



Single Instructor and Team Teaching: Effects on Tertiary Students' Academic Performance

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Abstract

The study scrutinizes the impact of single-instructor and team teaching on students' academic performance in Nigeria's South-West region tertiary education. The study's question seeks to delve into the relationship between teaching styles and students' academic performance using Hayes regression analysis. The findings reveal that both teaching approaches positively affect students' academic performance, but single-instructor teaching is more effective. Team teaching should be reviewed and improved, though, to enhance its potential effectiveness. The study recommended that every team member adheres to the same evaluation layout for grading, collaborate when planning, follow the course outline format, embrace individual differences, and coordinate teaching-learning objectives to increase the efficiency of team teaching in Nigerian higher institutions of learning.

Subject Areas

Education Administration, Science Education, Education Planning and Teaching Assessment

Keywords

Teaching Styles, Single Instructor, Team Teaching, Tertiary Education, Academic Performance, Nigeria's South-West Region

1. Introduction

1.1. Background

There is a growing need for tertiary institutions to change as accountability in-

creases, especially in university instruction [1]. Several methodologies and approaches have been introduced, including team teaching, to advance learning and continue increasing the value of education in universities. As an approach to teaching, team teaching can be visualized as a cooperative effort between two or more teachers to advance students' learning. Team teaching is becoming increasingly popular in many higher-learning institutions to enhance successful learning experiences [2]. When a group of lecturers works together to plan, execute, and evaluate learning activities for a group of student learning together in the same classroom, this is known as team teaching [3]. Team teaching is an approach to learning design that facilitates learners' adequate knowledge and understanding. Co-teaching, co-enrolling, collaborative, and cooperative teaching are all terms used to express team teaching [4] [5] [6].

As several studies have pinpointed, the key to success in the team teaching method is when the instructors work collaboratively for learners' learning outcomes and teach in different styles from different perspectives [5] [6] but [7] presumed that team teachers should present a unified and amicable unit to avoid passing contradictory messages to their students, even when it may be ideal for them to have diverse teaching philosophies. [8] reported that students face issues of cohesiveness in evaluation and discontinuity in team teaching. Many studies have confirmed that teaching and assessment issues create unavoidable problems in team teaching. Thus, it is essential to examine how team-teaching affects students' academic performance in tertiary education while the students' performance needs to meet the learning objectives. Team teaching methodology evolved for reasons such as balancing teaching loads, simulating scholarly discussion, providing knowledge on specific topics covered in a course, fitting instructors' schedules, and facilitating effective communication in academic environments [6].

Theoretically, team teaching allows educators to experience the value of collaboration and apply that knowledge to their collective efforts to enhance students' learning outcomes and scholarly discourse in teaching-learning activities [1]. The purpose of learning is to modify learners' behaviour and improve their performance. When evaluating students' performance, the effectiveness of the team-teaching technique is crucial. This is determined by how students respond to it. This study examines how team teaching and single learning strategies impact students' academic performance in higher education institutions in South-West Nigeria. Authors interchangeably use team teaching as cooperative and collaborative teaching and a single instructor as traditional and sequential teaching [4] [5] [6]. The research objectives include evaluating students' academic performance and level of understanding of the teaching methods used in their various institutions, assessing how well students perform when taught by a single instructor, evaluating the effectiveness and impact of team teaching on improving students' academic outcomes, and identifying the merits and challenges of team teaching in tertiary institutions.

1.2. Literature Review

The ability to learn from various professors of different perspectives is provided through a team-teaching technique, which significantly affects students' academic success. Several studies have highlighted the effectiveness of team teaching in improving academic performance. [9] researched team-teaching techniques and their impact on academic performance in tertiary institution settings. They evaluated and requested feedback from thirty-two (32) graduate students. The evaluation showed that students appreciated the team-taught course and agreed it was productive. In another study, [10] examined the effectiveness of team teaching and single instructor on academic achievements. Results from his study show the two instructional approaches regarding academic achievement are not significantly different. [3] investigated the effectiveness of team teaching on academic performance and found that team teaching was more effective than a single-teacher approach.

