# EFFECTS OF TEAM TEACHING STRATEGY ON SECONDARY SCHOOL STUDENTS' LEARNING OUTCOMES IN BIOLOGY IN ONDO STATE

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**Abstract**
*This study examined the effects of team teaching strategy on secondary school students' learning outcomes in Biology in Ondo State. The purpose of the study was to investigate the influence of students' attitude on their academic performance in Biology. The population consisted of 20,256 Senior Secondary Schools (SSS) two students in all the public secondary schools in Ondo State and the sample of 163 Senior Secondary Schools (SSS) two students in Ondo State was selected using multistage sampling procedure. Two research instruments used were: Biology Performance Test (BPT) and Biology Students' Attitudinal Test (BSAT). Face and content validities of the instruments were ascertained by the experts in Biology, Test, Measurement and Evaluation, and Guidance and Counselling. The test-retest method was used to establish the reliability of the instruments by administering them on twenty SSS 2 Biology students from outside the sampled Local Government Areas twice at the interval of 2 weeks in Ekiti State. Scores collected from the two tests were subjected to Pearson Product Moment Correlation analysis and the reliability coefficient of 0.89 and 0.81 were obtained for BPT and BSAT respectively which were used to adjudge the instruments to be reliable. Data collected were analyzed using inferential statistics. Specifically, the research question was analyzed using mean and standard deviation while hypotheses 1 was analysed using t-test and hypothesis 2 was analysed using Analysis of Covariance (ANCOVA). The three hypotheses were tested at the significance level of 0.05.The finding showed that there was no difference in the performance of students in the two groups before the treatment which means that both groups were homogeneous. The findings of this study also showed that there was significant difference in the students' attitude in Biology before and after the treatment. The finding also showed that there was significant difference in the pre-test and post-test mean scores of students exposed to team teaching strategy and the conventional method of teaching. It was therefore recommended the use of team teaching strategy should be encouraged in Biology class in secondary schools to enhance better students' academic performance and attitude in Biology. It was also recommended that the Ministry of Education should offer professional training and re-training to Biology teachers through workshops and seminars to enhance their skills in team teaching and collaborative pedagogical practices. The training should focus on effective communication, coordination, and synergy among teachers to maximize the benefits of team teaching.*

**Keywords;** Team Teaching Strategy, Learning Outcome, Students' Attitude, Academic Performance and Biology Education

## Introduction

Science is a systematized knowledge and a process of inquiry that is geared towards understanding nature in order to improve the living standard of man. The primary focus of science is to collect data and the ultimate purpose is to discern order that exists in natural phenomena and happenings around us. Countries all over the world are striving to improve their technological know-how and this can only be achieved through a solid foundation in science and technology. Having a solid foundation in sciences entails making students to have keen

interest in Biology right from their Junior Secondary School level of education.

Science is the bedrock on which modern day technological breakthrough is hinged. Jegede and Omotayo (2011) stated that science is the systematic knowledge of the physical or material world; systematized knowledge in general; knowledge of facts and principles; and knowledge gained by systematic study. This understanding helps man to know more about the universe. The major goal of science education is to develop scientifically literate individuals that are concerned with high competence for rational thoughts and actions. Science comprises the basic disciplines such as Biology, chemistry, physics and mathematics are seen as science education courses, (Pollyn, 2012).

Science education is a field of study that required a teacher as an important figure in teaching and learning process, because he/she follows the curriculum so that throughout the year all the important knowledge is provided to the students. The main purpose of teaching at any level of education is to bring out a significant change in the behaviour of learners and mostly Biology education is seen as a science subject that is part of daily activities of human endeavor (Tebabal & Kahssay 2011). The benefits of Biology for the development of any nation are too numerous to mention, and this is because Biology plays a key role in industrialization and other sectors of the economy. It serves as a prerequisite subject for most Science and related professions like Biochemistry, Pharmacy, Medicine, Nursing, and Environmental Sciences among others.

