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Survey on Effect of Biology Teacher's Variables (Factors) on Academic Performance of Senior Secondary Schools Students in Sokoto Metropolis, Nigeria

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Abstract

This research is aimed at finding the effect of biology teacher's variables on the academic performance of senior secondary school students in Sokoto metropolis, Nigeria. Five (5) schools were randomly selected as the sample of the study, including 5 Biology teachers and 200 Biology students, to make the sample of 190 respondents. Using a random sampling technique, two structural questionnaires were used as the instruments for data collection. Frequency count and percentage were the methods used in data analysis. Among the findings drawn in this study are: it was observed that the effects of teachers' qualities with respect to their qualification are high, which modify students' academic performance; most teachers in Sokoto state presently are experienced in their teaching, and this modifies students' academic performance; it was observed that the effect of teachers' qualities with respect to subject-matter knowledge is high. This shows that they have good knowledge of the subject matter. It is recommended that there should be a provision of adequate biology teachers, laboratory equipment, and regular teacher training, seminar, and workshops on the use of instructional materials.

Keywords: *Biology teachers; experience; qualifications; subject matter; academic performance*

INTRODUCTION

Science is a systematic process of making an inquiry about living and nonliving things in our environment. It is out there for the development of any country; in fact, the development of any country is rated based on its progress in its science and technological education (Ashafa, 2015). Science and technology are now integral parcels of world culture, such that any country which chooses to remain backward should consider neglecting science education. Therewith, economic progress is also achieved through science and technological advancements (Ahmed and Abimbola, 2011; Thomas and Collier, 2014; Vickova et al., 2019). Science is a great tool on which nations depend so as to advance in all spheres of life, more especially in attaining technological innovations to achieve development. It provides humans with the appropriate knowledge of the environment and social solutions to present global issues. That is why students are increasingly encouraged to study science-related fields from secondary to advanced levels of education (Ashafa, 2015). More specifically, the relevance of science in many fields, such as

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medicine, industries, construction, communication, engineering, transportation, technology, etc., is indisputable (Katto, 2004; Ashafa, 2015).

Biology is one of the major science courses needed by secondary school students to model them with appropriate knowledge to be able to study several courses at an advanced level of education. Biology is a branch of science that envisages the study of living things and nonliving things (Koroka, 2004). It discusses pertaining plants and animals, their structures, functions, growth, and relationships with the environment (Katto, 2004; Andrew, 2009; Ashafa, 2015). Biology is a basic science subject taught at most of the secondary schools in Sokoto state, Nigeria, because it is a pre-requisite to study medicine, pharmacy, nursing, science education, and other related science courses at Universities, polytechnics, colleges, and other advanced schools (Ashafa, 2015).

However, despite the popularity of biology subject in science and in the state among schools and students, several reports and studies are still depicting indices of poor performance in the subject (Ashafa, 2015). Albeit, many studies have successfully narrated several suggestions responsible for poor biology performance, one of the reasons submitted was the teacher quality or variables (Ashafa, 2015; Balarabe et al., 2019). Therefore, this study aimed to find the effect of biology teacher variables (teachers' qualifications, teachers' experience, teachers' knowledge, and teachers' pedagogical knowledge) on the academic performance of senior secondary school students in Sokoto metropolis, Nigeria.

Research questions

1. What is the effect of teachers' qualifications on the academic performance of biology students in the Sokoto metropolis?
2. What is the effect of teachers teaching experience on the academic performance of biology students in the Sokoto metropolis?
3. What is the effect of a teacher's knowledge of subject matter and concepts on the academic performance of biology students in the Sokoto metropolis?
4. What is the effect of teacher's pedagogical knowledge on the academic performance of biology students in the Sokoto metropolis