1.2.1. Model of Team Teaching

The learning-based model determines the classification of students based on the best ways learners process information [11]. Teams teach creativity when two or more teachers collaborate in teaching the course to a group of students. Students become active by participating in class activities, and their role as passive learners is reversed. [12] highlighted three styles of team teaching: interactive, participant-observer, and rotational. The interactive style of team teaching is when two or more instructors are presented in a class at the same time to teach a group of students; the rotational style of team teaching is when the work is divided among the members based on their expertise; in the rotational style of team teaching, the course coordinator will be the one to oversee the lesson plan and distribution of lessons among the members, while in the participant-observer style, one teacher teaches while the other observes even though he will also participate in the class. None of these styles is considered the best [12].

[13] asserted that there are five different team-teaching models: coaching, teaming, equal status, observing, and aiding. One instructor instructs the class using an observation approach while the other teachers observe and gather information. In the coach team teaching style, the role of the second instructor is more important than observing; he offers solutions to any issues the class may encounter. One instructor remains in command of the assistant teaching technique, and the other assumes the position of an assistant [13]. The equal-status teaching model distinguishes between the parallel, sequential, and station modes. The course's planning, delivery, and evaluation are only partially collaborative among teachers in the equal-status model; instead, there is cooperation. However, in the teaming model, teachers equally split these responsibilities while collaborating [13].

1.2.2. Single Instructor versus Team Teaching

Generally, team teaching describes a situation in which two or more lecturers

work together to take a group of students at once. Team teaching is a pedagogical method in which two or more lecturers collaborate to deliver lessons to students in a classroom [14]. In contrast, a single instructor is a lecturer who instructs a class of students independently from other lecturers in the faculty. He worked alone to plan, organize, evaluate, and deliver the lessons. This is also known as traditional teaching [2]. According to the literature, team teaching in academic settings offers merits and pitfalls. One of the benefits of team teaching is that it gains knowledge from many viewpoints. [5] asserts that “if experts from opposing perspectives pool their resources in a scholarly presentation, students can be exposed to the strengths of both viewpoints”. Students gain from team teaching for various reasons, including greater participation, improved evaluation, and multiple views. [4] listed some benefits of team teaching in developing students’ analytical skills, increasing curricular coherence, strengthening a sense of academic community, providing explicit structures for academic and social engagement, improving student-teacher relationships, making classes more engaging and challenging due to the depth and diversity of teacher experience drawn upon, and increasing retention rates. According to several academic studies, issues with teaching and evaluation are inevitable challenges in team teaching [15]. Evaluation, appropriate time planning, individual roles, variation of content knowledge, and honest exchanges may be significant setbacks to successful team teaching [15].

2. Research Gap

Some studies in the research space have explored analytical and qualitative ways of accepting collaborative teaching as a great teaching style with positive prospects on the outcome of students’ academic performance through their high level of understanding. However, this study adopts an inferential method of comparing the effect of single instructor and team teaching in some of Nigeria’s South-West tertiary institutions considering different teaching styles.

2.1. Research Hypotheses

Hypotheses

H₁: The teaching style adopted in a school does not significantly correlate with the student’s academic performance.

H₂: Students’ academic performance is not significantly affected by the teaching style of a single lecturer in tertiary education institutions where only one instructor teaches a course.

H₃: Students’ academic performance is not significantly affected by the team-teaching style in tertiary education institutions where more than one instructor teaches a course.

H₄: The teaching style of a single lecturer has no significant impact on students’ overall academic performance in tertiary education, where some courses are taught by one lecturer and others taught by a team of instructors.

H₅: Team-teaching style does not mediate the relationship between students' academic performance and single lecturer teaching style in tertiary education institutions where some courses are taught by one lecturer and others taught by a team of instructors.

H₆: The teaching style of collaborative instructors has no significant impact on students' academic performance in tertiary education institutions, where some courses taught by one lecturer and others taught by a team of instructors.

2.2. Research Framework

The variables of this study are academic performance (dependent variable), Teaching style: team-teaching, single-instructor, combined single-instructor and team-teaching (mediating variables), and team-teaching, single-instructor (dependent variables). The combination of those variables in the context of inferential statistics, particularly, hypothesis testing is represented in **Figure 1**.

