



THE IMPACT OF STABLE AND QUALIFIED SCIENCE TEACHERS ON STUDENTS' ACADEMIC PERFORMANCE IN SCIENCE IN BAUCHI, BAUCHI STATE-NIGERIA.

ALI MUHAMMAD MUTAH^{1*}, PROFESSOR RAKIYA MAIWADA ABUBAKAR², DR. ABDULKARIM ALI DEBA³, DR. ALI ABDU GIGINYU⁴ & SALISU BASHIR CHIROMA⁵

^{1,2,3,4&5} Department: Primary Education, Faculty: Education, Federal University Dutse, Jigawa State, Nigeria.

ARTICLE HISTORY

RECEIVED

16-07-2026

ACCEPTED

20-07-2026

PUBLISHED

23-07-2026

Corresponding author:

ALI MUHAMMAD
MUTAH

Department: Primary Education,
Faculty: Education, Federal
University Dutse, Jigawa State,
Nigeria.



Abstract

This study assessed the impact of stable and qualified science teachers on students' academic performance in science in Bauchi State, Nigeria. The key variables examined included teacher experience [as an indicator of stability], teacher quality and teacher qualifications. Data on students' academic performance were obtained from the senior secondary certificate examination for the years 2020, 2021, and 2022. The data were analyzed using the spearman Rank Order Correlation Coefficient to test two hypotheses. The objectives of the study were to examine the impact of stable and qualified science teachers on student academic performance; determine the effect of science teacher qualifications on performance in public secondary schools, assess the influence of teacher stability [length of retention] on students' learning outcomes, and evaluate the combined effect of teacher qualifications and stability on performance in science subjects. The findings revealed that teacher qualifications and experience were not significantly related to students' academic performance, as the calculate correlation coefficients.

($r = 0.46$ and $r = 0.2$) were lower than the critical [tabulated] values. Based on these findings, the study recommends the employment of qualified science teachers, improved recruitment processes, continuous training and regular workshops, ongoing professional development, provision of adequate teaching and learning resources, and motivation through incentives. Furthermore, emphasizes the need for effective monitoring and supervision of teachers, as well as the provision of a conducive learning environment by the government. Finally, the study suggests that further research should be conducted periodically to reassess these variables.

Keywords; Teacher Stability [Years Experience], Teacher Qualification, Science Students, Academic Performance, Science Subjects.

Background of the study

Education plays a fundamental role in the development of individuals and society, and at the heart of every effective educational system lies the teacher. The quality, stability, and qualification of science teachers, in particular, are critical determinants of students' academic performance, especially in subjects that require conceptual understanding, practical application and critical thinking. In the recent survey of the effect of teacher characteristics on student test scores by Coenen et al. (2018), science was among the subjects analyzed in only 11 of the 58 reviewed studies, while the majority of studies focused on mathematics and/or reading. The lack of interest in science is at odds with the current educational and political debate. Call for nurture science skills in school to address the need for employees with a STEM background and for a scientifically literate public have been pervasive in the last decade (Crnevale, Smith, and Melton 2011; PCAST 2012; OECD 2016; European Commission; DG Employment Social Affairs and Inclusion 2020). Furthermore, science education prepared students with the knowledge and skills needed for technological advancement, problem-solving, and national development. However, performance in science is not determined only by curriculum content or availability of facilities, it is strongly influenced by the quality and stability of teachers who deliver instruction in the classroom UNESCO, (2017). The quality science education depends on the science teachers as reflected in the performance of their duties Darling-Hammond, 2000; Briggs et al, (2012). This concern is supported by studies which reveal that the persistent poor performance of students in secondary school examination has become a national issue, attracting attention from stakeholders in the education sector Adeogun and Osifila (2022). The success of any teaching and learning process which invariably influences students' academic performance depend greatly on how effective and efficient the teachers are; no matter how good an education policy may be on paper, it may fail to achieve its target goals, if not properly implemented by teachers who are educational policy implementers. The efficiency of any institution depends on the academic competence of the teaching staff, since no education system can rise above the quality of its teacher (FRN, 2014, p. 39). Nigeria is part of a 'learning crises, where many students are in school but not learning effectively UNESCO and World Bank, (2023). Decline in the quality of science education cannot be ignored by anyone who is aware of the significant roles of science education as an instrument of societal transformation, technology and development.