LITERATURE REVIEW

Biology as a science subject is formed to teach individuals so that they can obtain basic awareness about the essentials of living and non-living things and the community. However, the achievement of students and attitudes toward biology has been a great concern for researchers because learning outcomes over the years have not been satisfactory (Timothy, 2021). Teachers' variables are factors or characteristics of teachers who can make or mar the teaching carried out by the teachers (Boh, 2021). Nunez et al. (2014), in a study, "Student, teacher, and school context variables predicting academic achievement in Biology: Analysis from the multilevel perspective," found that at the class level, academic achievement was only linked with teacher's strategies to teaching, through students approaches to learning. This has significantly revealed how teachers' variables are important in positively influencing the learning achievements of students. Ayeni (n.d.) observed teachers' competence as a prediction of students' achievement in Biology in southwest Nigeria, and the results indicate that teachers' competence predicts the achievement of students in biology.

The literature review represents the theoretical core of an article. The purpose of a literature review is to "look again" at what other researchers have done regarding a specific topic. A literature review is a means to an end, namely to provide background to and serve as motivation for the objectives

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and hypotheses that guide one's own research. A good literature review should not merely provide a summary of previous relevant research; the researcher is also expected to critically evaluate, re-organize and synthesize the work of others. Abimbola and Abidoye (2013), in a study of the effect of qualification and experience of biology teachers on the status of ecology teaching in Kwara state using a questionnaire, had gathered that ecology teaching had low status in the state of the study, and in turn affect the performance of students also, that the low ecology achievement was due to poor act of teachers and poor teaching training.

This was revealed in a descriptive study method. Bello (2015), in the Sokoto study, noticed the effect of selected teacher factors on the conduct of effective biology practical lessons and found teacher qualification and experience affect his capacity to use biology laboratory equipment for biology practical work. Alafiatayo et al. (2016) studied the effect of teacher's abilities on students' attitudes and academic performance in biology among secondary schools in Sabon Gari Local Government, Kaduna, Nigeria, using a specific survey and the results indicated a significant link between the teacher variables and students achievement in biology. Umar et al. (2018) predicted academic performance in biology among public senior secondary school students in Kwara state and realized that there were significant relationships between teachers' qualifications and teachers' experience on student academic performance using survey and correlational study methods. Another Nigerian study by Omosholape and Oluwole (2021). In a study of the influence of biology teachers on the academic performance of students in senior secondary schools in the southwest geopolitical zone, Nigeria observed that teachers generally had a positive influence on the academic performance of students. From the afore-listed literature, it can be seen that there is a vivid urge for teachers' factors or variables to improve the academic performance of students in biology. Teachers have to be up to task for the upcoming new challenges of their profession (Kusmawan, 2017). However, it is hard to find a study observing teacher variables in teaching biology in Sokoto and the link to student achievement; therefore, the need for this study is utmost.

Null Hypothesis

H_{01}: There is no significant effect on teachers' qualities with respect to their qualifications.
H_{02}: There is no significant effect on teachers' qualities with respect to teaching experience.
H_{03}: There is no significant effect of teachers' qualities in acquired knowledge with respect to the subject matter.
H_{04}: There is no significant effect of teachers' qualities with respect to pedagogical knowledge.

RESEARCH METHOD

Study Design

The descriptive survey design was adopted in this study. This method of design was adopted appropriately because it affords the researcher the opportunity to sample the opinion of the respondent on teachers' variables on the academic performance of students. This type of design allows generalization to be made from a large population when representative samples are drawn.

The population of the Study

The target population of this study consists of all secondary schools in Sokoto North and South Local Governments. This study is restricted to senior secondary school (SS II) biology students and biology teachers (both male and female) of senior secondary schools in Sokoto North and South Local Governments, Sokoto metropolis.

