

**IMPACT OF TEACHING EXPERIENCE OF CHEMISTRY TEACHERS ON THE
TEACHING AND LEARNING PROCESS OF CHEMISTRY IN SECONDARY
SCHOOLS IN OREDO LOCAL GOVERNMENT**

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CERTIFICATION

We the undersigned, certified that this research work was carried out by **Osawaru Jessica Uwaila** with the matriculation number **EDU2102081** in the Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin , Benin City in partial fulfillment of the requirement of the award of Bachelor of science (Ed) degree in chemistry Education.

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DEDICATION

This project work is dedicated to God Almighty.

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ABSTRACT

This study examined the impact of teaching experience of chemistry teachers on the teaching and learning process of chemistry in secondary schools in Oredo Local Government Area (LGA) of Edo State, Nigeria. A descriptive survey research design was adopted for the study. The population comprised Senior Secondary School II (SS II) students and chemistry teachers in public secondary schools within the study area. A total sample of 61 students and 20 chemistry teachers was selected using simple random and proportionate sampling techniques. Data were collected using two structured questionnaires designed for teachers and students, respectively. The instruments were validated by experts, and reliability was established using the test retest method. Data collected were analyzed using descriptive statistics such as frequency counts and percentages.

Findings revealed that teaching experience significantly enhances chemistry teachers' instructional effectiveness, classroom management, and ability to explain complex concepts. The results also showed that experienced teachers are more proficient in selecting and using instructional materials, conducting practical lessons, and addressing students' misconceptions. Furthermore, the availability and effective use of laboratory apparatus were found to positively influence students' understanding and academic performance in chemistry. The study concluded that teaching experience plays a vital role in improving the quality of chemistry instruction and students' academic achievement. It was therefore recommended that educational stakeholders prioritize teacher retention, continuous professional development, and adequate provision of laboratory facilities to enhance chemistry teaching and learning outcomes in secondary schools.

Chapter 1

INTRODUCTION

Background to the Study

Chemistry, as a core science subject, plays a key role in the technological and scientific advancement of any nation. In Nigeria, the effective teaching and learning of chemistry at the secondary school level are crucial for preparing students for higher education and for fostering scientific literacy. However, the quality of chemistry education is often influenced by various factors, among which the teaching experience of educators stands out prominently.

Teaching experience encompasses the duration and diversity of instructional practices that a teacher accumulates over time. Experienced teachers are generally believed to possess enhanced classroom management skills, deeper content knowledge, and refined academic strategies, all of which contribute to more effective teaching and improved student learning outcomes. According to Samuel et al. (2022), there is a significant correlation between teachers' years of experience and their academic content knowledge in chemistry, indicating that more experienced teachers are better equipped to deliver complex scientific concepts effectively.

Further supporting this notion, Apampa et al. (2022) conducted a study in Kaduna State and found that students taught by highly experienced and qualified chemistry teachers performed significantly better academically compared to those taught by less experienced educators. Similarly, Cleopas and Onwuchekwa (2024) observed that in Bayelsa State, teachers' qualifications and years of experience had a substantial impact on students' academic achievements in chemistry.

The influence of teaching experience extends beyond academic performance to involve teachers' self efficacy and instructional creativity. Nja et al. (2022) highlighted that chemistry teachers with more years of experience demonstrated higher levels of self efficacy and were more adept at employing innovative teaching methods, such as simulations, to enhance student engagement and understanding.

Despite these findings, challenges persist in the educational landscape. Issues such as inadequate laboratory resources, as reported by Udongwo (2025), hinder the effective teaching of chemistry, particularly in practical sessions that are essential for comprehensive science education. Moreover, Kazeem et al. (2022) identified barriers like insufficient teacher training and lack of infrastructure as significant barriers to effective chemistry instruction in Kaduna State.

However, despite its importance, students' performance in chemistry at the secondary level, particularly in regions such as Oredo Local Government Area (LGA), has consistently remained below expectations. Several factors contribute to this challenge, but one of the most impact is the teaching experience of chemistry teachers. Teaching experience goes beyond the number of years spent in the classroom. It encompasses content mastery, pedagogical skills, classroom management, familiarity with curriculum dynamics, and the ability to respond to diverse learner needs (Cleopas & Onwuchekwa, 2024).

Studies have shown that teachers with more years of experience tend to adopt more effective teaching strategies, manage their classrooms more efficiently, and are better at using assessment to improve student learning. For example, Adeyemi (2008) found that secondary schools in Ondo State with more experienced teachers recorded higher student achievement in science subjects compared to those with less experienced teachers. Similarly, in Bayelsa State,

Cleopas and Onwuchekwa (2024) reported that teacher experience significantly influenced student performance in chemistry, particularly in schools where teachers had over five years of teaching practice.