Ifunanya et al, (2025) study on students' poor performance in science subject in west African school certificate examination in Enugu state shows that the causes of students' poor performance in science subjects in West African senior school certificate examination are multi-dimensional some of which include; lack of qualified science teachers, teachers' poor teaching methods, students lack of interest in science subjects, lack of parents' supervision of their children 's' class work and academic performance, lack of qualified teachers' in the field of science. Another study carried out in Obafemi Awolowo University, Ile-Ife, Osun state, 2024 found that trained teacher is one who can translate the school curriculum into vivid reality, and can transmit vital information which positively impact on students' performance (Marzano and Robert, 2017). Studies conducted by Laura, (2022) on the effect of science teachers' instruction and methodological competences on science students' academic performance in secondary schools in River state revealed that science teachers' instructional process competences affect students' academic performance and science teachers' methodological competences

during instruction advances students' academic performance. According to UNAS (2016), in 2005 the government of Uganda made science subjects compulsory for secondary school students at 'O' level and committed itself to preferentially fund university students taking science course. Under this new policy, biology, chemistry, and physics classes were made compulsory for all secondary school students, and science students would receive the majority (75 percent) of the government scholarships to universities and other tertiary education institutions. However, the performance of students in science subjects has remained poor. In Nigeria Idris (2023) research shows that, there is persistent decline in performance of secondary school students in physics, chemistry and mathematics have been attributed to poor teaching methods, unstable stable, unqualified and inexperienced science teachers, poor student attitude toward science, and poor learning environment.

Furthermore, Teacher qualification and experience has been widely recognized as a key determinant of students' academic success. Teachers' instructional competences, researchers have argued that competence is a function of teacher qualifications Aghenta,2020; Ololube, 2018b, 2019) which suggests that the extent to which a teacher could be competent in teaching seem to depend largely on the teacher's qualification. However, it is not only the qualification obtained, but length of teaching experience of a teacher and actual achievement in terms of subject-matter competence. Qualified teachers are those who possess formal training in education, subject-matter expertise, and relevant teaching certifications. According to Linda Darling-Hammond (2021), teachers' subject knowledge and pedagogical preparation significantly influence students' learning outcomes, particularly sciences. Teachers who are well-trained are better equipped to use effective instructional strategies, adapt to student' learning needs, and create engaging classroom environments that promote understanding and retention of scientific concept. According to Cofeter, (2019) students typically perform higher on test taken by teachers who have advanced degrees on education or specialized training in their topic, especially in science, chemistry, and mathematics.

Moreover, to qualification, teacher stability is another crucial factor affecting students' academic performance. Teacher stability refers to the consistency and continuity of teachers within a school over time. Frequent teacher turnover, transfers, or absenteeism can disrupt the learning process and negatively impact students' achievement. Barber and Mourshed (2024 p.61) found that schools with stable teaching staff tend to achieve better academic outcomes because consistent instruction allows for better curriculum coverage and strong teacher-student relationships. Stability enables teachers to monitor students' progress effectively and provide continuous academic support. Lopez-Martin et al (2023), Sanfo and Malgoubri, (2023) indicate that students who have access to highly qualified teachers achieve a higher rate of success.

In addition, science subjects often require practical demonstrations, laboratory work, and inquiry-based learning approaches. Qualified science teachers are more likely to employ these methods effectively, thereby enhancing students' critical reasoning and problem analytic skills. According to Organization for Economic Co-operation and Development (2016), teacher quality include qualifications, experience, and professional development is one of the most significant school-related factors influencing student achievement. The report emphasizes that student perform better when taught by teachers who are have strong content knowledge and the ability to apply diverse teaching strategies.