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Sample and Sampling Technique

Samples were selected through random sampling. This is a method in which each sample has an equal probability of being chosen. A sample of five senior secondary schools consisting of Two Hundred (200) SS 2 students (males and females) and ten (10) biology teachers were selected from the sampled secondary schools, which are: (1) G.D.S.S. Kofar Marke, (2) G.D.S.S. Kofar Rini, (3) G.D.S.S. Alkanci, all from Sokoto North, while (4) G.G. A. S. S. S/Birni, and (5) Sultan Atiku Secondary Schools from Sokoto South Local Governments of which forty (40) S.S II biology students and two (2) biology teachers were selected in each school. The purposive sampling technique will be used in order to examine the teachers' variables on the academic performance of students in the selected schools. The sample characteristic is shown in Table 1.

Table 1. Sample Characteristic

S/N	Name of School	Biology Teachers	Biology Student		
			Male	Female	Total
1.	G.D.S.S. Kofar Marke	2	25	15	40
2.	G.D.S.S. Kofar Rini	2	20	20	40
3.	G.G. A. S. S s/ birni	2	25	15	40
4.	G.D.S.S. Alkanci	2	25	15	40
5.	Sultan Atiku Secondary School	2	40	-	40
	Total	**10**	**135**	**65**	**200**

Instrumentation

The instrument for this study will be a structured questionnaire developed by the researchers. The researchers developed an instrument consisting of sections A & B. Section A elicits information on the personal data of respondents. Section B contains 20 items that elicit information on biology teachers' variables on the academic performance of senior secondary school students. The response to the items is rated as follows:

Strongly agree	(SA) 4
Agree	(A) 3
Disagree	(D) 2
Strongly disagree	(SD) 1

Validity of the instrument

Validity is the degree to which an instrument measures what it is designed to measure. It is an indication of the truthfulness of a test for the effectiveness of the instrument to be used (Udeani, 2010). The instrument was thoroughly scrutinized and approved by the project supervisor to ensure face and content validity. The instrument was reviewed based on the suggestions made.

Reliability of the Instrument

Reliability is the degree to which an instrument yields the same results on repeated trials. The test-retest method was used to determine the reliability of the research instrument in order to obtain the reliability of the instrument in this study; the same test was used to administer within an interval of two weeks to biology students of Sokoto North and South Local Government in Sokoto metropolis. Scores collated from the administered questionnaire were tested with Chi-square, at 0.05 level of significance, and the result was used to check the consistency of the instrument.

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Method of Data Collection

Data are information that includes facts, opinions, motives, intentions, and obtained knowledge that is used to analyze a problem. The questionnaire will be personally administered by the researcher to 200 biology students, both male, and female (SS 2), offering Biology and ten (10) biology teachers. Data collected was obtained from five (5) schools, namely; G.D.S.S. Kofar Marke, G.D.S.S. Kofar Rini, G.G. A. S. S S/ Birni, G.D.S.S. Alkanci, and Sultan Atiku Secondary Schools.

Method of Data Analysis

Data collected from the questionnaire was presented in a tabular form. Analysis of these data is done using frequency distribution descriptive methods. Research questions were answered using frequency distribution tables, while the hypotheses were tested using Chi-square in Statistical Package for Social Sciences (SPSS).

FINDINGS AND DISCUSSION

Introduction

Two hundred (200) and Ten (10) questionnaires were administered to students and biology teachers of G.D.S.S Kofar Marke, G. D. S. S. Kofar Rini, G. G. A. S. S. S/Birni G.D.S.S Alkanci And Sultan Atiku Senior Secondary Schools in Sokoto North and Sokoto South Local Governments of which forty (40) students and Two (2) biology teachers will be selected in each school. The entire questionnaire were duly completed and returned by the respondents. Analytical techniques involved frequency distribution tables.

Student's demographic characteristics

Table 2. Gender Distribution of the Respondents

Category	Frequency	Percentage (%)	Cumulative Percentage (%)
Male	95	47.5	47.5
Female	105	52.5	100.0
Total	200	100.0	

Source: field survey (2021)

Table 2 shows that 95 (47%) of the respondents are male, while 105 (52.5%) of the respondents are female.