According to Ogunleye and Bamidele, (2013), the basic knowledge and skills acquired from the subject can be of tremendous help to man and the society. He further stated that the Impact of Biology on the life of living organisms is wide; all ensuring that the required standard of living for both plants and animals are maintained. There is no doubt about the immense contributions of Biology to the economic growth and development of a nation.

Despite the utilitarian value of Biology to the development of human capacity, technological and economic development of a nation, it is observed that the performance of students in the subject has been encouraging. It is also claimed by Njoku, (2019) that Biology can sometimes be difficult particularly when describing ideas that are abstract or cannot be fully comprehended by learners for the first time. Research finding by West African Examination Council WAEC, (2010) shows that a number of concepts in Biology which include Ecology, Evolution and Genetics contains topics that pose difficulty for Biology students to understand. Ecology is an aspect of the Biology syllabus for senior secondary students (S.S.SII) must study. However, Biology is considered by many students as voluminous in nature and difficult to understand which has resulted in poor learning outcomes among students.

The researcher observed through interviewing Biology students that Biology is mostly taught with conventional method by their teachers which is seen as a strategy that is not having enough capability to make students pass credibly in both internal and external examinations. This appears to have contributed immensely to the unencouraged performances of students in the subject. However, the researcher is more posited that it is necessary to improve the performance of students in Biology in order to avoid fluctuating results at both external and internal examinations in future.

Inclusion of Biology as a core subject for students in Senior Secondary School calls for an effective teaching using various recommended strategies. Biology as a Science subject is practical oriented subject which focuses more on knowledge application than mere knowledge acquisition, its objectives as contained in the National policy on Education (FRN, 2014) includes among others are; to equip learners with meaningful and relevant knowledge of Biology, adequate laboratory and field skills, this can be achieved through effective teaching strategies.

In order to achieve creativity and overall national development, teaching strategy that captures interest of secondary school students in science concepts is imperative. Many researchers agree that the conventional method does not help students, construct their own understanding and opined that the uninspiring teaching methods adopted by science teachers lead not only to low learning outcomes in the science but also incapacitates students from developing required skills necessary for creative thinking.

The search for improved strategies for teaching and learning of science is therefore a continuous process. This seem to be basically what triggered the need for this study, and to find out whether team teaching strategy on secondary school students' learning outcomes in Biology could of tremendous assistance to students.

Team teaching can be defined as a group of two or more teachers working together to plan, conduct and evaluate learning activities for the same group of learners. Team teaching can therefore be viewed, as team work between two or more qualified instructors who together make presentations on an audience (the learners).Team teaching involves a group of instructors working purposefully, regularly, and cooperatively to help a group of students of any age learn.

Teachers set goals together for a course, design a syllabus, prepare individual lesson plans, teach students, and evaluate the results of the teaching and learning process. In other words, team teaching according to Nkechi, Lilian and Ngozy, (2015) brings together two or more colleagues working together, but sometimes also working with professional and/or administrative colleagues - to plan, conduct and evaluate the unit of study, including assessment, for the same group of students.

Team Teaching (TT) is different from Single Teacher Teaching (STT) because it involves two or more teachers each with distinctive roles, sharing responsibilities for planning, presentation and evaluation of lessons for the same group of students. Main and Wang (2010) defined team teaching as two or more teachers who combine their talents, expertise, interests and resources to take joint responsibility for any or all aspects of teaching the same students. According to Brandenbury (2011) team teaching exposes students to a variety of teaching styles and approaches, which increases the potential for the team to meet the various learning styles of students.

Teams can be single-discipline, interdisciplinary, or school-within-a-school teams that meet with a common set of students over an extended period of time. New teachers may be paired with veteran teachers. Innovations are encouraged, and modifications in class size, location, and time are permitted. Different personalities, voices, values, and approaches spark interest, keep attention, and prevent boredom.