Statement of the Problem

The Federal government of Nigeria has, over the years, implemented various initiatives aimed at promoting the development of science and technology education in the country. One notable effort is the establishment and expansion of specialized science secondary schools designed to enhance the teaching and learning of science subjects. These schools are equipped to provide a more focused and enriched science curriculum, thereby fostering students' interest and competence in scientific disciplines. According to the Federal ministry of education Nigeria (2013) the creation of unity schools and special school forms part of the national strategy to strengthen science education and produce skilled manpower in science and technology related fields. Furthermore, NERDC (2013) emphasized that science focused institutions were established to support effective curriculum implementation and improve students' performance in science subjects. Despite the need for meaningful science teaching in Nigerian, there is a wide shortage of qualified and stable teachers of science in Nigeria. (Aina, 2020, Luketic and Dolan, 2022, Cho and Baek, 2024) students poor performance science subjects mainly caused by inadequate learning resources and teacher related challenges. The lack of instructional materials and poorly equipped laboratories limits effective teaching and practical understanding. At the same time issues, such as shortage of qualified science teacher, poor remuneration, employment of underqualified science teacher, insufficient training reduced the quality of instruction and teacher training [in service and pre service], stability teacher years of experience contributed to student poor performance. Factors like teacher instability and limited teaching experience further weaken students learning outcomes. Overall, both inadequate facilities and ineffective science teacher preparation significantly contribute poor academic achievement in science. Unqualified or underqualified teacher often lack the pedagogical skills necessary for effective science teaching particularly in practical and inquiry-based learning. The OECD (2018) study's that teacher quality has direct and measurable impact on student performance and engagement in science subjects.

Objectives of the study

1. To determine the effect of science teachers' qualifications on students' academic performance in public secondary schools in Bauchi State.
2. To assess the influence of teacher stability [length of retention] on students' academic performance in science.
3. To determine the combined effect of teacher qualification and stability on students' academic performance in science subjects

Research questions

1. What is the relationship between science teachers' qualifications and students' academic performance in science in Bauchi State
2. How does teacher stability affect students' academic performance in science
3. What is the combined influence of teacher qualification and stability on students' academic performance in science subjects.

Research hypotheses

1. There is no significant relationship between science teachers' qualifications and students' academic performance in Bauchi state.
2. Teacher stability has no significant effect on students' academic performance in science.
3. There is no significant combined effect of teacher qualification and stability on students' academic performance in science subjects.

Research Methodology

The study was conducted in Bauchi State, Nigeria, which comprises 20 Local Government Areas. It investigated the inter-relationship between teacher quality and stability (measured in years of experience) and students' academic performance in three core science subjects; Chemistry, Mathematics, and Physics. Students' grades in these subjects were treated as the dependent (criterion) variable, while teachers' qualifications, quality, and stability (years of experience) were considered the independent variables. A descriptive survey research design was employed for the study. This approach involved the collection and analysis of students' academic records and teachers' qualifications through the use of unstructured interviews and documentary evidence. The target population include all secondary school science students and their teachers in Bauchi State. The sample for the study consisted of 94 teachers drawn from six secondary schools across the state, as well as all science students from these selected schools who sat for the Senior Secondary Certificate Examination (SSCE) in the 2020, 2021, and 2022 academic session. The instrument used for data collection included students' SSCE results in Chemistry, Mathematics, and Physics for the years 2020, 2021 and 2022 from the six selected secondary schools across the three senatorial zones of Bauchi state. Additionally, data on teachers' qualifications and years of teaching experience in the respective schools were collected and analyzed.

TABLE 1: Teacher quality and their grades

Qualification	Grades points
BSc. Ed, B. ed, B. Sc	5
B. Sc	4
HND and PGDE	3
HND	2
NCE	1

The teacher years of experience was also graded

TABLE 2: Teacher years of experience and their graded

Teacher years of experience	Grades points
1-5	1
6-8	2
9-10	3
10 Above	4

These was no pilot study carried out on senior school certificate examination results since these results usually go through series of pilot study.