Table 3. Age Distribution of the Respondents

Age	Frequency	Percentage (%)	Cumulative Percentage (%)
12-13 years	105	52.5	52.5
14-15years	65	32.5	85.0
16-17years	30	15	100.0
Total	200.0	100.0	

Source: field survey (2021)

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Table 4. Department Distribution of the Respondents

Class\discipline	Frequency	Percentage (%)	Cumulative percentage (%)
Science	95	47.5	47.5
Art	65	32.5	80.0
Commercial	40	20	100.0
Total	**200**	**100**	

Source: field survey, (2021)

Teacher's demographic characteristics

Table 5. Validity Statistics of Teachers' Demographic Characteristics

Gender	Age	Marital status	Education qualification
Male	35-40	4 married 2 single	NCE and BSc.
Female	35-40	3 married 1 single	NCE and BSc.

Source: field survey, (2021)

Table 6. Gender Distribution of the Respondents

Gender	Frequency	Percentage (%)	Cumulative Percentage (%)
Male	6	60	60
Female	4	40	40
Total	**10**	**100**	**100**

Source: field survey (2021)

Table 7. Age Distribution of the Respondents

Age	Frequency	Percentage (%)	Cumulative percentage (%)
35-36	2	20	20
37-38	5	50	50
39-40	3	30	30
Total	**10**	**100**	**100**

Source: field survey (2021)

Table 8. Marital Status Distribution of the Respondents

Marital Status	Frequency	Percentage (%)	Cumulative frequency
Married	7	70	70
Single	3	30	30
Divorce	0	0	0
Widow	0	0	0
Total	**10**	**100**	**100**

Source: field survey (2021)

Table 9. Educational Qualification Distribution of the Respondents

Qualification	Frequency	Percent (%)	Cumulative frequency (%)
NCE	6	60	60
BSc	4	40	40
Total	**10**	**100**	**100**

Source: field survey, (2021)

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Findings

Answering research question one: What is the effect of teacher's qualification on the academic performance of biology students in the Sokoto metropolis?

Table 11. Percentage Count of the Effect of Teachers' Qualities with Respect to Their Qualification

No.	Items	SA	A	D	SD	Total
1	My teacher uses adequate methods to aid learning	75	65	39	21	200
2	My teacher selects appropriate materials based on what he wants to teach and how to teach	66	74	20	40	200
3	My teacher quality is based on students' need	73	67	35	25	200
4	The introduction of my teaching methods in any way improves my understanding of biology	80	60	40	20	200
5	Teacher makes learning easier when they have good qualifications.	85	55	45	15	200
Total		**379**	**321**	**179**	**121**	**1000**
Percentage total		**37.9**	**32.1**	**17.9**	**12.1**	**100**

Source: field survey, (2021)

Table 11 shows that 379 (37.9%) of the respondents strongly agree that teachers use adequate methods to aid learning, 321 (32.1%) agree that teachers use adequate methods to aid learning, 179 (17.9%) disagree that teachers use adequate methods to aid learning and 121 (12.1%) strongly disagree that teachers use adequate methods to aid learning. Table 11 also shows that 379 (39.7%) of the respondents strongly agree that teachers select appropriate materials based on what he wants to teach and how to teach, 321 (32.1) agree that teachers select appropriate materials based on what he wants to teach and how to teach, 179 (17.9%) disagree that teachers select appropriate materials based on what he wants to teach and how to teach and 121 (12.1%) strongly disagree that teachers select appropriate materials based on what he wants to teach and how to teach.