3. Methods

3.1. Participants and Data Collection

The research focused on Nigerian students in higher education institutions and those who recently graduated from schools with government or private ownerships, having experienced a variety of teaching style systems, most commonly; one instructor per course, team teaching styles, and the combination of the duo. The research was conducted between January and February 2023, covering the time-space when all higher institutions of learning were closed in Nigeria in line with the order from the Federal Government of Nigeria to enable everyone to partake in the 2023 General elections.

The uniqueness of the primary data involves the provision of valuable and

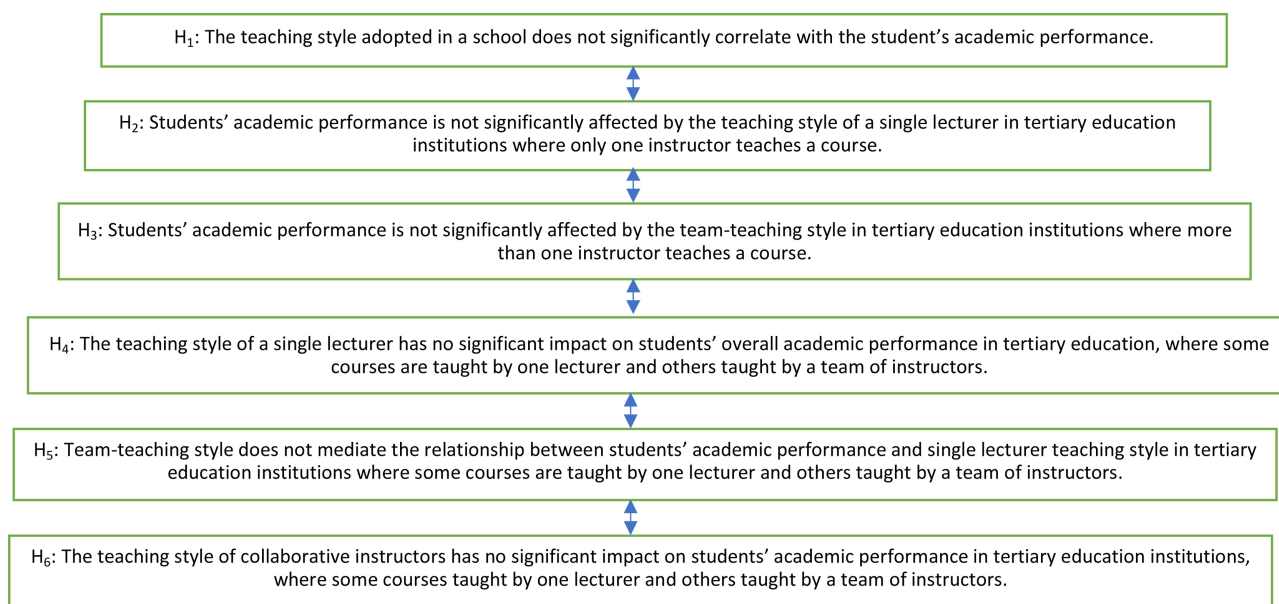


Figure 1. Research framework.

new insights that can be incorporated into the research question plotted within a defined population scope. The questionnaire proved to be an effective method for sourcing primary data used in this research as its operation guaranteed the vast accuracy and reliability of the data collected. Biases and inconsistency are avoided in this method as all the sampled individuals were asked the same question type in the same way with utmost simplicity and without revealing their identities while providing sensitive information [16]. An online survey's ability to quickly target a demographic and its simplicity in gathering a variety of data define essential benefits it has over other methods [17]. The respondents' detail about their socio-demographic status highlighted the gender, age bracket, current level at the institution, ownership-type of the institution, and a branching question inquiring about the teaching style adopted in the corresponding school.

Subsequently, further questions were asked to gather data that will enable researchers to evaluate the effectiveness of the teaching technique adopted in the school and its impact on students' academic performance and level of understanding. Similarly, the same audiences were asked about their academic performance and level of comprehension in a course taught by a single lecturer and separately if a team of instructors took the course as well as when the two teaching styles are combined for a course.

3.2. Sampling Determination and Units

Assessing a demographic makeup of a population appropriately is fundamental to representing and reflecting all units through a considerable sample size. In agreement with [18] on the affordable sample size needed to be represented for a given population in research activities, 230 students of Nigeria tertiary institutions in South-West Nigeria were reached through a questionnaire administered online on a Google form.

