

Teachers' qualifications and students' academic performance in biology in senior secondary schools in Benue State, Nigeria

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ABSTRACT

The study examined the relationship between biology teachers' qualifications and students' academic performance in biology in public and private senior secondary schools in Benue State, Nigeria. A descriptive correlational survey design was used for the study. Three research questions and three hypotheses guided the study. The population comprised biology teachers and students in government-approved public and private schools in Benue State. The sample consisted of 100 teachers and 200 students randomly selected from 50 senior secondary schools (25 public schools and 25 private schools, respectively) using purposive sampling technique. The Biology Teachers Qualification Checklist (BTQC) and past examination results of students in biology were used for data collection. The data collected were analyzed using percentages, independent t-tests, and Pearson Product Moment Correlation (PPMC). The findings revealed that the difference between the percentage of qualified biology teachers in public and private secondary schools is statistically significant in favor of biology teachers in public senior secondary schools ($t = 0.055$, $P < 0.005$). It was also found that there is a significant relationship between teachers' qualifications and students' academic performance in biology in both public ($r = 0.899$, $P < 0.005$) and private senior secondary schools ($r = 0.794$, $P < 0.005$). The study recommended, among other things, that the state ministry of education and all stakeholders should ensure that, irrespective of the school's status, qualified biology teachers are available to cover the syllabus, and regular workshops should be organized for biology teachers to enhance their competence levels to improve students' academic performance.

Keywords: Teachers' qualifications, academic performance, biology, public senior secondary schools, and private senior secondary schools.

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Highlights of this paper

- The study investigated the relationship between teachers' qualifications and students' academic performance in Biology in public and private Senior Secondary Schools in Benue State, Nigeria.
- The relationship between teachers' qualifications and students' academic performance was measured using the Biology Teachers Qualification Checklist (BTQC) and students' past examination results in biology from 50 senior secondary schools (25 public and 25 private schools) in the study area, employing a purposive sampling technique.
- It was found that there is a significant relationship between teachers' qualifications and students' academic performance in Biology in both public ($r = .899$, $P < 0.005$) and private senior secondary schools ($r = .794$, $P < 0.005$), respectively.

1. INTRODUCTION

The 21st century educators, government, parents, and society in general have been interested in the academic performance of students. This is due to the significant importance that education has on the national development of countries worldwide (Senge, 2016). Abimbola and Abidoeye (2018) pointed out that one key overriding factor that may determine students' academic success is the quality of the teacher. A teacher is an expert who is capable of imparting knowledge that will help learners to build, identify, and acquire skills that will be used to face challenges in life (Mbise, 2015). Thereby providing learners with the knowledge, skills, and values that enhance development. A teacher is a person capable of creating behavioral change in terms of cognitive, psychomotor, and affective domains (Senge, 2016). The author maintained that a qualified teacher is an educated person with higher qualifications and experience who is capable of utilizing available opportunities in any subject of specialization to impart knowledge. This implies that teachers impart knowledge at all levels of education based on their qualifications.

Teacher qualifications are one of the major factors affecting the quality of teaching and learning in schools, even in the 21st century. To improve students' performance levels, teachers must be knowledgeable and strive to stay informed about the most up-to-date methods and techniques in teaching. Ibrahim (2016) and Ali (2017) opine that teachers' qualifications are specific skills, experiences, or knowledge that make an individual suitable for teaching. The authors emphasize that qualified teachers must possess pedagogical knowledge, which can positively influence students' learning. Ajayi (2017) opines that teachers' qualifications and levels of exposure or experience can significantly influence students' academic performance. The author emphasizes that teachers play a crucial role in preparing students, especially at the senior secondary level, to perform well in examinations. Education at this level serves as the foundation for higher learning in tertiary institutions. Therefore, effective classroom teaching is unlikely to be achieved without teachers possessing the necessary qualifications.

Consequently, Tim, Agboghroma, and Oyovwi (2015) opine that teachers' qualifications and teaching quality may determine students' academic performance because academic performance is a measure of students' learning and acquisition of certain skills at the end of teaching and learning activities. Students' academic performance begins with students' participation in class activities and continues until the end of the term or session, with the results of examinations written by students often reflecting their learning (Ajayi, 2017; Musau & Abere, 2015). The authors emphasized that the extent to which a student accomplishes a given task depends on their understanding of the task or learning activity. Biology, which is the main focus of this study, is a natural science concerned with the study of life and living organisms, including their structure, function, growth, evolution, distribution, and taxonomy. It enables individuals to understand themselves and their environment. By studying biology, students learn to make more informed decisions about their health and significant biological issues such as genetically modified crops, the use of antibiotics, and the eradication of invasive species. Biologists contribute to medical and biotechnological advances (Michael, 2017).

