



Effects of Teacher's Qualification and Experience on Academic Performance of Students in Chemistry in Senior Secondary Schools in Yola Educational Zone of Adamawa State

Manu Mamman*, Abbas Babayi Abubakar, Zainab Muhammed, Salamatu Adamu and Kasimu Ayuba Yau

*Department of Chemistry, School for Secondary Education Sciences,
Federal College of Education, Yola, Nigeria.*

*Email: alchemist04.mm@gmail.com**

Abstract: This study investigated the effects of teachers' qualification and experience on academic performance of students in chemistry in senior secondary schools in Yola Education Zone of Adamawa State. The specific objectives of the study are to determine the effects of academic qualification of chemistry teachers on the performance of secondary school students, determine the effect of teachers' years of experience in teaching chemistry on students' academic performance in chemistry. A descriptive survey research design was adopted for the study in which a group of people or items are studied by collecting and analyzing data only from a few items considered to be representatives of the entire group. The responses obtained from the respondents were analyzed using mean and standard deviation statistical tool. Based on the findings, it was concluded that teacher qualification and experience have great positive effects on quality of chemistry education. It indicated that there is positive effect of academic qualification and experience of chemistry teachers on senior secondary schools' students' academic performance in chemistry. More recruitment of qualified and trained teachers required to meet the demand of the school. Federal and state ministries of education should organize regular seminars and workshop for the teachers to update their knowledge. Governments should make sure that the school inspectorate conducts the duties in an effective and efficient way. The NCE teachers must be trained to teach a junior form of the secondary schools, before teaching chemistry at SS classes. Hence it is strongly recommended that a study of the teaching qualification of the NCE chemistry teachers be carried out.

Keywords: Teacher's Qualification, Teaching Experience, Academic Performance, Chemistry, Nigeria.

INTRODUCTION

The standard of education in a nation can be assessed by the caliber of its teachers. A key element in enhancing students' performance in chemistry is the recruitment of experienced and qualified teachers, both in terms of academic credentials and practical experience, across all educational institutions. According to Abe and Adu (2013) [1], the quality of teachers is linked

to improvements in student performance, particularly noting that the measurement of teachers' experience and certifications correlates with students' achievements in chemistry. Furthermore, it has been reported that teachers' attributes, including certification status, specialization degrees, and years of experience in their subject area, are significantly and positively associated with students' learning outcomes in science, especially in chemistry.

A teacher who is academically experienced and qualified is one who has undergone academic training and developed a professional attitude through enrolment in educational institutions, obtaining qualifications such as NCE, B.Sc. (Ed.), or B.Ed. In contrast, professionally qualified teachers are those who have received specialized training that equips them with professional knowledge, skills, techniques, and aptitudes, distinct from general education (UNESCO, 2004). The disparities in academic performance among students in Nigeria have been, and continue to be, a significant concern and area of research for educators, government officials, and parents. This concern arises from the critical role that education plays in the national development of the country. Across Nigeria, there are widespread worries regarding the declining standards of education [2].

Parents unanimously agree that the significant investment in education is not producing results. Teachers also express concerns regarding students' low performance in both internal and external examinations. The yearly release of Senior Secondary Certificate Examination (S.S.C.E) results by the West African Examination Council (W.A.E.C) [3] highlights the widespread issue of poor performance among secondary school students across various subjects.

Consequently, the pressing question arises: what are the underlying causes of this decline in standards and the poor academic performance of students? Is the responsibility solely on the teachers, the students, or a combination of both? Could it be that teachers are no longer exerting the same level of effort and commitment as they once did? Might the issue lie in the teaching methods and interactions between teachers and pupils? Or is the lack of qualified teachers contributing to students' poor performance? This study aims to explore the relationship between teachers' qualifications and experience and the performance of senior secondary school students in chemistry.

Statement of the Problem

The qualifications and experience of teachers as key factors in ensuring quality chemistry education have become ongoing discussions. This is due to the crucial role teachers play in shaping the education provided to students, especially in light of the technological advancements occurring in today's job market. There is undoubtedly a shortage of chemistry teachers, and those who are available often lack the necessary qualifications and experience to effectively teach the subject. According to the National Teachers Institute (NTI), approximately 54% of teachers in the country are not adequately qualified for the essential role of educating young minds.