However, while team teaching may prove advantageous for many students, some may feel frustration and

discontentment about having more than one teacher. But with proper collaboration and cohesiveness within a team, there are vital benefits for those willing to adopt team teaching approach especially in Biology classroom. Hence, Hughes and Murwaski (2011) remarked that collaboration, cooperation and interaction distinguish team teaching from single teacher teaching. Beyond the advantages of creating, additional time for other academic activities and supportive environment. It is equally an opportunity for intellectual growth, increases student's teacher interaction (Wadkins, Wozniak & Miller, 2014). Apart from adoption of appropriate instructional strategies to teach students, attitude could also be a militating factor to the performance of students in any subject especially in Biology.

Attitude is defined as a person's feeling, thought and predicts position to behave or responds in some particular manner (Lakpini 2016). Attitude seems to be an integral part in learning, it promotes or hinders teaching and learning of science. Attitude is a vial aspect of teaching and learning process that cannot be overlooked. In this regard the student's development of positive attitude is part of the teachers' responsibilities.

Attitude is an expression of like and dislikes or person's disposition towards a particular area, a discipline or an object. Such disposition is generally based on one's feelings, mood, opinion and beliefs about the idea, discipline and object. (Gadzama, 2010). Attitude is indispensable in personality formation and manifestation and it is a core aspect in the study of human behavior. It has components which are related to beliefs, feelings and the tendencies to behave in a particular way. Students who are active in the instructional process, manipulating, measuring, observing, and recording data have been found to have more positive attitudes towards science than their peers who are asked to complete a worksheet following a traditional teacher led lecture (Holstermann, Grube, & Bogeholz, 2010). Based on these foregoings, the researcher intended to investigate effects of team teaching strategy on secondary school students' learning outcomes in Biology in Ondo state.

## Statement of the Problem

Despite the importance of Biology in the school system, technological and economic development of a nation, the fact that it has been taught and learnt for several decades, students' dwindling performance in the subject is worrisome. The dwindling performance of students over the years is of great concern to science educators and to the general public. The researcher observed constant use of conventional method in teaching Biology by teachers and this make students to believe that the subject is difficult to pass. Through the interview made by the researcher, it appears that the foregoing hsa grossly affected the attitude of the students towards the learning of Biology.

## Purpose of the Study

The purpose of the study was to investigate effects of team teaching strategy on secondary school students' learning outcomes in Biology in Ondo State. The study also investigated the influence that attitude of students towards Biology will have their academic performance.

## Research Question

One research question was raised;

1. What is the attitude of students in Biology before and after the treatment?

**Research Hypotheses**

Two research hypotheses were postulated for the study;

- There is no significant difference in the pre-test mean scores of students exposed to team teaching strategy and conventional method.
- There is no significant difference in the pre-test and post-test mean scores of students exposed to team teaching strategy.

**Significance of the Study**

The study could be useful to teachers, students, curriculum planners, textbooks publishers and parents. Biology teachers could realize the need to overhaul and reform the strategies of teaching Biology. The findings could provide alternative methods to effectively deliver instruction to their students. The findings of the study could also allow students have positive attitude towards Biology and thereby improve students' performance in Biology.

This study would also assist the curriculum planners to improve on the Biology curriculum such that Biology is taught through team teaching strategy. Curriculum designers/developers would hopefully benefit from the findings of this study, fitting in activities to topics that require active learning. Such findings may be developed in future curriculum. Textbook writers would hopefully find this study relevant to their profession in view of the fact that the effectiveness of learning strategies in Biology subjects would be incorporated into their publications for effective teaching and learning.

Parents of Biology students' would benefit from the findings as their children would be introduced to team teaching strategy that would enhance the study of their children thereby adding values to what they are investing on their children. Lastly, the findings of the study could add to existing knowledge in the field of Biology education.

**Delimitation of the Study**

The study was delimited to effects of team teaching strategy on secondary school students' learning outcomes in Biology in Ondo State. Only public SSS 2 students were used because they were readily available and they are not taking part in any external examination. The study was topically delimited to Reproduction in Unicellular Organisms and Invertebrates, Transport System, Circulatory System, and Excretion in Plants and Animals.