RESULT AND DISCUSSION

TABLE 1: Teachers quality by qualification in selected secondary schools.

Schoos	University graduate with specially in education		University graduate without specially in education		HND with PGDE		HND		NCE		Total
S/N	No	%	No	%	No	%	No	%	No	%	
1	2	40.0	0	-	0	-	0	-	3	60	5
2	4	11.4	3.0	5.7	2	5.7	1	2.8	26	74.2	35
3	0	-	1	7.1	2	14.3	3	21.4	8	57.1	14
4	1	9.1	0	-	0	-	2	18.2	9	81.2	12
5	0	-	1	7.7	1	7.7	1	7.7	10	76.9	13
6	2	13.3	2	13.2	0	-	2	13.3	9	6.1	15
Total	9		7		5		9		65		94

TABLE 2: Teacher years of experience of in the selected secondary schools.

Schools					Years of Experience				
1	1-5		6-8		9-10		10 above		Total
2	2	40.0	1	20.0	1	20.0	1	20.0	5
3	9	25.7	13	37.1	9	28.7	4	11.4	35
4	4	28.6	4	28.6	3	21.4	3	21.4	14
5	2	18.2	6	54.5	2	18.2	2	9.1	12
6	3	23.1	5	41.7	2	15.4	3	23.1	13
7	2	13.3	6	40.0	3	20.0	4	26.7	15
Total	22		35		20		17		94

TABLE 3: Students' academic performance on the SSCE of the selected secondary schools

Schools	Average number of candidates presented	Average number of students with 2 credits in science subject	$\frac{3}{4}$ z pass
1	341	178	
2	420	192	
3	174	71	
4	204	80	
5	261	113	
6	81	28	
Total	1481	662	

HO 1: There is no significant relationship between teachers' qualifications and student academic performance.

TABLE 4: Relationship between teachers' qualification and student academic performance in selected secondary schools.

Schools	Tq (x)	Rank (x)	SAP (y)	Rank (y)	D	D ²
1	17	6	1	1	5	10
2	130	1	2	2	-1	1

3	61	2	4	4	-2	4
4	54	5	5	5	0	0
5	60	3	3	3	0	0
6	59	6	6	6	-2	4

HO 2: There is no significant relationship between teachers' years of experience and student academic performance in secondary schools.

TABLE 5: Relationship between teacher years of experience and students' academic performance in selected schools.

Schools	TYE (X)	Rank (x)	SAP (y)	Rank (y)	D	D ²
1	11	6	52	1	5	25
2	78	1	46	2	-1	1
3	29	4	41	3	0	0
4	28	5	39	4	0	0
5	31	3	43	5	0	0
6	39	2	34	6	-4	16

$$d^2=42$$

$$1-6 = 6 - 6 \times 42 = 1 - 252 = 1 - 1.2 = -0.2$$

$$r = 1 - 6 \quad d^2 \quad 1$$

Note - TYE Teachers years of experience

SAP – Student academic performance.

D – Denotes the different between x-ranking and y-ranking.

D – Denotes the square of the obtained difference.

TQ – Teacher qualifications.

The data presented in the tables provide a comprehensive overview of teachers' qualifications, years of experience, and students' academic performance across the selected secondary schools. These tables help to give insight into both the quality of teaching outcomes of students in the schools under study.

Table 1 illustrates the distribution of teachers according to their qualifications in each of the selected secondary schools. The qualifications highlighted include B.sc and NCE, which are the major teaching credentials observed in the study. This table shows how qualified the teaching workforce is across the different schools and helps in assessing whether there is an adequate balance of professionally trained teachers.

Table 2 presents the years of teaching experience of the selected teachers. This information is important because teaching experience often influences instructional effectiveness and classroom management. The table categorizes teachers based on their length of service, thereby giving an indication of how experienced the teaching staff are in each school.

