EFFECT OF PRACTICAL ACTIVITIES ON ACADEMIC ACHIEVEMENT OF SENIOR SECONDARY SCHOOL STUDENTS IN BIOLOGY IN OYE LOCAL GOVERNMENT AREA, EKITI STATE

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Abstract
This study investigates the effect of practical activities on the academic performance of senior secondary school biology students in Oye Local Government Area, Ekiti State. The study adopted the quasi-experimental pre-test and post-test research design. The population of the study comprised all the 1,455 biology students in public senior secondary schools in Oye Local Government Area, Ekiti State.The purposive sampling technique was employed to 2select two (2) schools in Oye local government area. A sample of 50 students with 25 each for the two groups was selected purposefully. Biology Performance Test (BPT) was used to collect data for the study.The instrument was subjected to face and content validity by the researcher's supervisor and experts in the field of biology education. The test-retest method was used to determine the reliability of the instrument and a reliability coefficient of 0.84 was computed using Pearson Product Moment Correlation. The data was analyzed using descriptive and inferential statistics. The descriptive statistics of frequency counts, percentages, mean and standard deviation were used to answer the research questions, while the inferential statistics involving t-test analysis, was used to test the hypotheses. All the hypotheses were tested at a 0.05 level of significance.The study revealed that there is a significant difference in the performance mean scores of male students taught using intensive practical strategy compared to their counterparts taught using conventional teaching strategy. The difference favours the male students in the experimental group having a higher performance means score than their counterparts in the control group. Also, there is a significant difference in the performance mean scores of female students taught using intensive practical strategy compared to their counterparts taught using conventional teaching strategy. The difference favours the female students in the experimental group, having a higher performance means score than their counterparts in the control group. Based on the findings, it was recommended among others, that government and school administrator should encourage teachers to engage in professional developments that would ensure the use of intensive practical strategy in schools. Also, teacher should carry both gender (male and female) along during practical class so that both genders would develop the intensive practical strategy. Teachers should adopt intensive practical strategy for biology and other science instruction in secondary school.

Key words: Biology, Gender, Laboratory, Practical activities, Academic Performance

Introduction

Practical exercises are the backbone of the biological sciences, and they are often carried out in purpose-built biology laboratories. The future of every nation including Nigeria lies in the quality of education given to the citizenry. Biology education has practical aesthetic and intellectual values and these values can only be achieved through a sound knowledge of biology. Biology is a very important subject in the field of science and also one of the science subjects at the senior secondary school and as a result of its relevance to individuals and the nation at large, it was made an elective subject for science students only in Nigerian senior secondary school (Federal Republic of Nigeria, 2013).

The science of life and how it works is known as biology.According to Taiwo and Emeke (2018), biology is the subject that introduces students to the realm of self-knowledge as well as knowledge of the near and distant environment.Biology is the science of life that studies living matter, structure, function and behaviour of organism and helps us to understand ourselves. Biology is the study of living things in different forms, their evolution, structures, functions, growth, distribution and taxonomy; and it occupies a unique position in the secondary school science curriculum. It serves as a pre-requisite to the study of other lucrative and challenging professions like medicine, nursing, pharmacology, biochemistry, agriculture among others (Olayinka, Ayanda & Adeoye, 2020). However, gender refers to one's status of either being a male or female and it has become a very important issue among researchers. It is an important factor in the learning process and in educational setting which has been focused upon because of their significance in the development of the nation (Udoh & Eton, 2018). Akanwa, Ndirika and Udoh (2018) stated that gender has no effect on student achievement in science. Gender is an important variable in science education, most especially with increasing emphasis on ways of boosting man-power for technological academic development. Gender bias is still common and sex roles are also very rigid in African countries most especially in Nigeria.According to Okeke (2010), gender is a cultural construct that is not constant but instead fluctuates based on geographic culture and social culture unlike sex which is based on biology and applies to everyone. It has been noted by Gember (2015) that the societal definitions that people attach to gender impact the manner in which an individual's everyday activities may be affected in either a favourable or negative way throughout their whole life (from birth to death). When individuals are socialized into stereotypical gender roles, they learn to identify with and behave in accordance with the expectations placed on them by their sex. Okeke (2015) observed that gender disparity could also be implicated on students' poor academic performance in biology. He maintained that, the issue of gender stereotyping cut across social economic, political and educational development. He described gender stereotyping in schools as "hidden curriculum" which send out message to girls to conform to role expectation. This has created a big psychological alienation or depression in the minds of the female students.