Numerous instances exist where teachers lack the academic credentials required to teach chemistry. Furthermore, many teachers are inexperienced and do not possess the necessary skills to teach, yet they are still hired to instruct chemistry classes. This situation negatively impacts the quality of chemistry education. It is in this context that the study aimed to explore the influence of teacher qualifications and attitudes on the academic performance of chemistry students. In a research inquiry involving secondary school students studying science (Chemistry), it was found that they struggle to comprehend lessons from inexperienced

teachers. Additionally, over the years, as classroom chemistry instructors, it has been observed that a wealth of experience significantly enhances knowledge delivery to students. The impact of teachers' qualifications and attitudes on students' learning outcomes, as reflected in their academic performance, has been the focus of numerous studies [4].

Objectives of the Study

This study sets out clearly among other things to find out if there is relationship between teachers' qualification, experience and academic performance of students in Chemistry in secondary schools. Specifically, this study will find out:

1. The effects of academic qualification of chemistry teachers on the performance of secondary school' students in Chemistry in secondary schools.
2. The effect of teacher's years of experience in teaching Chemistry on student's academic performance in Chemistry.

Research Questions

1. What is the effect of academic qualification of chemistry teachers, on students' academic performance in chemistry?
2. What is the effect of teachers' years of experience in teaching Chemistry on student's academic performance in senior secondary schools?

LITERATURE REVIEW

Teacher qualification and experience, and students' academic performance

The academic performance of students has raised concerns among many individuals and continues to attract attention across all levels of the educational system. For science students, depending on their chosen field of study at the tertiary level, it is essential to undertake science courses, which must include Chemistry. Chemistry is a hands-on course that requires appropriate qualifications and experience for effective teaching. Educators must possess these fundamental qualifications and experiences to adequately address the increasing challenges posed by the evolving demands of society.

Teacher Qualification

Teacher qualification is a fundamental requirement for achieving the goals of the chemistry curriculum. It is the most critical factor in enhancing students' success in chemistry. Teacher qualification encompasses the academic and professional credentials that allow an individual to become a registered teacher at all educational levels. It also pertains to the acquisition of pertinent knowledge, skills, competencies, and creativity necessary for effective engagement in the teaching profession [5].

Darling-Hammond (2017) [6] described a well-qualified teacher as one who is fully certified and possesses a major equivalent in the subject area being taught. Currently, teacher education programs in Nigeria are categorized into various certificates, including the Nigeria Certificate in Education (NCE), Bachelor Degrees in Education (B.Ed, B.Sc. Ed, & B.A. Ed), and Post-Graduate Diplomas in Education (PGDE). These programs offer professional training for both pre-service and in-service auxiliary teachers, as well as for those pursuing M.Ed. and Ph.D. degrees. The teacher cannot teach the student well, if he is not well trained and grounded in the subject he is teaching. If a teacher is not well trained, the learning process will not be effective no matter how carefully a curriculum has been marked out, how detailed and scientifically

accurate the textbooks, worksheets, equipment and operating instructions are and how adequate the physical facilities are [7].

Teacher Years of Experience

The experience of teachers is linked to a heightened awareness of the need to diversify their search for innovative ideas, commitments, and challenges. The unique qualities of teachers' experience and subject matter knowledge contribute significantly to teaching effectiveness. As noted by Rice (2010) [8], the impact of teacher experience varies based on the teacher's educational background and the specific subject area. He also suggested that experience accumulated over time enhances workers' knowledge, skills, and productivity. These attributes help students develop their skills and abilities to engage with chemistry processes that are essential for exploration and analysis, leading to a deeper understanding of chemistry concepts. Moreover, teachers with extensive experience are confident that they can reach even the most challenging students if they put in the extra effort, whereas inexperienced teachers often feel overwhelmed when faced with unmotivated students (Gibson & Dembo, 1997).

Maduabum (2017) [9] argued that while newer teachers may be enthusiastic about new discoveries, those with greater experience can better differentiate between valuable insights and fleeting information, although exceptions may exist. Experience fosters humility, sound judgment, and the capacity to perceive the broader context. The depth of experience and immersion in the subject influences teaching in various ways, expanding the knowledge base and enhancing the effective use of diverse materials and ideas.

