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Effect of Team Teaching on Performance in Biology Among SSII Student of Giwa Educational Zone, Zaria-Nigeria

[1]Yashim, E. Y; [2]Lawal, F. K.; [1]Dambo, D.;[4]Asuke, U.A and [1]Anele, E. U.
[1]Department of Zoology, A. B. U., Zaria
[2]Department of Science Education, A. B. U., Zaria
[3] Department of Biology, A. B. U., Zaria
[4]Department of Microbiology, A. B. U., Zaria.
Corresponding Author: Yashim, E. Y

Abstract
This study investigated the effectiveness of team teaching on performance of Biology concepts among Senior Secondary School Students in Giwa Educational Zone of Zaria, Kaduna State, Nigeria. A total of 120 students consisting of 60 females and 60 males formed the sample for the study. Purposive sampling technique was used. The subjects were divided into two groups; the experimental group N=60 and the control group N=60. The study adopted the pretest and posttest quasi experimental and control group design. A pretest was administered before the treatment to establish the equivalence of the experimental and control groups. The subjects in the experimental group were taught using Team Teaching, while the control group subjects were exposed to the lecture method for a period of six weeks. The topics taught were Variation, Genetics and Evolution. A designed Biology Achievement Test (EAT) was adopted from biology textbook questions and past WAEC examination questions with reliability of 0.98. These were validated for data collection. Two null hypotheses were tested and t-test statistic was used to determine significant difference of the two groups at $p \leq 0.05$. The major findings from the study include the following: there is significant difference in the mean academic performance scores of experimental and control groups in favour of experimental group. On the gender related issue team teaching favoured male students over the female in academic performance. Based on the findings it was concluded that senior secondary school biology students learn Biology concepts better when taught using team teaching and it was therefore recommended that team teaching should be used by biology teachers to teach Variation, Genetics and Evolution concepts and other similar concepts in biology.

Keywords: academic performance, team teaching, biology, secondary, students

INTRODUCTION

The purpose of education is not only to make students literate but also to improve their knowledge, self-sufficiency and their ability to think rationally. In any society, education is tool for growth and progress because it not only imparts knowledge, skill and right type of values, but, also builds human capital which breeds, drives and sets technological innovation and economic growth. Many advances in science and technology have helped nations to promote efficiency, self reliance and the overall wellbeing of humanity through invention/innovation in telecommunication, transportation, health and agriculture (FRN, 2004). Science education plays a vital role in the lives of individuals and the development of a nation scientifically and technologically as reported by Alebiosu and Ifamuyiwa (2008), it is widely and generally acknowledged that the gateway to the survival of a nation scientifically and technologically is scientific literacy which can only be achieved through science education.

In Nigeria, the National Policy on Education (FRN, 2004) clearly spells out the objectives of science teaching from pre-primary to tertiary level. Specifically, at the Secondary level, it entails equipping students to live effectively in our modern age of Science and Technology. It is aimed at all ages of learners of all abilities and interests. Science is a process that helps in the development of the society. The global change in science curriculum arising from knowledge explosion and new wave in science and technology development demands for qualitative science teaching.

Angelides (2006) defines co-teaching as follows: "Two teachers are jointly responsible for a class and plan teaching together, plan instruction together, share teaching duties and design collectively all teaching aids". Buseri (2010) contends that to meet up with the rapid scientific progress in technology requires the presence of well-trained, efficient, knowledgeable and skillful teachers who are versatile in discharging their duties and responsibility. The persistent poor performance of student in science subjects at School Certificate level and the studies by Achor (2003); Umoren and Ogong (2007); Ogbeba (2009) has given rise to an assumption that most science teachers in secondary schools in Nigeria probably do not make use of varied form of teaching strategies to be able to cope with some specific

difficulties associated with the teaching of science. In order words, it implies that teachers are knowledgeable in science content but not in pedagogical aspects.

In any research work in Biology Education, more attention is placed on science education; this is because biology is one of the various subjects that explain science and also in Nigeria, biology is the general basic science subject. In an attempt to ensure result oriented biology delivery in schools, Akubuilo (2004) suggested the use of activity-oriented strategies such as guided-inquiry, cooperative learning, demonstration, thinks and do, use of analogy and many others.

Biology according to Adegbite (2005) is defined as the basic science that deals with the study of living things; it attempts to understand the teeming diversity of life on earth, a diversity of level that are all part of life. Life is not a simple concept, which may be one of the reasons why the teaching of biology is important. The teaching of biology at the secondary school level is very important because the knowledge of biology helps in improving the quality of life, as it helps to solve many societal problems relating to health, poverty, food shortage, crop production and environmental conservation, as well as serve as a foundation for feature learning of professional courses like medicine, pharmacy, agriculture and the likes. The various branches of biology calls for the need to use team teaching for its effective learning as no single individual can have full knowledge of the various branches.