Table 11 also shows that 379 (37.9%) of the respondents strongly agree that teachers' quality is based on students' needs, 321 (32.1%) agree that teachers' quality is based on students' needs, 179 (17.9%) disagree that teachers quality is based on students need and 121 (12.1%) strongly disagree that teachers quality is based on students need. Table 4.3.1 above also shows that 379 (37.9%) of the respondents strongly agree that the introduction of my teaching methods in any way improves my understanding of biology, 321 (32.1%) agree that the introduction of my teaching methods in any way improves my understanding of biology, 179 (17.9%) disagree that the introduction of my teaching methods in any way improve my understanding of biology and 121 (12.1%) strongly disagree that the introduction of my teaching methods in any way improves my understanding of biology. Table 11 above also shows that 379 (37.9%) of the respondents strongly agree that teachers make learning easier when they have good qualifications, 321 (32.1%) agree that teachers make learning easier when they have good qualifications, 179 (17.9%) disagree that teachers make learning easier when they have good qualifications and 121 (12.1%) strongly disagree that teachers make learning easier when they have good qualifications. Considering the percentage above, it is observed that the effects of teachers' qualities with respect to their qualifications are high, which modifies students' academic performance.

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Answering Research question two: What is the effect of teachers teaching experience on the academic performance of biology students in the Sokoto metropolis?

Table 12. Percentage Count of the Effect of Teachers' Qualities with Respect to Teaching Experience

No.	Items	SA	A	D	SD	Total
1	My teacher makes good use of communication skills due to their experience with the learning biology	73	67	35	25	200
2	My teacher uses clearer language in communicating the lesson	80	60	40	20	200
3	Effective teaching experience by my teacher plays a facilitating role in the teaching and learning process	85	55	45	15	200
4	My teacher's use of communication skills makes learning easier and more understandable	80	60	40	20	200
5	My teacher has good teaching experience.	80	60	40	20	200
Total		**398**	**302**	**200**	**100**	**1000**
Percentage (%) total		**39.8**	**30.2**	**20.0**	**10.0**	**100**

Source: field survey, 2021

Table 12 shows that 398 (39.8%) of the respondents strongly agree that teachers make good use of communication skills due to their experience towards the learning of biology, 302 (30.2%) agree that teachers make good use of communication skills due to their experience towards the learning of biology, 200 (20.0%) disagree that teachers make good use of communication skills is due to their experience towards the learning of biology, and 100 (10.0%) strongly disagree that teachers make good use of communication skills is due to their experience towards the learning of biology. It also shows that 398 (39.8%) of the respondents strongly agree that teachers use clearer language in communicating the lesson, 302 (30.2%) agree teachers use clearer language in communicating the lesson, 200 (20.0%) disagree that teachers use a clearer language in communicating the lesson and 100 (10.0%) strongly disagree that teachers use a clearer language in communicating the lesson. Also, 398 (39.8%) of the respondents strongly agree that teachers use clearer language in communicating the lesson, 302 (30.2%) agree that teachers use clearer language in communicating the lesson, 200 (20.0%) disagree that teachers use clearer language in communicating the lesson and 100 (10.0%) strongly disagree that teachers use a clearer language in communicating the lesson.

It also shows 398 (39.8%) of the respondents strongly agree that effective teaching experience by teachers plays a facilitating role in the teaching and learning process, 302 (30.2%) agree that effective teaching experience by teachers plays a facilitating role in the teaching and learning process, 200 (20.0%) disagree that effective teaching experience by teachers play a facilitating role in the teaching and learning process and 100 (10.0%) strongly disagree that effective teaching experience by teachers plays a facilitating role in the teaching and learning process. It shows that 398 (39.8%) of the respondents strongly agree that teachers' use of communication skills makes learning easier and understandable, 302 (30.2%) agree that teachers' use of communication skills makes learning easier and understandable, 200 (20.0%) disagree that teachers use of communication skills makes learning easier and understandable, and 100 (10.0%) strongly disagree that teachers use of communication skills makes learning easier and understandable. It also shows that 398 (39.8%) of the respondents strongly agree that their teachers have a good teaching experience, 302 (30.2%) agree that their teachers have a good teaching experience, 200 (20.0%) disagree that their teachers have a good teaching experience and 100 (10.0%) strongly disagree that their teachers have a good teaching experience. Considering the percentage above, it is

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observed that the effect of teachers' qualities with respect to teaching experience is high. This shows that most teachers in Sokoto state presently are experienced in their teaching, and this modifies students' academic performance.