3.3. Measures

Prior research was used as the root of the statements in the questionnaire, consisting of 15 Likert scale (of five varying options score) statements worded positively to retain consistency in the analytical part. The reliability and validity of this preference prospect are backed by studies such as [19] and [20]. The selection of the measures comes from three different studies. [21] [22] [23] in their conceptual studies, they initiated measures for academic performance & level of understanding of students under the teaching technique adopted in the school. [24] used measures for evaluating students' academic performance in a course taught by a single lecturer. [25] constructed statements to examine how well team teaching improves student learning outcomes. [26] focused on teaching aids like visuals in the school system; [27] highlighted measures for lecturers' competencies in students' academic performance. [28] suggested criteria for instructional strategy within the team of teachers, and [29] applied measures for learning improvement of students through styles of teaching.

3.4. Hayes Regression

While the traditional regression analyzes the relationship between a dependent variable and one or more independent variables, Hayes regression allows for the testing of mediation effects. The mediation analysis approach takes more concentrated connections than the traditional way of examining the mediation effect through regression, which often controls for the impact of the mediator when a direct effect of an independent variable is examined on a dependent variable. The bootstrapping mechanism provides a comprehensive understanding of the pictures of how relatable the variables are, leading to the application of Hayes' Process Macro on SPSS. The direct impact of single instructor and collaborative teaching styles on the academic performance and level of understanding of tertiary education students are analyzed using the Hayes method.

3.5. Data Analysis

The collected data were analyzed using quantitative research methodology. Descriptive statistics were obtained for socio-demographic variables. Factor analysis and correlational study were used for the main variables on academic performance, single instructor, and team-teaching score. Loadings, KMO-Bartlett, and Cronbach alpha were used to evaluate the validity and reliability of the research and components, while Process Macro Hayes was used for the inferential statistics. This was done at a 5% significance level.

4. Results Estimation

4.1. Model Fits

To focus on the essential components of the research, Factor analysis was considered (**Table 1**). Thus, for higher coefficients, absolute values less than 0.5 were suppressed. No statement scored below 0.4 in the correlation matrix, indicating high approval. Berlet's test of sphericity is significant at a 5% significance level. The KMO of Sampling Adequacy was 0.909 (Greater than the minimum requested 0.6 for further analysis), while it is also significant at 1% ($p < 0.01$). To examine whether multiple measures of the same general construct yield scores that are similar (internal consistency), the research also made an analysis using Cronbach's Alpha, where all variables scored over 0.7, which is the minimum value [30].

4.2. Sample Characteristics

The total number of respondents in this research is 230, with 50.4% females and 49.6% males. The data revealed that 30.4% of the respondents fall within the age 26 - 33 years, 10% are above 33 years, and 4% are below 18 years. Majority of the respondents (59.1%) fall within 18 - 25 years (**Table 2**). Among the respondents, 89.6% attended or are attending government-owned higher institutions, and 10.4% attended privately owned ones. Out of the participants, 37% are fresh graduates who finished not beyond two months, 27.8% are presently at the 300

Table 1. Cronbach's alpha and loadings on factor analysis.

Statement	Cronbach Alpha	Academic Performance	Single Instructor	Team Teaching
ACA1	0.802	0.758		
ACA2		0.640		
ACA3		0.721		
ACA4		0.652		
ACA5		0.512		
SNG1	0.859		0.745	
SNG2			0.651	
SNG3			0.714	
SNG4			0.728	
SNG5			0.689	
TEA1	0.878			0.809
TEA2				0.675
TEA3				0.731
TEA4				0.771
TEA5				0.798
Total rotation sums of squared loadings		3.028	3.100	3.423
Percent of total variance explained		20.189	20.669	22.817

level, and students in other levels aggregated to 35.2%. Also, from **Table 2**, 20% experienced one lecturer per course teaching style, 35.2% experienced team teaching, and 44.8% benefitted from the two teaching styles. **Table 3** presents the mean and standard deviation of scores from sampled students in their responses. Additionally, the distribution of scores is portrayed by measures of skewness and kurtosis. **Figure 2** represents the data distribution for students' academic performance adopting either the single instructor or team-teaching style in the school system.