Team teaching in biology therefore is a process whereby a group of teachers having separate but interlinked knowledge skills, make and implement instructional decision before, during and after instruction to increase the probability of covering the scheme on time and for effective learning on the part of the students. This subject of team teaching is of great importance for students and teachers development as it stimulate proper planning and execution of the lesson to students in a more concise and intellectual capacity thereby building up the intuitive ability of the student hence preparing them for national development. As a corporate learning process team teaching encourages full participation by all individuals being exposed to the technique.

AIM

The study aims at achieving the following objectives:

1. To assess the effectiveness of team teaching strategy on academic performance of secondary school biology students in Giwa zone.
2. To compare the effectiveness of team teaching strategy on academic performance of male and female secondary school biology students in Giwa zone.

Research Hypotheses

Ho_1: There is no significant difference in the academic performance of students taught biology concept using team teaching strategy and those taught using lecture method in secondary school of Giwa zone.

Ho_2: There is no significant difference on the academic performance of male and female students taught biology concept using team teaching strategy in secondary school of Giwa zone.

METHODOLOGY

The study adopted the pretest and posttest experimental control group design. The population of the study comprise of SS II students from government secondary schools of Giwa Educational zone, Kaduna State. There are seventeen (17) senior secondary schools in the zone from this number fourteen (14) are mixed while three (3) are single schools. The total population of SS II student in the schools are two thousand four hundred and eighty six (2486) consisting of 1, 587 males and 899 females.

Purposive sampling technique was used in this study. Selection of the schools depended on the availability of the teachers, willingness of school principals and teachers to cooperate and participate in the study. Two senior secondary schools were selected from the fourteen (14) mixed senior secondary schools in Giwa, Educational Zone of Kaduna state. The schools are Government Secondary school, Bomo and Government Secondary school Basawa. A total of one hundred and twenty (120) students comprising of sixty (60) males and sixty (60) females were randomly selected and grouped for the experimental and control groups (Table 1).

Table 1: Students in the Sampled Schools

Secondary school	Males	Females	Total
Government secondary school, Bomo	30	30	60
Government secondary school, Basawa	30	30	60
Total	60	60	120

The total number of students in the intact classes used in the selected coeducational Secondary Schools were sampled. The researcher went to the two schools involved in the study and requested permission from the principals and also met with the subject teacher of the classes to solicit their assistance. Sixty (60) students comprising of equal number of males and females were drawn from each school as sample population for team teaching and were taught by two teachers ie the researcher and the biology teacher for the respective schools (Table 1).

Biology Achievement Test (BAT) was used in collecting data for the study and validated by two science teachers. The BAT consists of 30 multiple

choice objective items with four options (A - D) adapted from past examinations and questions of West African Examination Council (West African Examination Council, May/June, 2011-2015) and National Examination Council (NECO, June/July, 2011-2015).The instrument was taken through test-retest reliability procedure in order to establish that the question set were reliable. The reliability coefficient was determined using Pearson Product Moment Correlation Coefficient and the value was calculated to be 0.92, this shows that the instrument is reliable and was used for this study.

A quasi-experimental design was used for the present study to teach three (3) biological concepts using team teaching strategy. Two classes comprising of one experimental and one control group were used. It was the experimental class co-taught by a pair of teachers. The other class, considered as a control group, included thirty students who were instructed by just one teacher using lecture method, whereas in the experimental, the concepts were taught by two instructors.

From one lesson note prepared on the same concept, one of the school teachers introduced the concept while the researcher did the actual teaching. The biological concepts taught are:
Variation in living things, Genetics, and Evolution

Together the two teachers in the experimental class help in administering the Achievement Test after which the scripts were collected, marked and results recorded. Sixty (60) students were drawn from two (2) schools as sample population for small group teaching and were treated with the same topic. The researcher in each group acted as the facilitator but the actual teaching-learning process was done by the students. The teaching lasted for a period of four (4) weeks and after the four weeks of teaching, the Achievement Test was administered as post test and the scripts collected for marking and analysis.

Data collected were analyzed using means and t-test. The null hypotheses were tested at 0.05 level of significance.

RESULTS

Research question 1: What is the effect of team teaching strategy compared to lecture method on academic performance of students taught biology in secondary schools of Giwa zone?

Table 2: Performance Mean Scores of Experimental and Control Groups

Variables	N	Mean	SD	Mean difference
Experimental	60	15.68	3.59	5.95
Control	60	9.73	2.58	

Source: Field data, 2016

Table 2: shows that the experimental group who were taught using team teaching had a mean score 15.68 at a standard deviation of 3.59 which is greater than the control who were taught using lecture method had a mean score of 9.73 at a standard deviation of 2.58. The mean difference between these is 5.95. This shows that the team teaching group performed better than the control. To find out whether the difference is significant t-test was used to test for significance.

Null Hypothesis 1

Ho_1: There is no significant difference in the academic performance of students taught biology concept using team teaching strategy and those taught using lecture method in two secondary school of Giwa Zone.

To test this hypothesis the posttest mean scores of the subjects in the experimental and control groups were compared using t-test statistic Table 4.1shows the results obtained.