Biology provides students with meaningful and relevant scientific knowledge that is applicable in health, agriculture, personal, and community daily life matters, as well as in the development of functional scientific attitudes. [Ajaja \(2019\)](#) states that biology is applied in many fields of science such as medicine, biotechnology, biochemistry, pharmacy, microbiology, and agriculture, among others. It is emphasized that at least a credit-level pass in the senior secondary school certificate examination (SSCE) is necessary for any prospective student who wishes to study science-related courses at a tertiary institution. Therefore, there is an increasing demand for effective teaching and learning of biology, with particular emphasis on teachers' characteristics such as qualifications and experience to improve students' performance ([Kola & Sunday, 2015](#); [Ajayi, Achimugu and Audu, 2025](#)).

Public senior secondary schools are schools owned and operated by the government. It is free for everyone to attend a secondary school owned by the government. Private senior secondary schools are schools owned by individuals or private organizations, not supported financially by the government, and parents must pay for their children to attend. Although all schools (public and private secondary schools) offer biology, students' performance in the subject may be affected by various factors such as school type, teacher qualifications, teaching methods, biology laboratories, and facilities, among others ([Ali, Toriman, & Gasim, 2022](#); [Ajayi, Ameh, and Alabi, 2025](#)). However, [Yara \(2024\)](#) concluded that teachers with good qualifications and communication skills, as well as effective use of teaching aids, positively influence instructional effectiveness. Conversely, teachers lacking good communication skills tend to have poor instructional delivery in basic science. Similarly, [Onacha \(2023\)](#) concluded that qualification influences teaching effectiveness in basic science in secondary schools in Enugu North.

In another related study, [Sass and Harris \(2016\)](#) opine that teachers' job group and teachers' qualifications are factors that contribute significantly to students' academic performance in chemistry. However, [Udom \(2013\)](#) reported that teachers' qualifications were not among the variables affecting students' academic achievement in basic science. Studies on teachers' variables, such as qualifications, continue to yield inconsistent results. Records from the West African Senior School Certificate Examination (WASSCE) and the National Examination Council of Nigeria (NECO) from 2019 to 2023 show average to poor student performance in Biology in Nigeria. It is unclear what is responsible for this unsatisfactory academic performance in the subject, despite the use of different teaching aids by teachers. Therefore, the researcher opines that this poor academic achievement may be due to some teachers' variables, such as teaching quality and qualifications. Hence, the present study investigates the relationship between biology teachers' qualifications and students' academic performance in public and private senior secondary schools in Benue State, Nigeria.

1.1. Purpose of the Study

The purpose of the study is to ascertain the relationship between teachers' qualifications and students' academic performance in Biology in public and private Senior Secondary Schools in Benue State, Nigeria. Specifically, to:

1. Ascertain the percentage difference between qualified biology teachers in public and private secondary schools in Benue State.
2. Find out the relationship between teachers' qualifications and students' academic performance in biology in public senior secondary schools in Benue State.
3. Find out the relationship between teachers' qualifications and students' academic performance in biology in private senior secondary schools in Benue State.

1.2. Research Questions

The following questions will be answered in the study.

1. What is the percentage difference between qualified biology teachers in public and private secondary schools in Benue State?
2. Is there any relationship between biology teachers' qualifications and students' academic performance in biology in public senior secondary schools in Benue State?
3. What is the relationship between biology teachers' qualifications and students' academic performance in biology in private senior secondary schools in Benue State?

1.3. Hypotheses

The following null hypotheses have been generated to guide this study.

1. There is no significant difference between the percentages of qualified biology teachers in public and private secondary schools in Benue State.
2. There is no significant relationship between teachers' qualifications and students' academic performance in Biology in public senior secondary schools in Benue State.
3. There is no significant relationship between teachers' qualifications and students' academic performance in biology in public and private senior secondary schools in Benue State.