Tolessa& Mohammed (2016) opined that secondary school is the base for preparing students for science education and it is at this level they are supposed to be exposed to laboratory equipment, activities and precaution or safety rules for practical activities. In the Biology laboratory, students acquire the skills in handling Biology apparatus, reading scales, drawing/ diagrams, careful observation, and taking

necessary precautions (Olayinka, (2016). According to Olayinka (2016), practical work includes any activity involving students in real-life situations, using genuine materials and the proper equipment and that advocates science teachers should therefore make efforts to involve students in more practical activities so that their attitudes will improve and consequently, there will be greater achievement in science.

The teaching and learning process has taken various dimensions with a view of ensuring that the students are guided by the teacher through planned activities so that they may acquire the richest learning possible from their experiences.Ude and Onah (2017) opined that is an instructional facility used by the teacher to help students learn about science and how scientists investigate the world around them. These findings agree with that of Khan and Iqbal (2011) found similar results in Pakistan and it was observed that the students taught through the practical inquiry laboratory teaching method showed more performance in science process skills than the students of the control group taught through traditional teaching methods. The knowledge of biology makes them well-informed and motivated to assume roles in which the practical and theoretical aspects are used in unravelling some basic problems of life (Ude, 2011).

In another study, Chukelu (2010) examined the impact of hands-on Biology activities on students' development of process skills. The findings showed that engaging in hands-on activities was more practical than listening to lectures in helping students learn science process skills. There was no statistically significant interaction between the types of instruction used and the students' sex distribution.

Therefore, the study examined the effect of practical activities on the academic performance of senior secondary school biology students in Oye Local Government Area, Ekiti State.

Statement of the Problem

Despite efforts through research to improve the performance of students in biology, the teac2hing and learning of biology have continually received a lot of criticism from the society sequel to students' low performance in biology external examinations.

According to WEAC Chief Examiners' report, students' achievement in biology over the years has been erratic and judging from the years reviewed, there was never a year that students' performance at credit level reached the assumed hundred percent (100%)and this weakness was attributed to students' inability to understand some biology concepts theoretically due to inadequate exposure to practical work. Years like, 2010 (49.47%), 2011 (38.28%), 2012 (35.67%), 2013 (51.73%), 2014 (55.07%), 2015 (53.21%), 2016 (73.82%), 2017 (65.85%), 2018 (62.49%), 2019 (74.42%) and 2020 (84.65%). Poor performance of students in biology can be attributed to numerous factors, including but not limited to teachers' inappropriate instructional approaches; a lack of adequate teacher laboratory facilities; poorly organized laboratory activities; teachers' and students' lack of commitment to laboratory work; laboratories that are not well-equipped; shortage of qualified biology teachers. There is a pressing need to try new approaches to instruction. Therefore, students should independently organize their laboratory work and observe the ideas in biology classes via practical activities in the laboratory. Students learn

more and become more invested in biology as a subject when they have hands-on experiences, such as doing experiments (Watts, 2013). Some biology teachers in Nigerian secondary schools often utilize ineffective methods of instruction.It is also for this lack of practical involvement of the learners in what they are taught. The researcher sought to investigate the effect of practical activities on the academic performance of senior secondary school Biology students in Oye Local Government Area. Ekiti State.

Purpose of the Study

The purpose of this study is to investigate the effect of practical activities on the academic achievement of Senior Secondary School Students in Biology in Oye Local Government Area, Ekiti State.
Specifically, the study intends to:

1. examine the achievement mean score of students taught Biology using practical activities and those taught with the conventional method.
2. determine the achievement mean scores of male students taught using practical activities compared to their counterparts taught using conventional teaching strategy.
3. investigate the achievement scores of female students taught usingpractical activities compared to their counterparts taught using a conventional teaching strategy.