**Research Design**

The study design adopted was pre-test, post-test control group quasi-experimental research. The base line of the knowledge of the students that were used for the study was established by pre-test while the posttest was used after the treatment to measure academic performance of the students.

**Population**

The population consisted of all 20,256 Senior Secondary Schools (SSS) two Biology students in all the public secondary schools in Ondo State.

**Sample and Sampling Technique**

The sample consisted of 163 intact class size drawn from 4 public secondary schools in Ondo State, Nigeria. The sample was selected using multistage sampling procedure. The

first stage involved the selection of one Senatorial District from the three Senatorial Districts in Ondo State through simple random sampling technique. In stage two, two Local Government areas were selected from the Senatorial District using simple random sampling technique. In stage three, two public secondary schools were selected from each of the Local Government area through simple random sampling technique. In stage four, Biology S.S.S. 2 intact class size of each of the four schools used for the study resulting to 163 students as sample.

Two research instruments were used which were: Biology Performance Test (BPT) and Biology Students' Attitudinal Test (BSAT). The instrument used for this study was Biology Performance Test (BPT) which consisted of two sections; section A and B. Section A was used to collect bio-data of the students while the section B contained twenty five multiple choice items drawn from the past questions of Senior Secondary School Certificate examination (SSCE) which were related to the topics taught in the class during the treatment. The correct option picked by the students attract two marks while the wrong options attract zero.

BSAT consisted of sections A and B. Section A sought for bio-data of the respondents while section B consisted of 20 items which sought for students' attitude towards the teaching of Biology. This was structured on a 4-point Likert-type scale of Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1. Each respondent was made to tick the appropriate option. The responses were collated and scored for data collection.

**Validity of the Instruments**

In ensuring the face and content validities of the instruments, the experts in Biology, Test, Measurement and Evaluation, and Guidance and Counselling ensured that the items in the instruments contained and represented adequately the traits being measured. The experts also indicated that the items in the instruments adequately measured what is supposed to measure. The facial look of the instruments were also validated.

**Reliability of the Instruments**

The test-retest method was used to establish the reliability of the instruments by administering them to twenty SSS 2 Biology students from outside the sampled local government areas twice at the interval of two weeks in Ondo State. Scores collected from the two tests were subjected to Pearson Product Moment Correlation and the reliability coefficient of 0.89 and 0.81 were obtained for BPT and BSAT respectively which were used to adjudge the instruments to be reliable.

**Data Analysis**

Data collected were analyzed using inferential statistics. Specifically, the research question was analyzed using mean and standard deviation while hypotheses 1 was analysed using t-test and hypothesis two was analysed using Analysis of Covariance (ANCOVA). The three hypotheses were tested at the significance level of 0.05.

**Descriptive Analysis**

**Research Question**

What is the attitude of students in Biology before and after the treatment?

In order to answer the question, data related to students' attitude before and after the treatment in the two groups were analyzed using mean and standard deviation. The result is presented in Table 1

**Table 1:** Mean and standard deviation of students' attitude towards Biology before and after treatment

| Strategies | Test | N | Mean | S.D | Mean Diff. |
|---|---|---|---|---|---|
| Team Teaching | Before Treatment | 79 | 38.09 | 2.62 | **28.45** |
| | After Treatment | | 66.54 | 1.57 | |
| Conventional | Before Treatment | 84 | 38.14 | 2.54 | **8.57** |
| | After Treatment | | 46.71 | 4.57 | |
| **Total** | | **163** | | | |

Table 1 shows the mean difference in students attitude towards Biology before and after treatment for team teaching strategy is 28.45 and conventional method is 8.57. The use of team teaching strategy and conventional method influences students attitude towards Biology with team teaching strategy being the more effective method in the teaching of Biology.

**Testing of Hypotheses**

**Research Hypotheses 1**

There is no significant difference in the pre-test mean scores of students exposed to team teaching strategy and conventional method.