2. METHODOLOGY

The study examined the relationship between teachers' qualifications and students' academic performance at public and private senior secondary schools in Benue State, Nigeria. A descriptive correlational survey design was used for the study. The population comprised all biology teachers and students in government-approved public and private senior secondary schools in Benue State. The sample consisted of 100 teachers (50 biology teachers from public schools and 50 from private schools) and 200 students (100 from public schools and 100 from private schools), randomly selected from 50 senior secondary schools (25 public and 25 private) in the study area using purposive sampling techniques. The public secondary schools included Government Secondary School Agila Ado; Methodist High School Igumale Ado; Government Secondary School Ulayi Otukpo; Saint Michael's College Apa-Agila Otukpo; Methodist High School Obagagi; Saint Bernard's Secondary School Aila-Agatu; ACSS Aila Agatu; Onoja Memorial High School Igoro; Apa Demonstration College Ugbokpo; Christ the King Academy Ugbokpo; Tombo Community Secondary School Buruku; Atta Secondary School Adi; Royal Secondary School Buruku; Saint Michael's College Anvambe; Comprehensive College Ijer; Dooshima High School Tyowanye; NKST Secondary School Wuna-Tobo; Mbativ Secondary School Gbemacha; Malamin Secondary School Gboko; Saint John's Day Secondary School Gboko; King Comprehensive College Mkar; Mkar Model College Mkar; Kusaki College Yandev; Government Secondary School Makurdi; and NKST Secondary School Makurdi.

The private secondary schools included are King International Secondary School Ikpayongo; Savior International College Zaki-Biam; God's Heritage Academy Zaki-Biam; Victory Academy Makurdi; Trust Academy Makurdi; Corona Private School Makurdi; Alven International School Makurdi; Royal College Gboko; Akpur College Gboko; Blessing Memorial College Ugba; Joyson Academy Ikpa; Mbahuan Divine Mercy College Gbor-Tongor; Divine Kiddies Academy Otukpo; Reformed Christian International Secondary School Alaide; Sunshine Secondary School Wannune; KWA Wisdom College Wannune; James Kuv College Wannune; Divine Favour Secondary School Ikachi; Progressive Secondary School Oju; Yisaikyo Millennium College Ugbema; Felix Makir Igbo Memorial Academy Naka; Lady Priscilla Secondary School Ugba; Divine Grace College Ihugh; Suranto Unique Academy Koti; and St. Pius Group of Schools Katsina-Ala.

Biology teachers' qualification checklist (BTQC) and past examination results of students in biology were used for data collection. Purposive sampling technique was employed to select 10 public senior secondary schools and 10 private senior secondary schools that offered biology at the senior secondary school certificate examination for over five years. The examination results of students with SSCE results for the 2023/2024 set were utilized. The results were categorized by school status (public and private schools). The biology results of students in SSCE for the 2023/2024 set, conducted by the West African Examinations Council (WAEC), provided data on academic performance in biology in public and private senior secondary schools in Benue State, Nigeria. The researcher used an inventory to collect students' result scores (data). The data collected consisted of results from standard examinations already validated by WAEC. Additionally, the Biology Teachers Qualification Checklist (BTQC) was validated by two experts in science education and test and measurement. The reliability coefficient of the instrument was determined using Cronbach's alpha, which was 0.80. The BTQC was administered to respondents by the researchers. The collected data were analyzed using descriptive statistics, including percentages, means, and standard deviations, while hypothesis one was tested using an independent t-test. Hypotheses two and three were addressed using Pearson Product Moment Correlation (PPMC).

3. RESULTS

Research Question 1: What is the percentage difference between qualified biology teachers in public and private secondary schools in Benue State?

Table 1. Percentage of biology teachers' qualifications in public and private schools.

S/N	Qualification	Public schools (n =50)		Private schools (n = 50)		
N	Certificate(s)	NO	%	NO	%	Decision
1	NCE	16	32	10	20	Qualified
3	OND	10	20	7	14	Unqualified
4	HND	06	12	8	16	Unqualified
5	B. ED	09	18	4	8	Qualified
6	B.SC	04	8	14	28	Unqualified
7	B.SC ED	02	4	1	2	Qualified
8	M.ED	03	6	2	4	Qualified
9	M.SC ED	-	-	4	8	Qualified
10	Others	-	-	-	-	-
	Total	50	100	50	100	

Note: Summary

Public schools: Total qualified teachers = 56% Private schools: Total qualified teachers = 48% Total unqualified teachers in public sch = 44% Total unqualified teachers in private sch =52%.

Results in Table 1 of research question 1 on the qualification of teachers handling Biology in Benue State. The question was investigated through a questionnaire. The results indicate that out of the 100 Biology teachers sampled in the study area, 56% are qualified to teach Biology in public schools, while 44% are not qualified. In private schools, 48% of teachers are qualified, and 52% are not. This implies that the percentage of qualified Biology teachers in public schools (56%) is higher than in private schools (48%).

Research Question 2: Is there a relationship between biology teachers' qualifications and students' academic performance in biology in public senior secondary schools in Benue State?

Table 2. Relationship analysis between teacher's qualification and academic performance in biology in public senior secondary schools.