Table 3: t-test Analysis of the Posttest Mean Scores of Experimental and Control **Groups**

Variables	N	Mean	Variance	Df	t-cal	p-value
Esperimental	60	15.68	12.90	107	10.41	*0.00
Control	60	9.73	6.70			

Significant at $p \leq 0.05$

From Table 3, the p-value obtained is 0.00 at $p \leq 0.05$ level of significant. Therefore there is a high significant difference. The null hypothesis of no significant difference between the academic performance of the experimental and control groups is rejected. The result thus shows that team teaching is better at improving students' performance taught biology concepts than the lecture method. The mean score value of experimental group is 15.68 and for the control group is 9.73.

Research Question 2: What is the effect of team teaching on academic performance of male and female students taught biology concept in secondary schools of Giwa zone?

In answering this question tables, means and standard deviation were used to compare the performance of males and females taught using team teaching and those taught using lecture method.

Table 4: Summary of Mean scores of Male and Female Students exposed to team teaching

Variables	N	Mean	Standard deviation	Mean Difference
Male	30	16.60	4.11	1.83
Female	30	14.77	2.82	

Source: Field data, 2016

Table 4: shows that the experimental group males who were taught using team teaching had a mean score 16.60 at a standard deviation of 4.11 which is greater than the females who had a mean score of 14.77 at a standard deviation of 2.82. The mean difference between these is 1.83. This shows that the males taught using team teaching performed better than the females. To find out whether the difference is significant t-test was used to test for significance.

Null Hypothesis 2

Ho_2: There is no significant difference on the academic performance of male and female students taught biology concept using team teaching strategy in some secondary school of Giwa Zone.

Table 5: t-test Analysis of Posttest Mean scores of Male and Female Students exposed to team teaching

Variables	N	Mean	Variance	Df	t-cal	p-value
Male	30	16.60	16.92			
				29	-2.21	*0.02
Female	30	14.77	7.98			

Significant at $p \leq 0.05$

From Table 5, the p-value obtained is 0.02 at $p \leq 0.05$ level of significant. Therefore there is significant difference. The null hypothesis of no significant difference on the academic performance of male and female students taught biology concept using team teaching is rejected. The result thus shows the performance of male is significantly higher than the performance of females that were taught using team teaching. The mean score value of male is 16.60 and for the female is 14.77.

DISCUSION

The research findings showed that the average scores of students that were taught using team teaching were higher than those of students taught using lecture method. Table 4.1 showed the mean scores of the experimental group is higher than the control which is evident that team teaching delivery enhanced student's academic performance. Team teaching was reported to have increased students interest in biology due to the fact that the approach of team teaching is both student and teacher centred. The two teaching methods showed significant difference in respect of students' achievement. Most of the experimental students preferred team teaching to traditional teaching. The discrepancy between team teachers' expectations of team teaching and its implementation was apparent. The differences in the teaching strategy also exposed team teachers to challenge and being compared with each other by students in class. The time taking in compilation of lecture materials made the teachers more committed and focus since they had to check on themselves by themselves. The findings of this study is in support of the research reports of Akpan, *et al*. (2010) who reported that team teaching enhances male and female students' performance in Introductory Technology. Yanamandram and Noble (2006) examined students experiences and perceptions about two models of team teaching in Australia and found that the majority liked the concept of learning through interest in - and exposure to teamed 'experts', but learning was hindered if the team failed to link adequately.

The result also reveal a significant difference in performance of male and female students though the performance of male is significantly higher than the performance of females that were taught using team teaching (Table 4.2). This finding supports the work by Collins (2000) who describes and evaluates various team teaching models that were implemented through the Training Rural Special Educators in Kentucky through Distance Learning (TREK-DL) project at the University of Kentucky. Average grades of participating students revealed few differences between on- and off-campus students. Additionally, there were few variations in student course evaluations when comparing team-taught distance learning courses with single-instructor-taught distance learning courses. The use of team teaching appeared to be a viable option for the effective and efficient delivery of distance education coursework.

CONCLUSION

In conclusion on the findings of this study, team teaching has the potential of enhancing secondary school student academic performance of biology concepts as the:

I. Students learn biology concepts better when taught using team teaching at senior secondary level
II. Male students taught using team teaching performed higher in biology concepts than female students taught using the same strategy.

RECOMMENDATIONS

I. Team teaching is encouraged for teaching biology in senior secondary schools because students learn biology concepts better when taught using team teaching at senior secondary level
II. The teaching of biology should be encouraged for both mixed and single schools to encourage cooperate learning.
III. Team teaching is further recommended for teaching difficult and abstract topics to enhance student's performance.

LIMITATIONS

I. The study was limited to two senior secondary school of Giwa Zone, Kaduna state because of the proximity and availability of the teachers

II. The concepts taught were limited to variation, genetics and evolution because the topics were established by the researchers to be abstract and difficult for students.
III. The sample size of the students was selected based on their availability.
IV. The discrepancy between team teachers' expectations of team teaching and its implementation was apparent.
V. The differences in the teaching strategy also exposed team teachers to challenge and being compared with each other by students in class.
VI. The greatest challenge for the instructors is the time and energy required to work as a team

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