EFFECTS OF TEAM TEACHING ON SECONDARY SCHOOL STUDENTS' PERFORMANCE IN BIOLOGY IN EKITI STATE, NIGERIA

BY

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Abstract

This study examined the effects of team teaching on secondary school students' academic performance in Biology in Ekiti State, Nigeria. The study adopted a quasi-experimental research design of the pre-test, post-test control group type. The population consisted of 16,721 SS II students in 206 public secondary schools across Ekiti State, from which 87 students were selected using a multistage sampling procedure. The Performance Test in Biology (PTB) was used for data collection. The instrument was validated by experts in Biology Education and Measurement and Evaluation, and its reliability was established using the test-re-test method, yielding a reliability coefficient of 0.93. The experimental procedure involved three stages: pre-treatment, treatment, and post-treatment. The PTB was administered as a pre-test to establish baseline equivalence between groups. During the six-week treatment period, the experimental group was taught Biology topics (reproduction, respiratory system, and excretory system) using team teaching, while the control group was taught using the conventional method. Each group received three 40-minute lessons per week. After treatment, the PTB was re-administered with reshuffled items on the two groups. Data were analyzed using descriptive and inferential statistic. The research question was answered using descriptive statistics of mean and standard deviation while the hypotheses were tested using t-test statistics at 0.05 level of significance. Findings revealed no significant difference between the groups at the pre-test stage, indicating homogeneity. However, students taught using team teaching performed significantly better than those taught using the conventional method after treatment. The study concluded that team teaching is an effective instructional strategy for improving students' academic performance in Biology. It was recommended that secondary schools teacher should adopt team teaching to enhance Biology learning outcomes.

Keywords: Academic performance, Conventional, secondary school, students, Team Teaching.

Introduction

Biology education is very important in secondary schools because it provides students with knowledge about living organisms, their structures, functions, and interactions with the environment. It helps students understand basic life processes such as growth, reproduction, and health maintenance, which are essential for personal and community well-being. Biology also prepares students for science-based careers such as medicine, agriculture, biotechnology, environmental science, and nursing (Okoli and Eze, 2022). In addition, Biology education promotes scientific literacy, critical thinking, and problem-solving skills, which are necessary for making informed decisions on issues related to health, environment, and technological development (Olanrewaju and Balogun, 2023). In Nigeria, Biology education contributes to national development by supporting public health improvement, food security, biodiversity conservation, and environmental sustainability.

Students' performance in Biology has remained a concern in secondary school education because of persistent poor achievement in the subject. Biology is often regarded as a difficult science subject due to its abstract concepts, terminologies, and the need for practical understanding of biological processes (Aremu, 2018). In many Nigerian secondary schools, poor academic performance in Biology has been linked to the use of teacher-centered instructional methods that limit students' active participation in learning (Akinbobola

and Afolabi, 2019). In addition, inadequate laboratory facilities and insufficient exposure to practical Biology experiments have contributed to students' low understanding of biological concepts, which negatively affects academic performance (Ogunleye, 2017). Students' attitudes toward Biology also play a role in their performance, as students who show low interest in the subject tend to perform poorly in assessments (Olatoye, 2019). Furthermore, other factors such as shortage of qualified Biology teachers, large class sizes, and lack of instructional resources have been reported to affect students' achievement in Biology in Nigerian secondary schools (Ahmed, 2020). Poor performance in Biology examinations has implications for students' future career opportunities in science-related fields, making it necessary to explore effective teaching strategies that can improve academic achievement in the subject (Aremu, 2018).

Teaching methods play a significant role in determining students' academic performance in Biology because they influence how well students understand biological concepts. Effective teaching requires the use of strategies that encourage active student participation, critical thinking, and practical application of knowledge (Adunola, in 2020). In many secondary schools, teacher-centered methods such as the lecture method have been widely used, but such approaches often limit students' interaction and practical engagement with Biology concepts, which may negatively affect performance (Akinbobola and Afolabi, 2019). Student-centered instructional strategies tend to improve academic achievement in Biology because they promote collaboration, discussion, and problem-solving skills (Oloyede, in 2022). Instructional effectiveness is also enhanced when teachers use appropriate teaching aids, laboratory activities, and real-life examples to explain Biology concepts (Ogunleye, 2017). In addition, innovative teaching strategies such as cooperative learning, inquiry-based learning, and team teaching have been found to improve students' understanding and performance in Biology (Slavin, 2014; Aremu, 2018). In Nigeria, improving instructional effectiveness in Biology is essential for raising students' academic performance and preparing them for science-related careers and national development (Olatoye, 2019). Therefore, the choice of teaching method remains a critical factor in determining students' success in Biology education.