Research question three: What is the effect of a teacher's knowledge of subject matter and concepts on the academic performance of biology students in the Sokoto metropolis?

Table 13. Percentage Count of the Effect of Teachers' Qualities with Respect to Subject-Matter Knowledge

No.	Items	SA	A	D	SD	Total
1	My teacher has a good knowledge of the subject matter	85	55	45	15	200
2	My teacher understands the content of what they teach and explain it well	85	55	45	20	200
3	My teacher's knowledge of the subject matter brings about a positive attitude in the students	90	40	45	25	200
4	My teacher's poor knowledge of the subject matter affects my interest in biology	80	60	45	15	200
5	My teacher delivers the lesson clearly, logically, and sequentially	85	55	40	20	200
6	My teacher has a good knowledge of the subject matter	95	45	40	20	200
Total		**520**	**310**	**260**	**115**	**1200**
Percentage total		**43.3**	**25.8**	**21.6**	**9.5**	**100**

Source: field survey, 2021

Table 13 shows that 520 (43.3%) of the respondents strongly agree that their teacher has a good knowledge of the subject matter, 310 (25.8%) agree that their teacher has a good knowledge of the subject matter, 260 (21.6%) disagree that their teacher has a good knowledge of the subject matter and 115 (9.5%) strongly disagree that their teacher has a good knowledge of the subject matter. Table 13 above also shows that 520 (43.3%) of the respondents strongly agree that their teacher understands the content of what they teach and explain well, 310 (25.8%) agree that their teacher understands the content of what they teach and explain well, 260 (21.6%) disagree that their teacher understand the content of what they teach and explain well and 115 (9.5%) strongly disagree that their teacher understands the content of what they teach and explain well. Table 13 above also shows that 520 (43.3%) of the respondents strongly agree that their teacher's knowledge of subject matter brings about a positive attitude in the students, 310 (25.8%) agree that their teacher's knowledge of subject matter brings about positive attitude in the students, 260 (21.6%) disagree that their teacher knowledge of subject matter brings about positive attitude in the students and 115 (9.5%) strongly disagree that their teacher knowledge of subject matter brings about positive attitude in the students.

Table 13 above also shows that 520 (43.3%) of the respondents strongly agree that their teacher's poor knowledge of subject matter affects their interest in biology, 310 (25.8%) agree that their teacher poor knowledge of subject matter affects their interest in biology, 260 (21.6%) disagree that their teacher poor knowledge of subject matter affects their interest in biology and 115 (9.5%) strongly disagree that their teacher poor knowledge of subject matter affects their interest in biology. It also shows that 520 (43.3%) of the respondents strongly agree that their teacher delivers the lesson clearly,

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logically, and sequentially, 310 (25.8%) agree that their teacher delivers the lesson clearly, logically, and sequentially, 260 (21.6%) disagree that their teacher delivers the lesson clearly, logically and sequentially and 115 (9.5%) strongly disagree that their teacher delivers the lesson clearly, logically and sequentially. Table 3.4.3 also shows that 520 (43.3%) of the respondents strongly agree that their teacher has a good knowledge of the subject matter, 310 (25.8%) agree that their teacher has a good knowledge of the subject matter, 260 (21.6%) disagree that their teacher has a good knowledge of the subject matter and 115 (9.5%) strongly disagree that their teacher has a good knowledge of the subject matter. Considering the percentage above, it is observed that the effect of teachers' qualities with respect to subject-matter knowledge is high. This shows that they have a good knowledge of the subject matter.

Research question four: What is the effect of teachers' pedagogical knowledge on the academic performance of biology students in the Sokoto metropolis?