4.3. Correlation

The Spearman correlation, as seen in **Table 4**, describes the relationship between variables. The overall evidence of the regression model is based on the already established test of significance in the association between student academic performance and teaching style adopted in the various schools. In a bid of a possible correlation between the two variables. **Table 4** shows they are significantly correlated ($r = 0.038$, $p < 0.05$), hence; the study's null hypothesis (H_0) would be rejected.

Table 2. Descriptive statistics of the socio demographic data.

Variables	Frequency	Percentage (%)
Gender		
Male	114	49.6
Female	116	50.4
Age		
Below 18 years	1	4
18 - 25 years	136	59.1
26 - 33 years	70	30.4
Above 33 years	23	10
School ownership		
Government	206	89.6
Private	24	10.4
Current level		
100 level	17	7.4
200 level	20	8.7
300 level	64	27.8
400 level	36	15.7
500 level	7	3.0
700 level	1	0.4
Graduate	85	37.0
Teaching style		
One lecturer only	46	20
Team teaching only	81	35.2
Both styles mixed	103	44.8

4.4. Regression Analysis

The Spearman rank correlation has established a significant correlation between student academic performance and the teaching style adopted in the school. **Figure 3** describes the interrelation between academic performance and different teaching styles in Nigerian tertiary education institutions. For Nigerian higher institutions that strictly adopt a single instructor for every course, the techniques and methods used by an instructor for imparting knowledge to students through the interaction manner with students, methods of teaching course material, and use of teaching aids for simplicity proved to be a significant factor that positively shapes their academic performance and level of comprehension ($\beta = 0.679$; $p < 0.05$), hence the study's null hypothesis (H_0) is rejected.

With team teaching becoming increasingly adopted in tertiary institutions, some Nigerian schools have strictly adopted team teaching for every course to expose students to different teaching styles and, thus, provide them with a more

Table 3. Measures around the responses.

	Statement	Mean	Std. dev.	Skewness	Kurtosis
Academic performance and level of understanding of students under the teaching technique adopted in the school					
ACA1	How successfully, on a scale of 1 to 5, did the school's instructors employ teaching aids (such as visuals, real-world examples, etc.) to make sure you understood the subject matter?	3.05	1.116	-0.066	-0.414
ACA2	On a scale of 1 - 5, how well did the teaching style adopted in the school help you understand the course material? (1-being not well, and 5 being very well)?	3.34	1.086	-0.314	-0.457
ACA3	On a scale of 1 - 5, how active did you feel in the course material under the teaching technique adopted in the school? (1 being not active, and 5 being highly active)	3.20	1.066	-0.071	-0.386
ACA4	How well did you perform academically in the course on a scale of 1 to 5?	3.78	0.875	-0.352	0.037
ACA5	How well, on a scale of 1 to 5, did the teachers handle and resolve any concerns you had with the course material?	3.16	1.096	0.018	-0.558
Evaluation of student's level of comprehension in a course taught by a single lecturer					
SNG1	How much did you feel committed to the lecturer's course? From 1 (not committed) to 5 (very committed)	3.66	1.014	-0.546	-0.019
SNG2	How would you rank the lecturer's teaching style on a scale of 1 to 5? 1 represents poor, and 5 represents exceptional?	3.53	0.965	-0.246	-0.052
SNG3	On a scale of 1 to 5, how well do you think the lecturer understands the subject matter? 1 is considered poor, and 5 is considered extraordinary?	3.83	0.931	-0.541	0.087
SNG4	How much, if anything, did you learn from the lecturer's course on a scale of 1 to 5? (1 is very little, and 5 is a lot)	3.53	0.987	-0.511	0.175
SNG5	How well is the instructor simplifying complex ideas on a scale of 1 to 5? 1 represents poor, and 5 represents exceptional.	3.40	1.022	-0.209	-0.440
Student learning outcomes in a course delivered by team of instructors					
TEA1	How would you consider your overall impression of the team-teaching strategy on a scale of 1 to 5? 1 represents poor, and 5 represents great.	3.49	1.064	-0.349	-0.490
TEA2	How would you grade the teachers' cooperation and collaboration in the team-teaching technique on a scale of 1 to 5? 1 represents inadequate, and 5 represents fantastic.	3.61	1.025	-0.480	-0.180
TEA3	How much, if anything, did you gain from the team-taught course on a scale of 1 to 5? (1 is very little, and 5 is a lot)	3.57	1.011	-0.421	-0.362
TEA4	How well did the team-teaching approach suit your learning method on a scale of 1 to 5? From 1 (not well) to 5 (extremely well).	3.44	1.025	-0.312	-0.329
TEA5	Would a very high percentage of the student populace benefit from team teaching? 1 being extremely unlikely, to 5 being very likely.	3.57	1.079	-0.433	-0.456

Table 4. Correlation between academic performance and teaching style.