The impact of teacher experience also extends to the ability to deliver practical chemistry effectively. Practical work are vital when it comes to the observational, manipulative, and inferential skills. Okolafor and Omoifo (2024) noted that in Oredo LGA, students' competence in acid base titration a critical practical component in chemistry was strongly influenced by the quality of teacher instruction, which in turn depended on the teacher's experience and practical exposure. Less experienced teachers were found to struggle with integrating laboratory work effectively, thereby limiting student engagement and understanding.

Teaching experience contributes significantly to the development of Technological Pedagogical Content Knowledge (TPACK), a framework that combines technology use with pedagogical strategies and content expertise. Adebusuyi, Bamidele, and Adebusuyi (2020) demonstrated that chemistry teachers with greater experience and professional development exposure were more proficient in applying TPACK. This proficiency enabled them to adopt interactive and student centered teaching methods, leading to improved student scientific attitudes and learning outcomes.

Despite these findings, many schools in Oredo LGA still face a high turnover of science teachers, inadequate training, and mismatched deployments, resulting in students being taught by less experienced or non-specialist teachers. This undermines both teaching effectiveness and student achievement, especially in subjects that require both theoretical and practical mastery such as chemistry.

Experienced chemistry teachers are often better equipped to recognize and address different learning styles and levels of ability among students. They are more likely to apply differentiated instructional strategies such as scaffolding, grouping, and using real life analogies to ensure that all learners grasp complex chemistry concepts (Yilmaz-Tuzun & Topcu, 2022). This contributes to more inclusive and equitable learning.

With years of classroom practice, experienced teachers are better able to respond to unplanned disruptions or policy changes like curriculum revisions or emergency transitions to online learning. Their professional judgment helps them maintain instructional quality under stress, which novice teachers may struggle with.

Experienced teachers often have a deeper understanding of formative and summative assessment strategies. They know how to use feedback loops and assessment data to improve instruction, identify learning gaps, and help students meet curriculum standards more effectively. Teachers with extensive experience often become informal mentors in their schools, supporting the professional growth of new or underqualified chemistry teachers. This improves the collective teaching quality within a school and contributes to more consistent learning outcomes across classrooms.

In low resource settings like many public schools in Nigeria, experienced teachers often innovate by creating locally sourced, low cost models and chemical substitutes for laboratory instruction. This skill, honed through years of practice, enhances hands on learning even when infrastructure is limited. With experience, teachers develop an understanding of the socio-cultural factors influencing students' motivation and behavior in specific locations (like Oredo LGA). This allows them to adapt their teaching style, examples, and classroom management

strategies to suit the local context. It is important to investigate the specific influence of chemistry teachers' teaching experience on the quality of teaching and student performance in secondary schools within Oredo LGA. Doing so will not only fill a critical gap in the literature but also guide policymakers and educational stakeholders in implementing strategies to improve science education in the region. Improving teacher experience through recruitment, retention, and continuous professional development can serve as a vital step toward enhancing chemistry education outcomes in Nigeria.

Beyond the commonly acknowledged advantages of teaching experience such as improved classroom management, mastery of subject content, and practical instruction emerging research highlights several less frequently discussed but equally critical impacts that experienced chemistry teachers bring to the classroom, particularly in complex educational environments like Oredo Local Government Area. Another vital but often overlooked contribution of teaching experience is the accumulation of pedagogical resilience the ability to maintain teaching quality despite systemic challenges such as overcrowded classrooms, inconsistent electricity (affecting lab work), or lack of modern instructional tools. Research indicates that veteran teachers develop adaptive strategies to navigate these challenges while still maintaining student engagement and achievement (Nguyen et al., 2022). In many Nigerian public schools, including those in Oredo, this form of resilience is essential for maintaining the continuity and quality of science education.

In of Oredo Local Government Area, there is a pressing need to investigate how the teaching experience of chemistry teachers influences the teaching and learning process. Understanding this impact is vital for informing policy decisions, teacher recruitment, and professional development programs aimed at enhancing the quality of chemistry education in the region.

Statement of the problem

Despite the acknowledged importance of chemistry in national development and its inclusion in the secondary school science curriculum, student performance in chemistry across Nigerian secondary schools remains suboptimal. This persistent underachievement raises critical concerns about the factors influencing teaching and learning outcomes in chemistry classrooms. Among these, the impact of chemistry teachers' teaching experience emerges as a pivotal factor warranting in depth exploration.