METHODOLOGY

A descriptive survey research design was utilized for this study. This approach was chosen because, as noted by Iketaku (2011) [10], a descriptive survey research design involves examining a group of individuals or items by gathering and analyzing data from a select few that are deemed representative of the whole group. This reinforces the notion that a survey research design is particularly suitable for this investigation. The research was conducted in several senior secondary schools within the Yola Education Zone of Adamawa State. The total population included 3,450 senior secondary school students enrolled in Chemistry, from which a sample of 100 students was randomly chosen from five different secondary schools. Data collection was performed using a structured questionnaire based on a four-point Likert scale, and the results were analysed using mean scores.

The research design employed in this study is a survey research design. The researcher selected this design because, according to Iketaku (2011) [10], a survey research design entails studying a group of individuals or items by collecting and analysing data from a few items that are considered representative of the entire group. This supports the assertion that survey research design is more appropriate than other methods for this study. The population for this study consists of senior secondary students studying Chemistry in the Yola Education Zone of Adamawa State. This group comprises three thousand four hundred and fifty (3,450) students, as reported by the Post Primary School Management Board (PPSMB) for the 2010/2022 school year. Sample and Sampling Technique The sample size for this study includes one hundred (100) students who were randomly selected from five (5) schools in the Yola Education Zone of Adamawa State. A simple random sampling technique was employed to choose five schools from the total number of senior secondary schools.

- a. Government day Secondary school, Yolde-pate
- b. Government day Secondary school, Fufore

- c. Government day Secondary School, Doubeli
- d. Mustafa Model Secondary School, Girei
- e. Aliyu Mustapha Academy, Jimeta Yola

A total of twenty (20) students were sampled from each of the five selected schools, resulting in an overall sample size of one hundred (100) students. The researcher created a tool to gather information from the participants. This tool was a structured questionnaire with closed-ended questions. It was designed according to a modified four-point Likert scale, which included Strongly Agreed (SA), Agreed (A), Disagreed (D), and Strongly Disagreed (SD), corresponding to the four research questions posed in the study.

The questionnaire is divided into two sections: Section A gathers brief personal data about the respondents, while Section B comprises 20 statement items that respondents are required to mark (✓) as applicable to them. The researcher personally administered the questionnaires to the students and collected them immediately after their responses, utilizing a face-to-face approach. Data Analysis Method The responses from the participants were analysed using frequency and mean to address the research questions. Given that the questionnaire was structured around the four-point Likert scale system of SA, A, D, and SD, numerical values were assigned to each response option as follows.

$$\begin{aligned} \text{Strongly agreed (SA):} & \quad 4 \\ \text{Agreed (A):} & \quad 3 \\ \text{Disagreed (D):} & \quad 2 \\ \text{Strongly Disagreed (SD):} & \quad 1 \\ \text{Mean of response} &= \frac{\sum fx}{n} = \frac{4+3+2+1}{4} = \frac{10}{4} = 2.50 \end{aligned}$$

Therefore, any item response with mean below 2.50 will be accepted as Disagreed while responses with mean of 2.50 and above will be accepted as Agreed. The data will be presents in table.

DATA PRESENTATION AND ANALYSIS

A total of One hundred (100) copies of questionnaire were distributed and retrieved. The data gathered through the use of questionnaire was collected, presented, analysed and discussed.

Presentation of Results

Research Question One:

What is the effect of academic qualification of chemistry teachers, on students' academic performance in chemistry?

Table 1: Mean response from the respondents on the effect of academic qualification of chemistry teachers, on students' academic performance in chemistry.