		Teaching style	Academic performance
Teaching style	Correlation coefficient	1.000	0.380**
	P-value		0.000
	N	230	230
Spearman's rho	Correlation coefficient	0.380**	1.000
	P-value	0.000	
	N	230	230

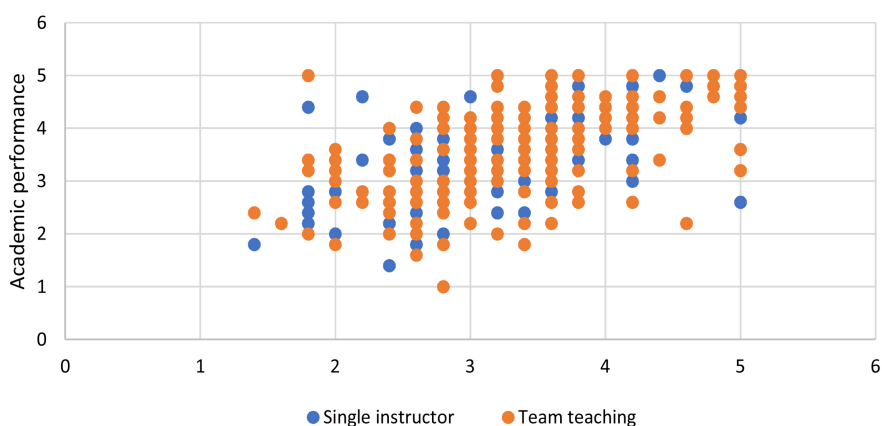


Figure 2. Distribution of the main variables.

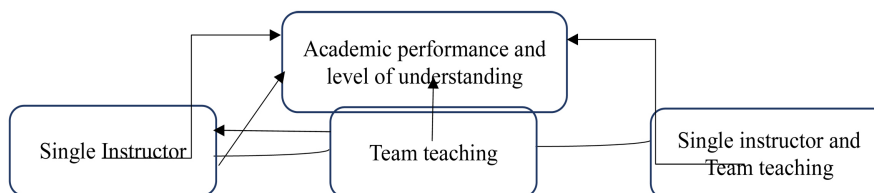


Figure 3. Model of the relationship.

diverse learning experience. This also has a positive significant impact ($\beta = 0.613$; $p < 0.05$) on the student's academic performance, then the study's null hypothesis (H_3) is rejected. However, following the magnitude of the regression coefficient, the magnitude of the positive impact of single instructors on academic performance is greater than that of team teaching.

For tertiary education institutions that combines single-instructor courses with courses taught by a team of instructors, when a single instructor takes a particular course, such teaching style significantly influences the academic performance of the students in a positive way ($\beta = 0.661$; $p < 0.05$) *i.e.* the study's null hypothesis (H_4) is rejected, but when instructors collaborate in teaching the same course in another academic term/semester, team teaching partially mediates

Table 5. Single instructor and team-teaching impact on students' academic performance.

Teaching style	Response (Predictor)	Model	β	Std. Error	p value
<i>Single instructor only</i>	Academic performance (Single Instructor)	Constants	0.870	0.178	0.000
		Single Instructor	0.679	0.048	0.000
<i>Team teaching only</i>	Academic performance (Team teaching)	Constants	1.086	0.277	0.000
		Team teaching	0.613	0.073	0.000
<i>Single instructor & Team teaching</i>	Academic performance (Single Instructor)	Constants	0.876	0.279	0.002
		Single Instructor	0.661	0.078	0.000
	Mediated by Team teaching	Constants	0.491	0.276	0.078
		Single Instructor	0.461	0.087	0.000
	Academic performance (Team teaching)	Constants	1.331	0.253	0.000
		Single Instructor	0.555	0.074	0.000

(i.e. reduces) the effect of single instructor ($\beta = 0.461$; $p < 0.05$) on the students' overall academic performance. Therefore, the study's null hypothesis (H_5) is rejected.