Experienced chemistry teachers often possess a refined pedagogical content knowledge (PCK), enabling them to effectively integrate subject matter expertise with instructional strategies tailored to students' needs. A study by Samuel et al. (2022) in Anambra State revealed that teaching experience significantly correlates with the depth of PCK among chemistry teachers, influencing their ability to convey complex concepts effectively. The impact of teaching experience extends to the facilitation of practical chemistry sessions. In Makurdi, Benue State, Adikwu et al. (2018) found that teachers with more years of experience demonstrated higher competence in conducting practical chemistry classes, which is crucial for student understanding and engagement. However, in Oredo LGA, there is a dearth of empirical studies examining how teaching experience specifically affects chemistry teaching and learning outcomes. This gap in localized research makes it challenging to develop targeted interventions aimed at improving chemistry education in the area.

Moreover, the systemic challenges such as inadequate laboratory facilities, large class sizes, and limited access to continuous professional development may either worsen or mitigate the impact of teaching experience on student performance. For instance, Udongwo (2025) highlighted that even experienced teachers struggle to deliver effective practical lessons in the

absence of adequate laboratory resources, underscoring the interplay between teacher experience and infrastructural support.

Given these complexities, it is important to investigate the impact of chemistry teachers' teaching experience on the effectiveness of instruction and student learning outcomes in public secondary schools within Oredo LGA. Such a study would provide valuable insights for policymakers, educators, and stakeholders aiming to enhance the quality of chemistry education in the region.

However, in Oredo LGA, there is a dearth of empirical studies examining how teaching experience specifically affects chemistry teaching and learning outcomes. This gap in localized research makes it challenging to develop targeted interventions aimed at improving chemistry education in the area.

Therefore, the problem this study seeks to address the impact of teaching experience of chemistry teachers on the teaching and learning process of chemistry in secondary schools in Oredo Local Government Area.

Research Questions

1. To what extents does teachers' years of experiences have on the student academics performance?
2. Does availability of Laboratory apparatus influence chemistry students?
3. How does teaching experience affect chemistry teacher's choice of instructional materials?
4. Does teacher years of experience have effect on academic achievement of chemistry student?

Purpose of the study

The primary purpose of this study is to investigate the impact of teaching experience of chemistry teachers on the teaching and learning process of chemistry in secondary schools in Oredo Local Government Area (LGA) of Edo State. Specifically, the study aims to:

1. Examine the extent to which teachers' years of teaching experience influence students' academic performance in chemistry.
2. Assess how teaching experience influences the availability and use of laboratory apparatus and its impact on chemistry students.
3. Evaluate the effect of teaching experience on the use of instructional materials in the chemistry classroom.
4. Investigate the effects of teacher's years of experience on academical achievement on chemistry.

Significance of the Study

This study holds significant value as it seeks to explore the impact of teaching experience of chemistry teachers on the teaching and learning process within the context of secondary schools in Oredo Local Government Area (LGA), Edo State. The findings are poised to benefit multiple stakeholders including policymakers, educators, curriculum developers, students, and parents.

The findings will be crucial for curriculum planners, textbook authors, and instructional designers. By understanding how teaching experience influences the delivery of chemistry lessons, developers can design materials that align with both the strengths and limitations of teachers at different stages. For instance, more complex laboratory procedures may be tailored with step-by-step instructional guides for newer teachers, while enrichment materials may be developed to support experienced teachers in adopting innovative and learner-centered approaches (Cleopas & Onwuchekwa, 2024). These insights ensure that the chemistry curriculum is practically implementable and responsive to teacher capacity, thereby promoting more effective teaching and improved student learning in the subject.

The study will provide empirical evidence on how the teaching experience of chemistry teachers impacts student learning outcomes, which is crucial for policy formulation. In Nigeria, teacher posting and deployment are often done without sufficient consideration of experience level. This research can guide education authorities in Edo State and beyond to develop strategic frameworks for deploying teachers based on experience, particularly in critical science subjects like chemistry. For example, placing more experienced chemistry teachers in underperforming or underserved schools could help bridge learning gaps and improve student performance Ojelade & Aregbesola, 2018. Such data-driven deployment will ensure equitable distribution of teaching expertise, especially in hard-to-staff schools within Oredo LGA. This can also influence state and national teacher recruitment and retention policies, encouraging the development of career progression pathways that reward classroom experience and effectiveness.