Sl.	Items Statement	SA	A	D	SD	N	EFX	X	Remark
1	Chemistry teachers with professional qualification (BSc. Ed) in chemistry positively affect student academic performance in chemistry.	26	56	10	8	100	300	3.00	Agreed

2	Workshop, seminar, and conference to update teachers' knowledge, positively affect student academic performance in chemistry.	40	40	16	4	100	316	3.16	Agreed
3	Most of the chemistry teachers in secondary schools are NCE holder which Negatively affect student academic performance in chemistry.	40	30	26	4	100	306	3.06	Agreed
Grand Mean:								3.08	Agreed

In table 1 above shows that, the researcher presents the responses by the respondents to questionnaire item 1 to 3 in relation to first research question one which sought to find out the effect of academic qualification of chemistry teachers, on students' academic performance in chemistry. From the calculations made above, the first questions has a mean score of 3.00 which is above the criteria mean of 2.50, the second questions have a mean score of 3.16 and the last question has a mean score 3.06 respectively which are also above the criteria mean of 2.50 and as such termed as agreed, From the grand mean calculated which has a mean score of 3.08 which is denoted as agreed, indicated that, the academic qualification of chemistry teachers have positive effects on students' academic performance in chemistry.

Research Question Two:

What is the effect of teachers' years of experience in teaching Chemistry on student's academic performance in Chemistry?

Table 2: responses from the respondent on the effect of teachers' years of experience in teaching Chemistry on student's academic performance in Chemistry.

Sl.	Items Statement	SA	A	D	SD	N	EFX	X	Remark
4	Chemistry teacher's knowledge of teaching methods appropriate for each topic positively affect students' academic performance in chemistry.	44	50	3	3	100	335	3.35	Agreed
5	Chemistry teacher with higher working experiences positively affects students' academic performance in chemistry.	42	34	18	6	100	312	3.12	Agreed
6	Ability of chemistry teacher to make judicious use of variety of teaching methods for different topics positively affect students' academic performance in chemistry.	42	44	10	4	100	324	3.34	Agreed
Grand Mean:								3.28	Agreed

From table 2 above, the researcher presents the responses by the respondents to items 4 to 6 in relation to research question three which sought to find out the effect of teachers' years of experience in teaching Chemistry on student's academic performance in Chemistry. From the calculations made above, the first question has a mean score of 3.35 which is above the criteria mean of 2.50, the second question has a mean score of 3.12 which is above the criteria mean score of 2.50, the third question has a mean score of 3.34 which is above the criteria mean of 2.50 and then termed as Agreed. Based on the grand mean calculated, which has a mean score of 3.28 which was denoted as agreed indicated that, there is positive effect of teachers' years of experience in teaching Chemistry on student's academic performance in Chemistry.

DISCUSSION OF RESULTS

The findings presented in Table 1 indicate that the researcher has summarized the responses of participants to questionnaire items 1 through 3, which pertain to the first research question aimed at determining the impact of chemistry teachers' academic qualifications on students' academic performance in chemistry. The calculated grand mean, which yielded a mean score of 3.08, categorized as 'agreed', suggests a positive influence of chemistry teachers' academic qualifications on students' performance in the subject. In the relevant literature, Udofot (2010) [11] asserted that the nation emphasizes the significance of teacher quality, and the education they receive is based on the high societal demand for educational standards. Consequently, the prerequisite qualifications for teachers must be prioritized.

To achieve quality chemistry education, it is essential for teachers to possess the appropriate qualifications and experience necessary to impart skills that facilitate productive and engaging practical activities for learners. The findings from Table 2 further reveal that the researcher has compiled the responses of participants to items 4 through 6, which relate to the third research question that sought to explore the impact of teachers' years of experience in teaching chemistry on students' academic performance in the subject. The grand mean calculated, which resulted in a mean score of 3.28, also categorized as 'agreed', indicates a positive effect of teachers' years of experience in teaching chemistry on students' academic performance. In the related literature, Okey (2012) [12] noted that experience is closely linked to teachers' capabilities in lesson planning, addressing diverse student responses, reflecting on their teaching effectiveness, and fostering student inquiry.

Summary of the Findings

This study investigated the effects of teachers' qualification and experience on academic performance of chemistry students in senior secondary schools in Yola central Area of Adamawa State. The specific objectives of the study are the effects of academic qualification of chemistry teachers on the performance of secondary school students, the effect of teachers' years of experience in teaching chemistry on students' academic performance in chemistry.