In order to test the hypothesis, pre-test scores of students in both experimental and control group were subjected to statistical analysis using t-test at 0.0 5 level of significance. The result is presented in Table 2

**Table 2:** t-test analysis for pre-test Mean scores of students in Experimental and control Groups.

| Variations | N | Mean | SD | df | $t_{value}$ | P |
|---|---|---|---|---|---|---|
| Team teaching Strategy | 79 | 13.19 | 2.14 | 161 | 0.253 | 0.800 |
| Conventional | 84 | 13.11 | 2.03 | | | |

p>0.05

Table 2 shows that the t-value is 0.253 as the difference in the pre-test mean scores is not significant because the P value (0.800) > 0.05 at 0.05 level of significance. This implies that null hypothesis is not rejected. Hence, there is no significant difference in the pre-test mean scores exposed to team teaching strategy and conventional method. The students in both groups were homogenous in their performance at the commencement of the study.

**Research Hypotheses**

Hypotesis 2 : There is no significant difference in the pre-test and post-test mean scores of students exposed to team teaching strategy and conventional method of teaching.

In order to test the hypothesis, pre-test and post-test scores of students in both experimental and control groups were subjected to statistical analysis using analysis of covariance (ANCOVA) at 0.0 5 level of significance. The result is presented in Table 3.

**Table 3: analysis of covariance (ANCOVA) for pro – test mean scores of students under the groups**

| Source | Sum of squares | Df | Mean square | F | Sig. |
|---|---|---|---|---|---|
| Corrected Model | 5854.394[a] | 2 | 2927.197 | 604.311* | .000 |
| Intercept | 2646.846 | 1 | 2646.846 | 546.443* | .000 |

| | | | | | |
|---|---|---|---|---|---|
| Pre-test | .011 | 1 | .001 | .002 | . 963 |
| Groups | 5852.364 | 1 | 5852.364 | 1208.203* | .000 |
| Error | 775.017 | 160 | 4.844 | | |
| Total | 114130.000 | 163 | | | |
| Corrected Total | 6629.411 | 162 | | | |

a. R Squared-.883 (Adjusted R Squared=.882) *P<0.05

The result presented in Table 6 shows that there is a significant difference in the pre-test and post-test mean scores of students in the groups (Team teaching strategy and Conventional method) as P=0.000<0.05. There is a strong evidence to reject the null hypothesis which states that there is no significant difference in the pre-test and post-test mean scores of students exposed to team teaching strategy and conventional method. This result led to the the rejection of the null hypothesis. By implication, there is significant difference in the pre-test and post-test mean scores of students exposed to team teaching strategy and conventional method. In order to find out the more probable effective strategy. Multiple Classification Analysis (MCA) was carried out. The result is shown in Table 4.

**Table 4**: Multiple Classification Analysis (MCA) of students' performance in Biology by treatment.

| **Grand Mean** =25.73 | | | | | |
|---|---|---|---|---|---|
| Variable + Category | N | Unadjusted Dev'n | Eta ² | Adjustment for Independent | Beta |
| Experimental (Team teaching strategy) | 79 | 6.13 | . 94 | 6.06 | .09 |
| Control | 84 | -5.86 | | -5. 95 | |
| Multiple R | | | | . 939 | |
| Multiple R² | | | | .883 | |

The result in Table 4 shows the Multiple Classification Analysis (MCA) of students' performance in Biology by treatment. It reveals that, with a grand mean of 25.73, students exposed to team teaching strategy had higher adjusted mean score of 31.86 (25.73 +6.13) than their counterparts in the control group 19.87(25.73+(-5.86). This means that team teaching strategy was the most effective strategy of teaching Biology than conventional method. There was a very high multiple relationship(R=0. 939) between the two groups and academic performance of students in Biology. The two treatment strategies can also account for 88.3% variability in the academic performance of the students in Biology. It means that there is a need for other researcher's to find out teaching strategies (other than the two strategies under consideration) that could account for 11.7% of the variability in academic performance of students in Biology.