The study directly benefits students by promoting a deeper understanding of how experienced chemistry teachers can facilitate better learning outcomes. When schools recognize and harness the positive impact of teaching experience, they can optimize classroom learning

conditions and ensure that students receive quality instruction. Moreover, informed parents can better advocate for their children's education by demanding the placement of qualified and experienced chemistry teachers in their schools. This can drive community-level accountability and participation in educational development within Oredo LGA. Over time, such advocacy contributes to improved public trust and outcomes in the science education sector.

Scope and delimitation of the study

This study is specifically designed to investigate the impact of teaching experience of chemistry teachers on the teaching and learning process of chemistry in secondary schools within Oredo Local Government Area (LGA) of Edo State, Nigeria. The research focuses on evaluating how varying levels of teaching experience influence key educational variables, including instructional delivery, student academic performance, classroom engagement, and laboratory management in the subject of chemistry.

The geographical scope of the study is restricted to Oredo Local Government Area, which includes both urban and semi-urban school environments. It encompasses both public and private secondary schools that offer chemistry at the senior secondary level (SS1 to SS3). Only schools with functional chemistry programs and registered chemistry teachers will be considered for the purpose of relevance and validity.

Definition of terms

The following terms are operationally defined as:

Teaching Experience: The duration and diversity of instructional practices that a teacher accumulates over time. It goes beyond the number of years spent in the classroom and encompasses content mastery, pedagogical skills, classroom management, familiarity with curriculum dynamics, and the ability to respond to diverse learner needs.

Technological Pedagogical Content Knowledge (TPACK): A framework that combines technology use with pedagogical strategies and content expertise.

Pedagogical Resilience: The ability to maintain teaching quality despite systemic challenges such as overcrowded classrooms, inconsistent electricity, or lack of modern instructional tools.

Pedagogical Content Knowledge (PCK): The integration of subject matter expertise with instructional strategies tailored to students' needs.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

- Theoretical Framework
- Conceptual Framework
- Teachers Experience in Student Academic Performance
- The role of experience in integrating practical work
- Challenges Faced by Chemistry Teachers
- Effect of Years of Chemistry Teachers in Student Academic Achievement
- Summary of Existing Literature Review

Theoretical Framework

This research is conceptually anchored in the Technological Pedagogical Content Knowledge (TPACK) framework, a comprehensive and influential theory that explains the complex interplay of knowledge bases required for effective technology integrated teaching. Developed by Mishra and Koehler (2006) as an extension of Shulman's (1986) foundational concept of Pedagogical Content Knowledge, the framework moves beyond viewing technology as a mere adjunct to pedagogy and content. Instead, it posits that meaningful and effective teaching with technology emerges from the nuanced and contextual interplay between three primary forms of knowledge: Content Knowledge, Pedagogical Knowledge, and Technological Knowledge. The framework is visually and conceptually represented by the intersection of these three core knowledge domains, giving rise to several more specialized and integrated forms of knowledge.

The first of these integrated knowledge types is Pedagogical Content Knowledge, which represents the core of effective teaching. It involves mastering the most useful representations of concepts, the most powerful analogies, illustrations, examples, and explanations, coupled with a

deep awareness of what makes specific topics easy or difficult for students to grasp. The second is Technological Content Knowledge, which refers to an understanding of the reciprocal relationship between technology and content. It involves knowledge of how specific technologies can fundamentally alter how content is represented and manipulated, thereby changing how a subject is learned and practiced. The third is Technological Pedagogical Knowledge, which is an understanding of how various technologies can be used in teaching and learning settings, encompassing the pedagogical affordances and constraints of a wide range of technological tools. The ultimate goal of the framework is the synthesis of all three core knowledge domains into what Mishra and Koehler term Technological Pedagogical Content Knowledge. This represents a form of knowledge that is qualitatively different from the sum of its parts. It is a holistic, situated understanding of the complex interactions between content, pedagogy, and technology within the specific dynamics of a classroom.

The framework provides a powerful and appropriate lens for analyzing and understanding the impact of teaching experience in chemistry education. The development is not an instantaneous event but a gradual, iterative process that is honed through reflective practice and accumulated classroom experience. Experienced chemistry teachers possess a profound and flexible understanding of chemical principles, or Content Knowledge, which allows them to see connections between topics and anticipate the conceptual hurdles students will face. Furthermore, over years of practice, these teachers refine their Pedagogical Content Knowledge, developing a rich repertoire of pedagogical strategies tailored specifically to chemistry. They understand that stoichiometry requires careful scaffolding, that equilibrium can be demonstrated through dynamic analogies, and that abstract concepts like molecular geometry demand concrete representation.