Team teaching is a collaborative instructional approach in which two or more teachers jointly plan, teach, and evaluate lessons for the same group of students (Murphy, Hall, & Green, 2020). This strategy promotes shared responsibility, allows teachers to combine their strengths, and supports diverse instructional techniques in the classroom. In contrast to traditional single-teacher methods, team teaching encourages active student engagement, peer interaction, and differentiated instruction, all of which are linked to improved academic outcomes.

In Biology education, team teaching is especially valuable because the subject includes both theoretical concepts and practical laboratory activities that students often find challenging. With multiple teachers present, there is greater opportunity for real-time clarification, demonstration, and targeted support for students who struggle, which can enhance understanding of complex biological ideas (Smith & Johnson, 2021). Additionally, team teaching allows for the integration of varied teaching methods such as inquiry-based learning, group discussion, and hands-on activities within a single lesson, making learning more interactive and meaningful (Lee, 2022). Recent studies suggest that collaborative teaching approaches can improve students' performance in science subjects by fostering a supportive learning environment and increasing learner participation (Ademola & Yusuf, 2023; Chukwu & Obi, 2024). In light of these findings, investigating the effect of team teaching on students' academic performance in Biology is necessary, especially in secondary schools in Ekiti State, Nigeria.

Several recent studies have examined the impact of instructional strategies on students' academic performance, particularly in science subjects like Biology. Ademola and Yusuf (2023) investigated the effects of collaborative instructional strategies on senior secondary school students' Biology achievement and found that learners exposed to team-based teaching approaches performed significantly better than those

taught using traditional methods. Their study highlighted that cooperative planning and shared delivery among teachers helped clarify difficult concepts and increased students' engagement during lessons. Similarly, Chukwu and Obi (2024) examined the influence of team teaching on secondary school science performance and reported that students taught through team teaching experienced higher conceptual understanding and improved test scores compared to peers taught via conventional lecture methods. Their findings suggested that team teaching facilitated more meaningful classroom interaction, peer support, and differentiated instruction, which contributed to improved academic outcomes. In addition, Esan and Adeyemi (2022) studied the effect of co-teaching models on students' performance in Biology and showed that co-teaching enhanced practical skill acquisition and reduced students' anxiety toward laboratory exercises. The researchers attributed this improvement to increased teacher support and real-time feedback during learning activities. Furthermore, Oladele (2023) explored how collaborative teaching approaches influence students' attitudes and performance in senior secondary Biology and found a positive relationship between group-oriented instructional practices and learners' examination results, noting that students who participated in team-oriented lessons demonstrated greater interest and higher achievement levels. While these studies indicate that collaborative and team-based instructional strategies can positively influence students' performance in Biology and other sciences, few have focused specifically on team teaching in Ekiti State, Nigeria.

Therefore, this study seeks to examine the effects of team teaching on secondary school students' academic performance in Biology in Ekiti State, Nigeria, and by comparing the performance of students exposed to team teaching with those taught using the conventional method.

Statement of the Problem

Students' academic performance in Biology at the secondary school level has continued to generate concern among educators, parents, and policymakers. Despite the importance of Biology as a core science subject and its relevance to career opportunities in medicine, agriculture, environmental science, and other science-related fields, many students record unsatisfactory achievement in internal and external examinations. This persistent poor performance has been attributed to several factors, particularly the continued reliance on conventional lecture methods that often limit students' active participation and practical engagement during lessons. Biology, by its nature, requires clear explanation of abstract concepts, demonstration of processes, and adequate practical exposure. However, in many secondary schools, instruction is predominantly teacher-centered, which may not effectively address students' learning difficulties or promote deep understanding of biological concepts. As a result, students may develop low interest in the subject, leading to poor academic outcomes. Although innovative instructional strategies such as collaborative and student-centered approaches have been recommended to improve learning outcomes, there is limited empirical evidence on the effectiveness of team teaching specifically in enhancing students' performance in Biology in Ekiti State, Nigeria. It therefore becomes necessary to investigate whether the use of team teaching can significantly improve students' academic performance in Biology compared to the conventional teaching method.