Table 3 summarizes the total number of teachers across all the selected schools, which is 94. It further breaks down these teachers according to their qualification (B.Sc. and NCE). From the data, it is evident that there is a variation in the distribution of science teachers among the schools. School 2 has the highest number of science teachers, with a total of 35, suggesting a relatively strong staffing capacity in science-related subjects. In contrast, school 1 has the lowest number of science teachers, with only 5, which may indicate a shortage that could affect teaching effectiveness in science subjects. Furthermore, on students' academic performance in the selected schools. It shows that the total number of students' is 1,481. Out of this number, 662 students have obtained at least two credit passes in the basic science subjects. This reflects the overall performance level of students in science-related courses and provides a basis for evaluating academic achievement. Moreover, the percentage pass rates in each school. The data reveal noticeable differences in student performance across the schools. School 1 records the highest percentage pass rate at 52.0 percent, indicating relatively better academic performance in science subjects. On the other hand, school 6 has the lowest percentage pass rate at 34.6 percent suggesting weaker performance that may require further attention and improvement strategies.

Table 4 focuses on the relationship between teacher quality and student academic performance in the selected secondary schools. The hypotheses formulated for this analysis states that there is no significant relationship between teacher quality and students' academic performance. Teacher quality in this context is measured based on professional qualifications, such as B.sc and NCE, as well as other indicators relevant to effective teaching. In addition, from the results obtained in Table 4, the relationship between teacher quality and students' academic performance was analyzed using Spearman's rank correlation coefficient. The calculated correlation value [r] was found to be 0.46. This value indicates a moderate positive relationship between the two variables. Additionally, when tested at 0.05 level of significant, the results shows that the relationship is not statistically significant. Based on this outcome,

the null hypotheses which states that there is no significant relationship between teacher quality and students' academic performance is therefore accepted.

Table 5 highlight the relationship between teachers' years of experience and students' academic performance. The second hypotheses formulated for this analysis states that there is no relationship between teachers' years of experience and students' academic performance. Teaching experience is often considered an important factor in education, as it is assumed that more experienced teachers are better equipped with classroom management skills and instructional strategies. The analysis in Table 5 was also conducted using Spearman's rank correlation coefficient. The calculated value of the correlation was found to be 0.2. This value indicates a weak negative relationship between teachers' years of experience and students' academic performance. The negative sign suggests that as the years of teaching experience increase, students' academic performance tends to decrease slightly, however, this relationship is very weak and not statistically significant.

Conclusion and Recommendation of the study

This study assessed the impact of stable and qualified science teacher on students' academic performance in science in Bauchi State, Nigeria. The findings of this study present an overview of teachers' qualifications, experience, and distribution across the selected secondary schools. A total of 94 teachers were sampled, with qualifications ranging from NCE to BSc. degrees, reflecting varying levels of professional training. The distribution of science teachers was uneven, with school two having the highest number (35) and one the lowest (5). Furthermore, student academic performance in the selected schools. The total number of students was 1,481, out of which 662 obtained at least two credits in the three basic science subjects. This indicates that a significant proportion of students did not meet the expected academic benchmarks. Moreover, the results show clear disparities in both teacher-related factors and student academic performance across the schools. One recorded the highest pass rate at 52.0 percent, while school six had the lowest at 34.6 percent. In addition, from the table show that there is no statistically significant relationship between teacher quality and student academic performance although a moderate positive correlation ($r=0.46$) was obtained. Additionally, there is no significant relationship between teachers experience and student academic performance. The correlation coefficient ($r=0.2$) indicated a weak negative relationship, implying that years of teaching experience alone do not necessary improve student academic performance. The following policy recommendations for improvement of science education subjects in Bauchi State, Nigeria. Are derived from this study have been made; **1.** Employment of qualified science teacher, **2.** Improved teacher recruitment, training and regular workshops, **3.** Regular professional development, **4.** Provision of adequate teaching and learning resources, **5.** Motivation and incentives for science teachers, **6.** Monitoring and supervision of teachers, **7.** Conducive learning environment must be provided by government. Implementing the followings recommendations will likely improve the quality of science education and enhance student academic performance in science subjects. The study also recommended for further research.

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