CONCLUSION

Based on the findings, it was determined that the qualifications and experience of teachers significantly enhance the quality of chemistry education. These factors promote effective learning by ensuring that there are sufficient resources and skilled personnel available to inspire and motivate the teaching of chemistry. The results clearly demonstrate that the presence of qualified teachers in secondary schools positively influences student performance. The depth of knowledge in the subject correlates directly with students' academic success. The presence of qualified educators is likely to lead to improved learning outcomes. In light of the results

and conclusions drawn from this study, several recommendations have been proposed to address the issue of poor performance among chemistry students. The researcher hopes that if these recommendations are thoroughly examined and implemented, they will significantly enhance the teaching and learning environment, as well as reduce the incidence of poor student performance. These recommendations are grounded in the research findings.

- It is recommended that chemistry teachers receive ongoing training to enhance their competencies, thereby promoting high-quality chemistry instruction in schools throughout Adamawa State and Nigeria as a whole. All teacher training institutions offering chemistry programs should only admit candidates who meet the necessary prerequisites to qualify them for teaching chemistry.
- It is advisable to produce a greater number of qualified and trained teachers to satisfy the needs of schools. This can be accomplished through in-service training and by providing incentives for teachers undergoing training.
- The government should enhance school libraries to ensure a greater availability of reading materials for students. This is essential as libraries serve as resource centers for both teachers and students.
- The government, along with school administrators, should promote student engagement and independent learning by organizing quizzes, debates, and excursions for students.

REFERENCES

- [1] T. O. Abe and E. L. Adu, "Influence of qualification on development and assessment of computer programmed instructional package on energy concept in upper Basic Technology in Ekiti state," *April Journal Science Technology*, vol. 3, no. 6, pp. 611 - 618, 2013.
- [2] H. U. Adebule, D. A. Umoru, and O. K. Bake, "The Relevance of Learning Resources in the Effective Teaching of Science, Technology and Mathematics," in *50th Anniversary Conference Proceeding of STAN HEBN PLC*, 2004, pp. 73–76.
- [3] WAEC, "WAEC State Committee Meeting Agenda Papers for Taraba State," West African Examinations Council, 2012.
- [4] S. N. Adediwura and K. L. Tayo, "Teacher education curriculum in Nigeria in the perspective of lifelong education," *The Journal of International Social Research*, 2017. [Online]. Available: <http://www.sosyalarastirmalar.com/ciltz/sayi8pdf/osuji.pdf>. [Accessed: Jan. 3, 2018].
- [5] Dovrat Committee, "Israel - Task Force for the Advancement of Education in Israel: National plan for educational," Jerusalem: Israel Government, 2005/2015.
- [6] L. Darling-Hammond, "Teacher and teaching: Testing Policy Hypothesis from a National Commission Report," *Educational Researcher*, vol. 27, no. 1, pp. 57 - 77, 2017.
- [7] Akpan and Adedayo, "Science Education in Nigeria: From the Beginning to the Future," U. M. O. Ivowi, Ed. Lagos, Nigeria: Foremost Educational Services Limited, 2012.
- [8] Rice and Bauer, "The Impact of Teacher Experience: Examining the evidence and Policy Implications," 2004/2015. [Online]. Available: <http://www.urban.org>. [Accessed: Jul. 24, 2014].
- [9] M. A. Maduabum, "In-service education: a neglected dimension of the professional development of the Nigerian Science Teacher," *West African Journal of Educational Research (WAJER)*, vol. 1, no. 2, pp. 183-185, 2017.
- [10] Iketaku, *Qualitative research for education: An introduction to theories and methods*, 5th ed. Boston, MA: Pearson Education, Inc., 2011.
- [11] M. Udofot, "Teacher Education Curriculum Innovations and the Challenges of Implementation in Nigeria," *Journal of Childhood and Primary Education*, vol. 7, no. 1, pp. 26-37, 2010.

- [12] S. M. Okey, "Teachers' Training/retraining: A vital tool for progressional development in Nigeria," in *Education in Nigeria, from the beginning to the future*, U. M. O. Ivowi and B. B. Akpan, Eds. Lagos, Nigeria: Foremost Educational Service Ltd, 2012, pp. 257-266.



This is an open access article distributed under the terms of the Creative Commons NC-SA 4.0 License Attribution—unrestricted use, sharing, adaptation, distribution and reproduction in any medium or format, for any purpose non-commercially. This allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms. For any query contact: research@ciir.in