Purpose of the Study

The purpose of this study is to:

i. examine the effect of team teaching on students' academic performance in Biology; and
ii. comparethe academic performance of students taught Biology using team teaching and those taught using the conventional method.

Research Question

1. The following research question was raised to guide this study:
2. What is the performance of students in Biology before and after the treatments?

Research Hypotheses

The following hypotheses were formulated to guide this study:

1. There is no significant difference in the performance of students taught Biology using team teaching

strategy and conventional method before treatment.

2. There is no significant difference in the performance of students taught Biology using team teaching strategy and conventional method after treatment.

Methodology

This study adopted a quasi-experimental research design of the pre-test, post-test and control group design. The design involved two groups: an experimental group and a control group. Both groups were administered a pre-test to determine their level of homogeneity before the treatment. The experimental group was exposed to the team-teaching strategy, while the control group was taught using the conventional method. At the end of the treatment period, a post-test was administered to both groups to determine the effect of the instructional strategy on students' academic performance in Biology. The design can be represented as:

Experimental Group: O_1 X_1 O_2;

Control Group: O_3 Xc O_4,

Where: O_1 and O_3 represent pre-test observations,

O_2 and O_4 represent post-test observations,

X_1 represents the team teaching strategy, and

Xc represents the conventional teaching method.

The population of the study consisted of 16,721 Senior Secondary School Two (SS II) students in 205 public secondary schools across the 16 Local Government Areas of Ekiti State (Ministry of Education, Ekiti State, 2025). SS II students were considered appropriate for the study because the selected Biology topics—reproduction, respiratory system, and excretory system—are contained in the SS II scheme of work. A sample of 87 SS II students was selected using a multistage sampling procedure. Two senatorial districts were selected through simple random sampling, after which one Local Government Area (LGA) was selected from each district using simple random sampling. One public secondary school was then selected from each chosen LGA using stratified because it involves dividing a population into distinct subgroups random sampling, making a total of two schools. One intact SS II class was selected from each school through simple random sampling, and all students in the selected classes constituted the sample. The classes were randomly assigned to experimental and control groups. The instrument used for data collection was the Performance Test in Biology (PTB). The PTB consisted of two sections: Section A collected respondents' bio-data, while Section B contained 30 multiple-choice questions with four options (A–D) drawn from the SS II Biology scheme of work. Each correct response attracted one mark, while incorrect responses attracted zero. The same test items were reshuffled for the post-test to minimize test-wiseness and carry-over effects. The instrument was subjected to face and content validity by experts in Biology Education and Measurement and Evaluation, as well as experienced WAEC and NECO examiners. Their suggestions and corrections were incorporated before final administration. The reliability of the PTB was established using the test-retest method on 20 students outside the sampled schools. The scores obtained from the two administrations were analyzed using Pearson's Product Moment Correlation Coefficient, which yielded a reliability coefficient of 0.93, indicating that the instrument was reliable for the study. The experimental procedure was carried out in three stages: pre-treatment, treatment, and post-test. During the pre-treatment stage, permission was obtained from school authorities, and research assistants were trained. The pre-test was administered to obtain baseline data on students' performance in Biology. The treatment stage lasted six weeks, during which the experimental group was taught using the team teaching strategy, while the control group received instruction through the conventional method. Lessons were delivered for 40 minutes per period, three times per week, covering the selected topics. At the end of the treatment period, the post-test was administered to both groups. The data collected were analyzed using descriptive and inferential statistics. Mean and standard deviation were used to

answer the research question, while t-test analysis was employed to test the hypotheses at the 0.05 level of significance.

Results

Research Question 1: What is the performance of students in Biology before and after the treatments?