Table 14. Percentage Count of the Effect of Teachers' Qualities with Respect to Pedagogy Knowledge

No.	Items	SA	A	D	SD	Total
1	My teacher's method of teaching is suitable for learning	80	60	45	15	200
2	My teacher uses a student-centered method when teaching.	85	55	40	20	200
3	Teaching methods provided by my teacher are a medium for effective teaching	95	45	40	20	200
4	The method used in teaching biology by my teacher affects my learning of biology positively.	80	60	45	15	200
5	Poor teaching method by teachers leads to poor performance and learning.	85	55	40	20	200
Total		**425**	**275**	**210**	**90**	**1000**
Percentage total		**42.5**	**27.5**	**21.0**	**9.0**	**100**

Source: Field survey, 2021

Table 14 shows that 425 (42.5%) of the respondents strongly agree that their teacher method of teaching is suitable for learning, 27.5% agree that their teacher method of teaching is suitable for learning, 210 (21.0%) disagree that their teacher method of teaching is suitable for learning and 90 (9.0%) strongly disagree that their teacher method of teaching is suitable for learning. Table 14 above also shows that 425 (42.5%) of the respondents strongly agree that their teacher uses a student-centered method when teaching, 275 (27.5%) agree that their teacher uses a student-centered method when teaching, 210 (21.0%) disagree that their teacher uses student-centered method when teaching and 90 (9.0%) strongly disagree that their teacher uses student-centered method when teaching.

It also shows that 425 (42.5%) of the respondents strongly agree that teaching methods provided by their teacher are a medium for effective teaching, 275 (27.5%) agree that that teaching method provided by their teacher is a medium for effective teaching, 210 (21.0%) disagree that that teaching method provided by their teacher is a medium for effective teaching and 90 (9.0%) strongly disagree that that teaching method provided by their teacher is a medium for effective teaching. It also shows that 425 (42.5%) of the respondents strongly agree that the method used in teaching biology by their teacher affects their learning of biology positively, 275 (27.5%) agree that the method used in teaching biology by their teacher affects their learning of biology positively, 210 (21.0%) disagree that the method used in teaching biology by their teacher affects their learning of biology positively and 90 (9.0%) strongly

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disagree that the method used in teaching biology by their teacher affects their learning of biology positively. Considering the percentage above, it is observed that the effect of teachers' qualities with respect to pedagogy knowledge is high.

Testing Hypothesis

H_{01}: There is no significant effect on teachers' qualities with respect to their qualifications.
H_{a1}: There is significant effect on teachers' qualities with respect to their qualifications.

Table 15. Correlation of Teachers' Qualities with Respect to Their Qualification

Teacher qualification		**TQ**	**Teachers' qualification**
TQ	Pearson Correlation	1	-.069
	Sig. (2-tailed)		.334
	N	200	200
Teachers' qualification	Pearson Correlation	-.069	1
	Sig. (2-tailed)	.334	
	N	200	200

Note: TQ= Teachers' quality
Source: field survey (2021)

The Pearson correlation value of -0.069 was less than 0.05 level of significance. Therefore, the alternate hypothesis that says there is a significant effect of teachers' qualities with respect to their qualifications is accepted, while the null hypothesis is rejected.

H_{02}: There is no significant effect on teachers' qualities with respect to teaching experience.
H_{a2}: There is significant effect on teachers' qualities with respect to teaching experience.

Table 15. Correlation of Teachers' Qualities with Respect to Teaching Experience

Teacher qualification		**TQ**	**Teachers' experience**
TQ	Pearson Correlation	1	.021
	Sig. (2-tailed)		.766
	N	200	200
TE	Pearson Correlation	.021	1
	Sig. (2-tailed)	.766	
	N	200	200

Note: TQ= Teachers' quality
Source: field survey (2021)

The Pearson correlation value of 0.021 was less than the 0.05 level of significance. Therefore, the alternate hypothesis that says there is a significant effect of teachers' qualities with respect to teaching experience is accepted, while the null hypothesis is rejected.