Research Questions

The following research questions guided the study:

1. What is the achievement mean scores of students exposed to practical activities and those exposed to conventional teaching strategy?
2. Is there any difference in the achievement scores of male students taught using practical activities compared to their counterparts taught using conventional teaching strategy?
3. Is there any difference in the achievementscores of female students taught using practical activities compared to their counterparts taught using conventional teaching strategy?

Hypotheses

The following research hypotheses stated in their null form were formulated from the objectives of the study;

1. There is no significant difference in the achievement mean scores of students exposed to practical activities and those exposed to conventional teaching strategy.
2. There is no significant difference in the achievement mean scores of male students taught using practical activities compared to their counterparts taught using conventional teaching strategy.
3. There is no significant difference in the achievement mean scores of male and female students taught using practical activities compared to their counterparts taught using conventional teaching strategy.

Results

Research Question 1: What is the achievement mean scores of students exposed to practical activities and those exposed to conventional teaching strategy?

Table 1: Mean and standard deviation of pre-test and post-test scores of students exposed to practical activities and those exposed to conventional teaching strategy.

Group	Test	N	Mean	S.D	Mean Diff.
Practical Activities	Pretest	25	21.56	1.21	**34.74**
	Posttest		56.30	1.26	
Conventional	Pretest	25	22.07	1.01	**11.11**
	Posttest		33.18	1.88	
Total		**50**			

Table 1 revealed the achievement pretest and post-test mean scores of students exposed to practical activities and conventional teaching strategy. The pretest mean scores of the experimental and the control group were 21.56 and 22.07 respectively. Also, the posttestmean scores of the experimental and the control group were 56.30 and 33.18 respectively. The achievement mean difference of the experimental group in biology between the pretest and posttestis 34.74 while that of the control group is 11.11. It appears that the treatment used on the experimental group yielded a higher increase in the achievement of the students in biology, as the achievement mean difference score in the experimental group is greater than the control. The graphical representation below further shows the difference between the students in the experimental and control groups.

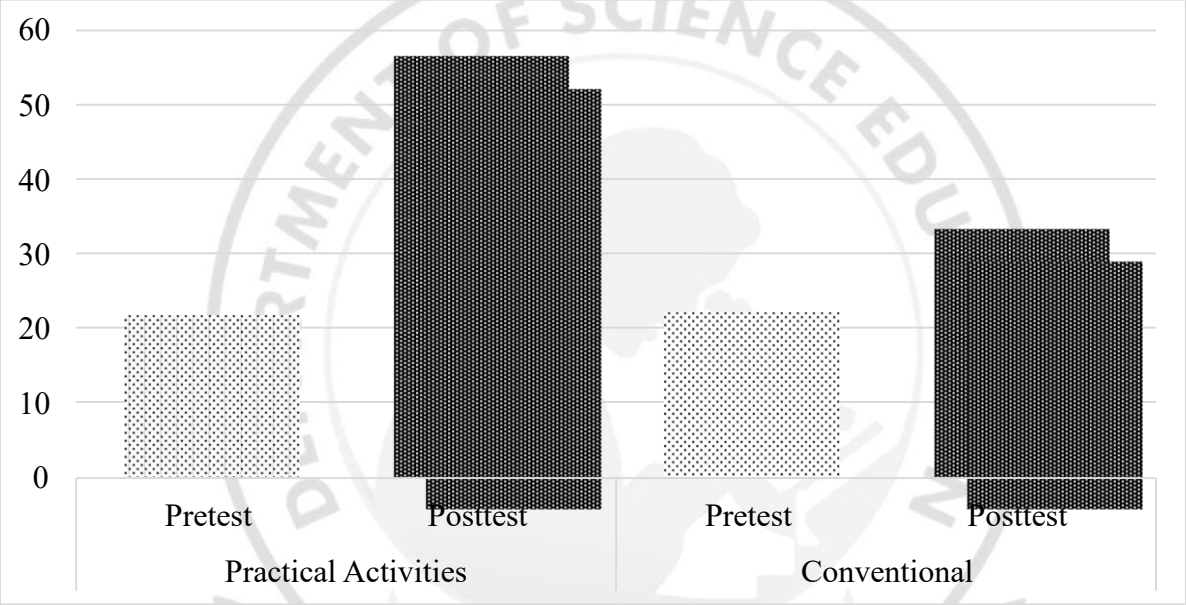

Figure 1: Bar chart showing the pretest and posttest students' achievement in the experimental and control group

Research Question 2:

Is there any difference in the achievement scores of male students taught using practical activities compared to their counterparts taught using conventional teaching strategy?