Table 1: Mean and Standard Deviation of students' scores before and after treatments

Group	N	Before		After		Mean Difference
		Mean	SD	Mean	SD	
Team Teaching	42	52.4	6.8	78.1	7.5	25.7
Conventional Method	45	51.9	7.0	65.3	7.8	13.4

Table 1 shows the mean and standard deviation of students' scores in Biology before and after exposure to the two teaching methods. Students taught with the team teaching strategy (N = 42) had a pre-test mean score of 52.4 (SD = 6.8) and a post-test mean score of 78.1 (SD = 7.5), resulting in a mean difference of 25.7. On the other hand, students taught using the conventional method (N = 45) had a pre-test mean score of 51.9 (SD = 7.0) and a post-test mean score of 65.3 (SD = 7.8), with a mean difference of 13.4. These results indicate that while both groups improved after instruction, the improvement was greater for students exposed to team teaching, suggesting that the strategy had a stronger positive effect on academic performance in Biology. This further depicted in figure 1 below:

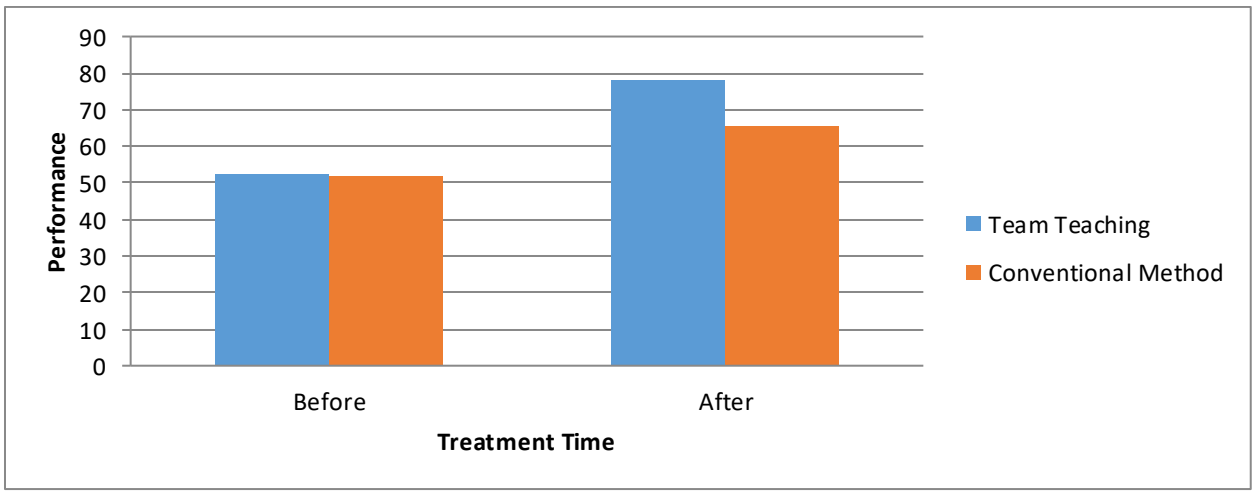

Figure 1: Bar Chart showing the performance of students in Biology before and after the treatments

Testing of Hypotheses

Hypothesis 1: There is no significant difference in the performance of students taught Biology using team teaching strategy and conventional method before treatment.

Table 2: t-test of students taught Biology using team teaching strategy and conventional method before treatment

Group	N	Mean	SD	df	t	p
Team Teaching	42	52.40	6.80	85	0.42	0.676
Conventional Method	45	51.90	7.00			

p<0.05

Table 2 shows the result of the t-test comparing the pre-test scores of students taught Biology using the team teaching strategy and those taught with the conventional method. The mean score of the team teaching group (M = 52.40, SD = 6.80) was slightly higher than that of the conventional method group (M =

51.90, SD = 7.00). However, the difference was not statistically significant, t(85) = 0.42, p = 0.676, since the p-value is greater than 0.05. This indicates that both groups had comparable academic performance before the treatment, suggesting that the students started at the same baseline level.

Hypothesis 2: There is no significant difference in the performance of students taught Biology using team teaching strategy and conventional method after treatment.

Table 3: t-test of students taught Biology using team teaching strategy and conventional method

Group	*N*	*Mean*	*SD*	*df*	*t*	*p*
Team Teaching	42	78.1	7.5	85	7.32	0.000
Conventional Method	45	65.3	7.8			

p<0.05

Table 3 presents the t-test result of the post-test scores of students taught Biology using the team teaching strategy and those taught with the conventional method. The mean score of the team teaching group (M = 78.10, SD = 7.50) was higher than that of the conventional method group (M = 65.30, SD = 7.80). The difference was statistically significant, t (85) = 7.32, p = 0.000, which is less than 0.05. This indicates that students taught with the team teaching strategy performed significantly better than those taught with the conventional method, showing the positive effect of team teaching on academic performance in Biology.