Variables	N	Mean \bar{x}	Std.dev δ	r	Remark
Teachers' qualification	100	3.3611	0.53892	0.899**	Strong relationship
Relationship					
Academic performance (Public schools)	100	3.3892	0.63001		

Note: N: Number; r: Relationship **: Positive.

Table 2 reveals the relationship between teachers' qualifications and students' academic performance in biology in public senior secondary schools. The results indicate that there is a strong positive relationship between teachers' qualifications and students' academic performance ($r = .899$). This implies that the higher the qualifications of teachers teaching biology, the better the students' academic performance in biology in public senior secondary schools in Benue State, Nigeria.

Research Question 3: What is the relationship between biology teachers' qualifications and students' academic performance in biology in private senior secondary schools in Benue State?

Table 3. Relationship analysis between teacher's qualification and academic performance in biology in private senior secondary schools.

Variables	N	Mean \bar{x}	Std.dev δ	R	Remark
Teachers' qualification	100	3.2460	0.53820	0.794**	Strong relationship
Relationship					
Academic performance (Private schools)	100	3.3849	0.69331		

Note: N: Number; r: Relationship **: Positive .

Table 3 reveals the relationship between teachers' qualifications and students' academic performance in biology in private senior secondary schools. The result indicated that there is a strong positive relationship between teachers' qualification and students' academic performance ($r = .794$). This implies that the higher the qualifications of teachers handling biology, the higher the students' academic performance in biology in private senior secondary schools in Benue State, Nigeria.

Hypothesis 1: There is no significant difference between the percentage of qualified biology teachers in public and private secondary schools in Benue State.

Table 4. t-test analysis of qualified biology teachers in public and private senior secondary schools in Benue State.

Variables	N	Percentage %	t	df	P	Decision
Public schools	50	56	0.055	98	0.00	Rejected
Private schools	50	48				

Note: N: Number; df: Degree of freedom; t: t-test.

Table 4 presents the t-test analysis of qualified biology teachers in public and private senior secondary schools in Benue State. The data in **Table 4** indicates that there is a significant difference in the percentage of qualified biology teachers in public and private senior secondary schools in Benue State ($t = 0.055$, $P < 0.005$). Therefore, the null hypothesis is rejected. This suggests that the difference in the percentage of qualified biology teachers between public and private secondary schools is statistically significant, favoring biology teachers in public senior secondary schools.

Hypothesis 2: There is no significant relationship between teachers' qualifications and students' academic performance in Biology in public senior secondary schools in Benue State. The results of hypothesis 2 are presented in the table.

Table 5. Pearson correlation between teachers' qualifications and academic performance in public senior secondary schools.

Variables	N	r	p – value	Remark
Teachers' qualification	100			
Relationship		.899**	0.000	Significant
Academic performance (Public schools)	100			

Note: N: Number; r: Relationship.

Table 5 presents the Pearson correlation test results for the relationship between biology teachers' qualifications and students' academic performance in biology in public senior secondary schools in Benue State. The data in Table 5 reveal that the Pearson product-moment correlation between teachers' qualifications and students' academic performance in public schools was found to be statistically significant ($r = .899$, $P < 0.005$). Therefore, the null hypothesis that there is no significant relationship between teachers' qualifications and students' academic performance in public schools was rejected. This indicates a significant relationship between teachers' qualifications and students' academic performance in biology in public senior secondary schools in Benue State, Nigeria.

Hypothesis 3: There is no significant relationship between teachers' qualifications and students' academic performance in Biology in private senior secondary schools in Benue State. The results of hypothesis 3 are presented in the table.

Table 6. Pearson correlation between teachers' qualifications and academic performance in private senior secondary schools.

Variables	N	r	p – value	Remark
Teachers' qualification	100			
Relationship		.794**	0.000	Significant
Academic performance (Private schools)	100			

Note: N: Number; r: Relationship.

Table 6 presents the Pearson correlation test results for the biology teachers' qualifications and students' academic performance in biology in private senior secondary schools in Benue State. The data in Table 6 reveal that the Pearson product-moment correlation between teachers' qualifications and students' academic performance in private schools was found to be statistically significant ($r = .794$, $P < 0.005$). Therefore, the null hypothesis that there is no significant relationship between teachers' qualifications and students' academic performance in private schools was rejected. This indicates that there is a significant relationship between teachers' qualifications and students' academic performance in biology in private senior secondary schools in Benue State, Nigeria.