Table 2: Mean and standard deviation of post test scores of male students in the experimental and control group

Gender	Test	N	Mean	S.D	Mean Diff.
Male	Experimental	11	55.769	1.212	**24.551**
	Control	10	31.218	1.872	
Total		21			

Table 2 revealed the achievement posttest mean scores of male students in the experimental and control group. The achievement mean difference of male students in biology between the experimental and control groups is 24.551. It appears that the treatment used on the experimental group yielded a high increase in the achievement of male students in biology, as the achievement mean posttest score in the experimental is greater than the control. The graphical representation below further shows the difference between the male students in the experimental and control groups.

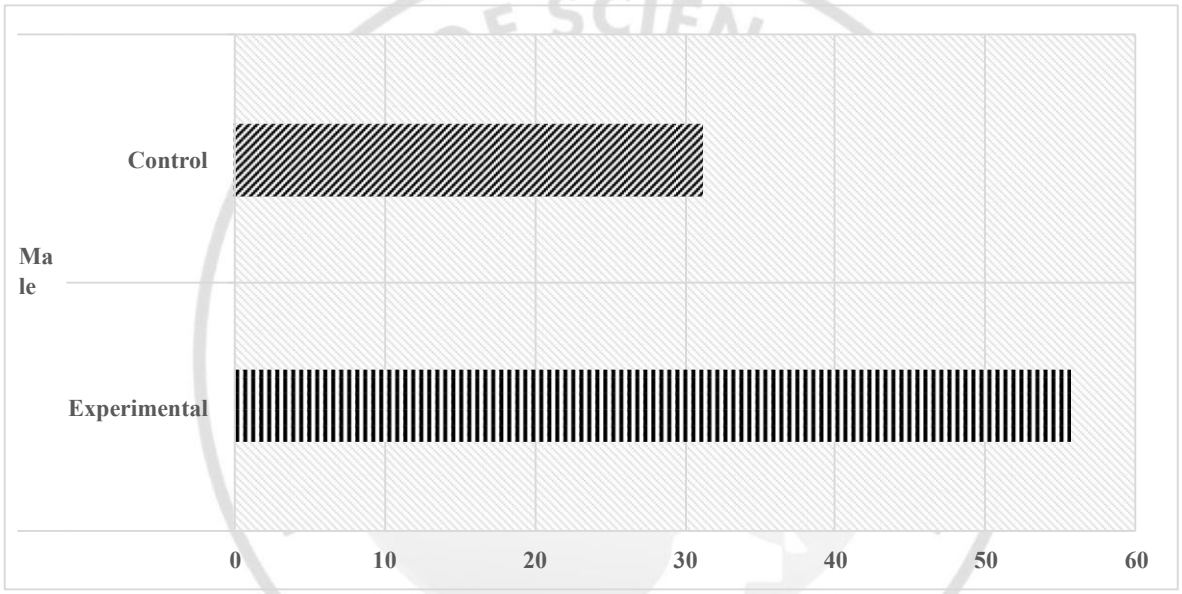

Figure 2: Bar chart showing the male students' achievement in the experimental and control group.

Research Question 3: Is there any difference in the achievement scores of female students taught using practical activities compared to their counterparts taught using conventional teaching strategy?

Table 3: Mean and standard deviation of post- test scores of female students in the experimental and control group

Gender	Test	N	Mean	S.D	Mean Diff.
Female	Experimental	14	56.821	1.312	**21.675**
	Control	15	35.146	1.895	
Total		29			

Table 3 revealed the achievement post- test mean scores of female students in the experimental and control group. The achievement mean difference of female students in biology between the experimental and control groups is 21.675. It appears that the treatment used on the experimental group yielded a high increase in achievement of female students in biology, as the achievement mean posttest score in the experimental is greater than the control. The graphical representation below further shows the difference between the achievement of female students in the experimental and control groups.