## Discussion

The findings showed that there is mean difference in students attitude towards Biology before and after treatment for team teaching strategy and conventional method. The use of team teaching strategy and conventional method influences students attitude towards Biology with team teaching strategy being the more effective method in the teaching of Biology. This finding is in agreement with the findings of Merrill, (2014) who claimed that team teaching as two or more teachers who combine their talents, expertise, interests, attitude and resources to take joint responsibility for the students.

The findings of the study revealed that there was no significant difference in the pre-test mean scores of students exposed to team teaching strategy and conventional method. The students in both groups were homogeneous at the commencement of the study. The findings of the study, which indicated no significant difference in the pre-test mean scores between students exposed to a team teaching strategy and those taught using a conventional method, offer valuable insights into the realm of education. This might be because of the students were exposed to the same strategy before the treatment. This assertion is supported by Oniya, (2018) that successful teaching and learning leading to better performance depend on the use of a innovative teaching method whose activities targets mostly on learning senses.

The findings of this study showed that there is significant difference in both the pre-test and post-test mean scores between students exposed to a team teaching strategy and those taught using a conventional method. There was a high multiple relationship (R = 0.939) between the two groups and their academic performance in Biology, these treatment strategies can account for 88.3% of the variability in academic performance students in Biology.

The findings of this study showed a significant difference in pre-test and post-test scores suggests that the choice of teaching method plays a crucial role in shaping students' knowledge acquisition and retention over time. This finding aligns with Richards (2011), Baniab delrahman (2013) and Andrews (2016) which consistently emphasizes the importance of effective teaching strategies in influencing student achievement. The post-test scores, in particular, reflect the effectiveness of these strategies in facilitating long-term learning and understanding of the subject matter.

The high multiple relationship (R = 0.939) signifies a strong association between the two treatment groups (team teaching strategy and conventional method) and students' academic

performance in Biology. This strong relationship suggests that the teaching method employed has a substantial influence on students' overall academic achievement. In the literature, the strength of the relationship between teaching methods and student outcomes is a topic of interest, with researchers exploring various factors that contribute to effective pedagogical practices. Moreover, the assertion that these treatment strategies can account for 88.3% of the variability in academic performance underscores the importance of instructional choices in explaining students' success in Biology. This high percentage of variability explained suggests that the teaching methods themselves have a substantial impact on academic performance. Baniab delrahman (2013) affirmed the benefits of team teaching and advise teachers to use team teaching strategy in their classrooms.

The finding of the study is supported by Richards (20 11) and Haghighi and Abdollahi (2014) that highlights the benefits of collaborative and interactive teaching methods, such as team teaching, in enhancing student learning outcomes. These methods can promote engagement, critical thinking, and a deeper understanding of subject matter, which can contribute to improved academic performance.

The finding of the study emphasize the substantial impact of teaching methods on student learning outcomes in Biology. The significant differences in pre-test and post-test scores, the strong multiple relationship between teaching strategies and academic performance, and the high percentage of variability explained highlight the crucial role of pedagogical choices in shaping students' educational experiences.

## Conclusion

Based on the findings of this study, it could be concluded that team teaching strategy enhanced students' performance in Biology more than the conventional method. It is also concluded that team teaching strategy enhanced students' attitudes towards learning of Biology.

## Recommendations

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

- The use of team teaching strategy should be encouraged in Biology class in secondary schools to enhance better students' academic performance and attitude in Biology.
- The Ministry of Education should offer professional training and re-training to Biology teachers through workshops and seminars to enhance their skills in team teaching and collaborative pedagogical practices. The training should focus on effective communication, coordination, and synergy among teachers to maximize the benefits of team teaching.
- Curriculum planners and textbook publishers should inculcate team ideas in their plans to allow meaningful and effective classroom interaction that foster better students' academic performance and attitude in Biology.

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