4. DISCUSSION OF FINDINGS

The study examined the relationship between biology teachers' qualifications and students' academic performance in public and private senior secondary schools in Benue State, Nigeria. The findings revealed that the percentage of qualified biology teachers in public schools (56%) is higher than in private schools (48%). An independent t-test showed that the difference in the percentage of qualified biology teachers between public and private secondary schools is statistically significant, favoring public senior secondary schools. This finding aligns with Onacha (2023), who investigated teachers' qualifications and teaching effectiveness in basic science in secondary schools in Enugu North. The study by Onacha (2023) revealed that 60% of teachers in public schools and 67% in private schools are not qualified to teach basic science. The likely reason for this outcome may be that biology teachers in public senior secondary schools in Benue State tend to hold more advanced degrees, such as Bachelor's or Master's degrees in Education, and have more years of teaching experience compared to their counterparts in private schools. Additionally, teachers in public schools are more likely to participate in professional development training, often

sponsored by the government, compared to teachers in private schools. Furthermore, public senior secondary schools are generally subject to stricter state and federal regulations regarding teacher qualifications and training.

The findings of the study revealed that there was a significant relationship between teachers' qualifications and students' academic performance in Biology in both public and private senior secondary schools. This study aligns with [Yara \(2024\)](#), who conducted research on teachers' qualifications and teaching aids in different school types and academic performance in basic science in secondary schools in Boki Local Government Area of Cross River State. The study employed a survey research design. [Yara \(2024\)](#) concluded that teachers with good qualifications and communication skills, as well as effective use of teaching aids, positively influence instructional effectiveness. Conversely, teachers lacking good communication skills tend to have poor instructional delivery in basic science. Similarly, [Onacha \(2023\)](#) concluded that qualification influences teaching effectiveness in basic science in secondary schools in Enugu North. The study also emphasized that teachers should be effectively trained to facilitate lesson delivery, regardless of the teacher's gender. In the same vein, [Ajayi \(2017\)](#) conducted a study on teachers' qualifications and science teachers' classroom behavior in secondary schools in Ikot Abasi Local Government Area. The findings of the study revealed that teachers with a Certificate (Nigeria Certificate in Education (NCE)) and a Bachelor of Science in Education (B.Sc.Ed.) differ significantly in the course of instruction from teachers with a Bachelor of Science in Education (B.Sc.) and a Master's Degree in Science Education (M.Sc.Ed.). [Ajaja](#) concluded that the instructional effectiveness of teachers is significantly influenced by their level of exposure, which is evidenced by their qualifications. [Udom \(2013\)](#) investigated teachers' variables and students' academic achievement in basic science based on laboratory activities in a private secondary school in Calabar Education Zone, Cross River State, Nigeria. However, the results of the present study are contrary to those of [Udom \(2013\)](#), who reported that teachers' qualifications were not among the variables affecting students' academic achievement in basic science. In another related study, [Sass and Harris \(2016\)](#) examined the effect of teachers' qualifications on secondary school students' academic performance in chemistry in Ilorin, Nigeria. The findings showed that factors contributing significantly to students' academic performance in secondary schools include teachers' job groups and teachers' qualifications. The likely reason why most research, such as studies by [Yara \(2024\)](#), [Onacha \(2023\)](#), [Ajaja \(2019\)](#), [Ajayi \(2017\)](#), and [Sass and Harris \(2016\)](#) concluded that teachers' qualifications have a significant relationship with students' academic performance. This may be because teachers with higher qualifications tend to have better teaching quality, which includes effective communication, classroom management skills, subject matter knowledge, and pedagogical skills. Biology teachers with higher qualifications and more years of teaching experience are better equipped to engage students, deliver instructions effectively, and utilize technological pedagogical tools, ultimately leading to improved academic performance.

5. CONCLUSION

It was concluded that the percentage of qualified biology teachers teaching in public schools (56%) is higher than that in private schools (48%). Therefore, the difference in the percentage of qualified biology teachers between public and private secondary schools is statistically significant in favor of public senior secondary schools. It was also concluded that there is a significant relationship between teachers' qualifications and students' academic performance in biology in both public and private senior secondary schools. To maintain Nigeria's top ranking in global competitiveness in biological sciences, it is necessary for the government and all stakeholders in education to revisit strategies so that issues related to teacher qualifications, which hinder effective biology teaching in both public and private secondary schools, can be appropriately and promptly addressed.

6. RECOMMENDATIONS

The following recommendations were made:

1. Private school owners and the government through the Ministry of Education should ensure that qualified teachers are employed for effective teaching of biology, especially in private senior secondary schools in Benue State, Nigeria.
2. Private school owners and the Ministry of Education should encourage biology teachers' involvement in professional development training that could improve teaching quality, skills, and educational qualifications.
3. Qualified and non-qualified in-service biology teachers should be monitored and motivated to ensure effective instructional delivery, ultimately leading to improved academic performance.

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