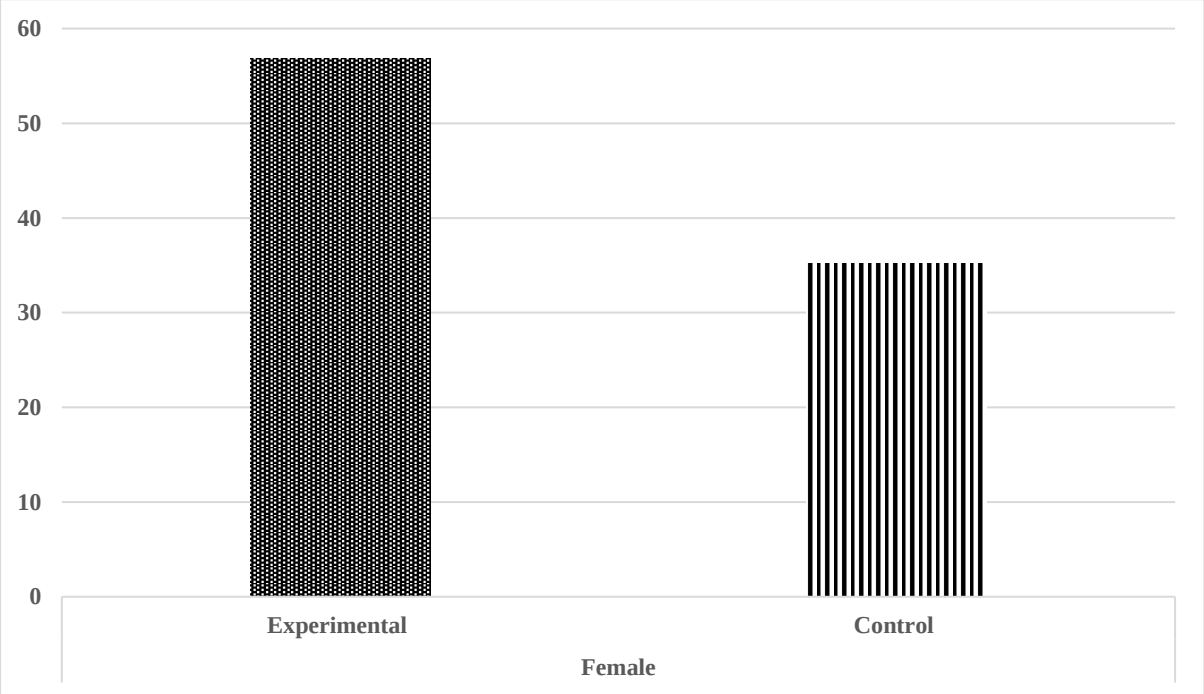

Figure 3: Bar chart showing the female students' achievement in the experimental and control group.

Hypotheses Testing

Hypothesis 1: There is no significant difference in the achievement mean scores of students exposed to practical activities and those exposed to conventional teaching strategy.

Table 4: t-test analysis for the difference in the achievement pretest and postest mean scores of students in the experimental and control groups.

Variations	Categories	N	Mean	S.D	Df	T_{cal}	P (Sig)
Pretest	Experimental	25	21.56	1.21	48	1.618	.112
	Control	25	22.07	1.01			
Po8stest	Experimental	25	56.30	1.26	48	51.079	.000
	Control	25	33.18	1.88			

*P<0.05

Table 4 shows t-test analysis of the difference in the achievementpretest and posttestmean scores of students in the experimental and control groups. It is revealed from the table that for the pretest, t_{cal}

value of 1.618 is not significant because the P-value (.112) > 0.05 at 0.05 level of significance. This implies that there is no significant difference in the achievement of students in Biology before the treatment. This establishes the homogeneity of the groups at the commencement of the experiment. Also from the table, the posttestt_{cal} value of 51.079 is significant because the P-value (.000) < 0.05 at 0.05 level of significance. The null hypothesis is rejected. Hence, there is a significant difference in the achievement mean scores of students exposed to practical activities and those exposed to conventional teaching strategy. The difference favours students in the experimental group having a higher achievement means score than their counterparts in the control group. This implies that the students taught biology using practical activities performed better than students taught using a conventional teaching strategy.