Discussion

The finding of this study revealed that team teaching significantly improved students' academic performance in Biology compared to the conventional method, as evidenced by the larger mean gain. This result is consistent with the findings of Oloyede and Adeyemi (2021), who reported that collaborative teaching strategies enhance students' understanding and retention of scientific concepts. The improvement may be attributed to the diverse instructional approaches and shared expertise of teachers in a team-teaching setting, which allows for differentiated explanations, immediate feedback, and increased engagement. Furthermore, this finding corroborated that of Akinola and Bello (2019), who found that students in team-taught classes demonstrated higher problem-solving skills and conceptual understanding in Science subjects. The interactive nature of team teaching likely fosters a richer learning environment, encourages peer discussion, and addresses individual learning needs more effectively than a single-teacher approach. However, Eze and Okeke (2022) found no significant difference in performance between team-taught and conventionally taught Biology classes, suggesting that the effectiveness of team teaching may depend on factors such as teachers' coordination, training, and class size. This implies that successful implementation requires careful planning and collaboration among educators. The implications of this finding are substantial for educational practice and policy. Schools may consider adopting team teaching as a strategy to enhance learning outcomes, particularly in challenging subjects like Biology.

The finding of this study revealed that there was no significant difference in the pre-test performance of students in both groups, indicating comparable baseline academic performance. This outcome is consistent with the opinion Creswell and Creswell (2023), who emphasized that establishing equivalence between groups prior to an intervention is essential for attributing post-test differences to the teaching method rather than pre-existing disparities. The similarity in baseline performance suggests that random assignment or careful grouping effectively controlled for initial academic ability, thereby strengthening the internal validity of the study. This ensures that any subsequent differences observed in post-test performance, attitudes, or engagement can be confidently linked to the instructional approach employed. The finding corroborated that reported by Oloyede and Adeyemi (2021) that there is no significant pre-test difference between groups in studies evaluating collaborative teaching strategies, highlighting the importance of comparable starting points in experimental educational research.

Another finding of this study is that students taught with team teaching performed significantly better in the post-test than those taught with the conventional method. This result is consistent with the submission of Oloyede and Adeyemi (2021), who found in their study that team teaching strategies enhance students' comprehension, retention, and application of scientific concepts. The observed improvement may be attributed to the interactive and supportive nature of team teaching, which allows multiple instructors to provide diverse explanations, immediate feedback, and address individual learning needs, thereby fostering deeper understanding. This finding also corroborated the finding of Akinola and Bello (2019), that students exposed to team-taught lessons demonstrated higher problem-solving skills and conceptual grasp in Science subjects. The presence of two or more teachers in the classroom encourages dynamic learning activities, stimulates peer discussion, and promotes engagement, which collectively enhance academic performance. However, Eze & Okeke, (2022) in their study reported contradictory results, noting no significant difference in post-test performance between team-taught and conventionally taught classes. Such discrepancies may be due to factors like inadequate teacher coordination, large class sizes, or differences in students' prior knowledge and motivation. The implications of this finding are significant for educational practice. Schools may consider adopting team teaching as an instructional strategy to improve student outcomes in challenging subjects such as Biology. Additionally, teacher training programs should emphasize collaborative instructional methods to ensure educators are well-equipped to implement team teaching effectively.

Conclusion

Based on the findings of this study, it was concluded that team teaching is an effective strategy for teaching Biology. Students who were taught using the team teaching approach performed better in tests than those taught using the conventional method. The collaborative and interactive nature of team teaching enhances lesson delivery, improves students' understanding of biological concepts, and promotes active participation in the learning process. Therefore, team teaching can be considered a viable instructional strategy for improving students' academic performance in Biology.

Recommendations

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

1. Schools should consider implementing team teaching in Biology classes, as it has been shown to improve both students' academic performance and attitudes toward the subject.
2. Teachers should be trained in collaborative and team-teaching strategies to ensure they can effectively plan and deliver lessons using this approach.
3. Educational planners should include opportunities for team-teaching methods in the school curriculum to enhance engagement and learning outcomes.
4. Schools should provide the necessary support, such as teaching assistants and resources, to ensure team teaching is implemented successfully.

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