However, when a team of instructors teaches a particular course, such a teaching style also significantly impacts the student's academic performance ($\beta = 0.555$; $p < 0.05$), although it is not as impactful as the single instructor (**Table 5**), and the study's null hypothesis (H_6) would be rejected.

5. Discussion

The stakeholders in the education sector in the South-West regions of Nigeria have been weighed up with concerns about the outcome of student academic performance as a matter of consequence in teaching style adopted across the existing schools. These concerns do not exempt policymakers and educators. The promotion of deep learning and critical thinking in students has been monitored through the impact of the number of instructors allotted for a course in tertiary institutions. This research examined the growing concern that marks traditional lecture-based teaching as worthy of being substituted by team teaching. It has been carefully established that a positive association exists between the teaching style instructors adopt and students' academic performance. This supports [19], who showed that teaching style and students' academic performance have significant correlation.

Nigerian Universities that solely operate on one instructor for one course seemingly retain the standards ranging from the clarity of expectations for

coursework and assessments. They always prepare students to check out for what is expected of them and lead to the motivation they need to deliver the best in their capacity. This study has unveiled the substantial contribution of a single instructor on the student's academic performance and level of understanding. The dedication and skillfulness of the instructors in giving individual attention and the consistency in the teaching approach added to the convincing reasons.

Educational specialists always strive to add to the value of education and keep working towards learning development by introducing different methodologies in which team teaching is amongst. [2] claimed that in the quest to enhance the practical learning experience, team teaching is gaining popularity in many citadels of learning. Collaboration and teamwork tied in team teaching have been discovered to positively influence the academic outcome of students in some institutions that adopt team teaching only for every course a student registers. Comprehensive coverage of topics and diverse teaching styles are other opportunities that enable students to achieve their academic goals and succeed in their chosen fields. However, this study has examined that the acclaimed rate in the academic victory which students record in schools adopting single instructors per course is slightly above that in schools adopting team teaching only.

Some Nigerian institutions recognize the essentiality of providing a variety of learning experiences for their students. This is why some courses are taught by a single instructor with expertise in that field. The primary instructor is better suited to teach it alone and requires no multidisciplinary approach. Also, for courses with complex subject matters that necessitate an interdisciplinary approach, those institutions allow collaborative teaching for students to benefit from teaching styles of diverse perspectives from multiple instructors. This research finds that students' academic performance is improved in courses taught by a single instructor than in those taught by a team of instructors. Through mediation analysis conducted, the results describe that students' overall academic performance drops when the number of courses taken by a team of instructors increases. This may be due to factors like lack of course coordination in team teaching, lack of consistency in evaluation by the tutors, and lack of cohesiveness in team teaching.

6. Conclusion and Recommendations

This research has shown that although one instructor and collaborative teaching styles positively affect students' academic performance and level of understanding, the effectiveness is more significant in the former. However, the latter teaching style should be reviewed and improved in all its fundamental objectives and ways as all the models of team teaching need to be practiced and compared in their effectiveness.

Team teaching has proven effective in higher institutions within and outside Nigeria's Educational content. Henceforth, evaluation should be made more apparent to the students to improve the effectiveness of team teaching in Nigerian

institutions. All team members should follow the same evaluation format for grading. Team members should work collaboratively and put more effort into planning. There should be strict conformity in the layout of the course outline to rule out the confusion that students can nurture. Team members should be ready to accommodate individual differences while learning from each other to unify the ultimate teaching-learning objectives. Despite the effectiveness of team teaching, a single instructor teaching method should be adopted where the primary instructor is better suited to teach it alone and where the course requires no multidisciplinary approach. The two methods should be adopted based on need and suitability and not as cultural practice.

Considering this study's valuable findings, caution is advised in the approach to its interpretation, considering the limited focus on the sample scope. Generalizing the insights to broader contexts demands prudent consideration.

Conflicts of Interest

The authors declare no conflicts of interest.

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