Hypothesis 2: There is no significant difference in the achievementmean scores of male students taught using practical activitiescompared to their counterparts taught using conventional teaching strategy.

Table 3: t-test analysis for the difference in the achievementmean scores of male students in the experimental and control groups

Variations	N	Mean	SD	Df	t_{cal}	P (Sig)
Male_ExperimentalMale_Control	11 10	55.769 31.239	1.212 1.872	19	35.992	0.000

*P<0.05

Table 3 shows t-test analysis of the difference in the achievementmean scores of male students in the experimental and control groups. It is revealed from the table that the t_{cal} value of 35.992 is significant because the P-value (0.000) < 0.05 at 0.05 level of significance. This implies that the null hypothesis is rejected. Hence, there is a significant difference in the achievementmean scores of male students taught using practical activitiescompared to their counterparts taught using conventional teaching strategy. The difference favours the male students in the experimental group having a higher achievementmeans score than their counterparts in the control group. This implies that the male students taught biology using an intensive practical skills strategy performed better than the male students taught using a conventional teaching strategy.

Hypothesis 3: There is no significant difference in the performance mean scores of female students taught using practical activities compared to their counterparts taught using conventional teaching strategy.

Table 4: t-test analysis for the difference in the achievementmean scores of female students in the experimental and control groups

Variations	N	Mean	SD	Df	t_{cal}	P (Sig)

Female_ExperimentalFemale_Control	14	56.218	1.312	27	34.568	0.000
	15	35.146	1.895			

*P<0.05

Table 4 shows t-test analysis of the difference in the achievementmean scores of female students in the experimental and control groups. It is revealed from the table that the t_{cal} value of 34.568 is significant because the P-value (0.000) < 0.05 at 0.05 level of significance. This implies that the null hypothesis is rejected. Hence, there is a significant difference in the achievementmean scores of female students taught using the practical activities strategy compared to their counterparts taught using the conventional teaching strategy. The difference favours the female students in the experimental group, having a higher performance means score than their counterparts in the control group. This implies that the female students taught biology using practical activities perform better than the female students taught using conventional teaching strategy.

Discussion

The study reveals that there is a significant difference in the achievementmean scores of male students taught using practical activitiescompared to their counterparts taught using conventional teaching strategy. The difference favours the male students in the experimental group having a higher achievementmeans score than their counterparts in the control group. This implies that the male students taught Biology using practical activitiesperformed better than the male students taught using conventional teaching strategy. This contradicts the findings of Harlen (2014) who attributed gender inequality in science teaching methods used by science teachers that creates wider gap in achievement. The study also reveals that there is a significant difference in the achievementmean scores of female students taught using intensive practical strategy compared to their counterparts taught using conventional teaching strategy. The difference favours the female students in the experimental group, having a higher achievementmeans score than their counterparts in the control group. This implies that the female students taught biology using practical activitiesperform better than the female students taught using conventional teaching strategy. This contradicts the opinion of Ogunleye (2014) who indicated that science achievement depends on gender. Also, the study concurs with Nzewi (2010) who posited that gender is insignificant in science achievement.

Conclusion

On the basis of the findings of this study, it is concluded that students taught Biology using practical activitiesoutperformed their counterparts taught with conventional methods. Also, the male students taught biology using practical activitiesachievedbetter than the male students taught using a conventional teaching strategy. Additionally, the female students taught biology using practical activitiesachieved better than the female students taught using a conventional teaching strategy.

Recommendations

The following recommendations were made;

1. Government and school administrators should encourage teachers to engage in professional development that would ensure the use of practical activitiesin schools.
2. The teacher should carry both genders (male and female) along during practical class so that both genders can develop the intensive practical strategy.

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