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H_{03}: There is no significant effect of teachers' qualities in acquired knowledge with respect to the subject matter.
H_{a3}: There is significant effect of teachers' qualities in acquired knowledge with respect to the subject matter.

Table 16. Correlation of Teachers' Qualities with Respect to Subject-Matter Knowledge

Teacher qualification		**TQ**	**Teachers' subject-matter**
TQ	Pearson Correlation	1	.013
	Sig. (2-tailed)		.852
	N	200	200
Teachers' subject-matter	Pearson Correlation	.013	1
	Sig. (2-tailed)	.852	
	N	200	200

Note: TQ= Teachers' quality
Source: field survey (2021)

The Pearson correlation value of 0.013 was less than the 0.05 level of significance. Therefore, the alternate hypothesis that says there is a significant effect of teachers' qualities with respect to subject-matter knowledge is accepted, while the null hypothesis is rejected.

H_{04}: There is no significant effect of teachers' qualities with respect to pedagogical knowledge.
H_{a4}: There is significant effect of teachers' qualities with respect to pedagogical knowledge.

Table 17. Correlation of Teachers' Qualities with Respect to Pedagogical Knowledge

Teacher qualification		**TQ**	**Pedagogical knowledge**
TQ	Pearson Correlation	1	-.093
	Sig. (2-tailed)		.192
	N	200	200
Pedagogical knowledge	Pearson Correlation	-.093	1
	Sig. (2-tailed)	.192	
	N	200	200

Note: TQ= Teachers' quality
Source: field survey (2021)

The Pearson correlation value of -0.093 was less than 0.05 level of significance. Therefore, the alternate hypothesis that says there is a significant effect of teachers' qualities with respect to pedagogical knowledge is accepted, while the null hypothesis is rejected.

Academic success or failure is related to numerous factors. In general, various studies that attempt to explain academic success or failure start with three components that intervene in education; parents, students, and teachers (Diaz, 2003). However, poor performance in biology examinations has led many researchers to investigate the factors that could be responsible for this. Among the variables identified are: Students'" poor study habits, low self-esteem, teacher factors (teacher quality), shortage of qualified teachers, inadequate teaching facilities in Schools, home and school environmental factors, and so on (Oludipe, 2002). Adodo (2007) argued that one key overriding factor for the success of students" academic achievement is the teacher. Balarabe et al.(2019) assert that the key factor in what comes out at the end of schooling is what goes on in the classroom. Mills (as cited in Wambugu and Changeiywo, 2008) states that teaching methods are crucial factors that affect the academic achievement of students,

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and no matter how well-developed and comprehensive a curriculum is, its success is dependent on the quality of the teachers implementing it (Ajaja, 2009). Usman (2003) submitted that the shortage of qualified teachers is responsible for the poor academic achievement observable among students. One report argued that poor knowledge of the subject matter, inadequate preparation, and poor labeling of diagrams were some of the variables that negatively reduced a candidate's performance.

CONCLUSION

Based on the findings of this study, it can be concluded that biology teachers' variables of good qualification, experience, and relations can positively impact the academic performance of students or schools in Sokoto Metropolis, Nigeria. Based on the findings of this study, it is necessary to say teachers should be exposed to seminars and workshops to upgrade and enhance their knowledge of biology and regularly supervised and monitored on the general aspect of teaching and learning. Teachers should be able to establish a good relationship with their students to enhance their interest in learning biology. Likewise, teacher education programs should be given much attention, especially in the area of course content, the quality of students being admitted, and the quality of teachers being produced. Lastly, regular and continuous professional development is paramount to developing and maintaining high-quality science and mathematics teachers; thus, the Ministry of Education should ensure that all teachers have the chance to improve their classroom instruction by receiving ongoing training aimed at professional growth and better student outcomes.

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