional strategy performed superior than those exposed to traditional lecture method. This finding recommended among other things that teachers should be trained on how to use process skills strategy in teaching biology concepts by engaging them to attained training, seminars, and workshops conferences. There is also need to adopt the method of student centered teaching method as they are exposed to practical activities they equally enquire and find solution to a given problem.

Keywords: Process skill, practical – oriented instruction strategy, Performance

INTRODUCTION

Biology as a science subject involves the use of process skills and different pedagogies to bring about meaningful learning to the students. However, there appears to be a continuous annual meager performance of students in public examinations (Okebukola, 2006). Alarming reports still continue to come out from examination bodies like WAEC and NECO concerning performance in sciences despite various educational improvement efforts. One of such factors is the approach used during deliberation of lesson (Olorukooba and Lawal, 2010). Sambo and Eriba (2012) asserted that there has been consistent decline in the performance of students in public examinations conducted by WAEC and NECO in science across the country over the years. As important as the subject is, students are failing at an alarming rate as shown in the report from WAEC result of 2013-2017 in Table 1.

Table 1: WAEC Result Analysis 2013-2017

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Year	No. of students that sat for Exams	No. of students that passed (A1-C6)	% passed	No failed (D7-F9)	% failed
2013	1675224	819390	49	855834	51
2014	1543683	555726	36	987957	64
2015	1692435	529732	31	1162703	69
2016	1593442	544638	34	`1048804	66
2017	1544234	597310	39	946924	61
Total	**8049018**	**3046796**		**5002222**	

Source: WAEC Office, Kano (2017)

An analysis of the students' performance above indicated that the total students with D7-F9 over a period of five years are 5,002,222 representing 62%. While those that have passed for the same period of time with grade between A1-C6 were 3,046,790 representing 38%. The low performance could be attributed to the teaching strategy employed. In another report by Ndioho, (2005) opined that the use of traditional lecture method approach by science teachers has a great negative impact on the students performance. For several years reports from expert panels have called for improvements in Science Technology Engineering and Mathematics (STEM) education and the use of process skill. This is one of the reasons why researchers are calling for a paradigm shift from behavioral learning approach such as the conventional teaching method which encourages rote learning to a constructivist approach that will explore all cognitive domains to the students and encourage their activeness so as to make best use of their academic performance.

The use of process skill practical-oriented instructional strategy take in conceptual understanding of subject matter, scientific reasoning skills, laboratory manipulative skills and a better understanding of natural science research. It is of significant for students to gain understanding of, and experience in several aspects of scientific research through the use of practical-oriented instructional strategy in teaching. Students should be allowed to contribute actively in all concepts taught by the teacher, for this reason, process skill practical-oriented instructional strategy gives opportunity for direct interactions between learners and their instructors, this reason justify the research.

OBJECTIVES OF THE STUDY

The objective of the study is to: Find out the difference in the mean score of SS II Biology Students exposed to process skill practical-oriented instructional strategy and those exposed to traditional lecture teaching method.

RESEARCH QUESTIONS

The following research question guided the study:

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- What is the difference in the mean score of SS II Biology students exposed to process skill practical-oriented instructional strategy and those exposed to traditional lecture teaching method?

HYPOTHESES

The following null hypothesis was tested at $P \leq 0.05$ levels of significance.

- There is no significant difference between the mean score of SS II biology students exposed to practical-oriented instructional strategy and those exposed to traditional lecture method.

METHODOLOGY

The experimental research design employed for the study was Quasi-experimental design with pretest (O_1) and posttest (O_2) design, experimental (EG) and control (CG) groups. Integral classes were randomly assigned to experimental and control groups. Both groups were given pretest and posttest treatments.

EG----------O_1----------X_1----------O_2
CG----------O_1----------X0----------O_2 **Fig:**
1. Illustration of a Research Design.
Source: Adapted from Mamman (2013)

Key:	EG -----Experimental Group	CG ----- Control Group
	O_1 ------ Pretest	O_2 ------ Posttest
	X_1 -------Treatment	X0 ------ Untreated

The population of the study comprised of all the SS II Biology students within Kano metropolitan. There were thirty seven Secondary Schools in the Educational Zone with a population of 9,840 students comprising 5,439 males and 4,401 females. A sample of 160 SS II Biology students was drawn from four randomly selected schools (forty students each per school). This was achieved by subjecting the four sampled schools to pretest using Biology Performance Test (BPT) and the scores were analyzed using Analysis of Variance (ANOVA) and Scheffe's test to ensure their equivalence academically. This number (160 students) is adequately enough to represent the population of the study as stated by Roscoe (1975), that a sample sizes larger than 30 and less than 500 are appropriate for most researches. Two schools were used as experimental and the other two as the control.

RESULTS ANALYSIS

The result obtained was presented below;
Research Question: What is the difference in the mean score of SS II Biology students exposed to process skill practical-oriented instructional strategy and those exposed to traditional lecture teaching method?
Mean and Standard Deviation were used to answer the question analysis was presented in Table 2.

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Table 2: Mean and Standard Deviation of Posttest Scores of Exp and Control

S/N	Groups Group	N	Mean	SD	MD
1.	Experimental	82	36.27	6.03	15.37
2.	Control	76	10.97	4.04	

Table 3: t-test Analysis of Students' Performance in Exp. and Control Groups

S/N	Group	N	Mean	SD	DF	t-Val	P-Val	Remark
1.	Experimental	72	18.20	4.05				
					137	8.142	0.000	Sig
2.	Control	68	13.75	3.01	Significant			
	at $P \leq 0.05$							

Table 3 above shows that t-value of 8.142 was obtained and the p-value observed was 0.000 at 128 degree of freedom. The P-value of 0.000 being less than the alpha value of 0.05 indicates that there is a remarkable significant difference in the mean score of experimental group over the control group. Based on the result, the null hypothesis which affirmed that there is no significant difference between the mean score of SS II Biology students exposed to process skill practical-oriented instructional strategy and those exposed to traditional lecture method was rejected.

DISCUSSIONS

The findings of research question discovered that those students exposed to process skill practical-oriented instructional strategy performed better than those exposed to traditional lecture method. The result agree with the work of Usman and Lawal (2017); Abdullahi (2009); Nwakonobi (2008). Ajayi and Osoko (2013) discovered that experimental subjects which were exposed to the practical assisted instructional strategy performed significantly better than their counterparts in the control group who were taught the same concept using the traditional lecture method. Nwakonobi (2008); and Nwagbo (2009) also found that students exposed to practical coupled with theory performed significantly better than those taught using traditional lecture method. Olagunji (2000) also discovered that there was a remarkable difference in the achievement scores of students taught using practical.

CONCLUSION

The result concluded that process skill practical-oriented instructional strategy has significant impact on students' academic performance and achievement.

RECOMMENDATIONS

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The following recommendations were drawn from this study;

1. Training, seminars and symposium should be organized to science teachers
2. Curriculum should be geared toward practical activities
3. Practical period at least 2hr per week should be assign to science subject

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