While novice teachers may possess Technological Knowledge in isolation, experienced teachers excel at its purposeful integration. Their Technological Content Knowledge allows them to select tools uniquely suited to the subject matter. For instance, they might use PhET simulations or virtual labs to allow students to conduct experiments that would be too dangerous or expensive in a physical laboratory. They might employ molecular modeling software to make the invisible world of atoms and molecules visible, directly addressing a central learning challenge in chemistry. Similarly, their Technological Pedagogical Knowledge enables them to

use data loggers and probeware not just for demonstration, but to design lessons that foster interactive, student centered inquiry, where students can focus on analyzing data and understanding principles rather than on manual recording. Empirical research supports the critical role of effective science teaching. Studies, such as that by Adebuseyi, Bamidele, and Adebuseyi (2020), found that experienced teachers were significantly more proficient in leveraging technology to create interactive and student centered chemistry lessons. Their research indicated that these teachers did not use technology as a novelty but as an integral component of their instructional design to demystify complex scientific concepts, a finding that aligns perfectly with the core premise of the framework. An experienced teacher might use a single computer and projector to run a simulation for an entire class, facilitating a guided inquiry discussion, or leverage digital resources and mobile applications to supplement a lack of physical textbooks, thereby ensuring that conceptual understanding is not compromised.

Conceptual Framework

This study looks at how the teaching experience of chemistry teachers affects the quality of teaching and student performance in Oredo Local Government Area (LGA). Teacher Experience refers to the number of years a teacher has been in the classroom and the range of their teaching practices. This includes their understanding of the subject, teaching skills, and ability to manage a classroom and meet the needs of different learners. Teaching Quality is about how well teachers deliver lessons, manage their classrooms, assess student understanding, and create an engaging learning environment. Good teaching involves using various methods, clear communication, and supporting students effectively. Student Performance measures how well students do in chemistry, including their test scores, practical skills, and understanding of the subject. It also covers nonacademic factors like student engagement, attendance, and attitudes toward learning. A teacher's experience positively influences their teaching quality, which leads to better student performance. Experienced teachers are generally better at classroom management, have deeper subject knowledge, and use more effective teaching strategies. Samuel et al. (2022) found a strong link between teachers' experience and their chemistry knowledge. Similarly, Apampa et al. (2022) and Cleopas and Onwuchekwa (2024) noted that students taught by more experienced teachers performed better academically. Studies show that teaching

experience is linked to student achievement. Gains are most significant in the early years but continue as teachers gain more experience. However, some studies suggest that the benefits may level off after a certain number of years. Kane, Rockoff, and Staiger (2008) noted that the advantages of experience tend to stabilize after four or five years, and Boyd et al. (2008) found similar results for math teachers. Other studies, like those by Papay and Kraft (2015) and Aaronson, Barrow & Sander (2007), show that experienced teachers improve over the long term. Experienced teachers develop specific skills that make them effective. König and Kramer (2016) emphasize the importance of pedagogical content knowledge, while Danielson (2011) highlights how experienced teachers are better at managing classroom dynamics and fostering positive relationships with students.

The effectiveness of teaching experience is also influenced by the school environment and available resources. Teachers in supportive settings tend to improve more than those in less helpful environments. Ladd (2009) found that strong school leadership and planning time contribute to school effectiveness. Inadequate laboratory resources can hinder effective chemistry teaching, especially during practical lessons. Teachers' beliefs about their students' abilities play a significant role in student performance. Study shows that expectations can vary based on students' characteristics, such as race and socioeconomic status (Wang et al., 2018; Campbell, 2015). Teachers who believe students can improve and learn tend to set higher expectations for them (Yeager et al., 2013). Despite the advantages of teaching experience, challenges remain, such as high teacher turnover, insufficient training, and mismatched assignments, particularly in areas like Oredo LGA. Kazeem et al. (2022) pointed out that inadequate teacher training and a lack of resources are major barriers to effective chemistry instruction.

Teachers experience in student academic Performance

Teacher experience is a critical factor influencing student academic performance, and numerous studies highlight its significance. Research consistently indicates that, on average, more experienced teachers positively impact student outcomes. For instance, evidence suggests that improved teacher experience correlates with higher student achievement in various subjects, particularly in standardized test scores. Experienced teachers not only enhance student learning

but also contribute to greater school attendance and engagement. The effectiveness of teachers tends to increase significantly during the initial years of their careers, as they refine their pedagogical strategies and develop better classroom management skills. As they gain experience, teachers cultivate essential skills and knowledge, including pedagogical content knowledge (König & Kramer, 2016), which allows them to effectively convey complex concepts. Seasoned teachers are often adept at creating well-organized and positive classroom environments, which is crucial for developing student learning (Danielson, 2011). Beyond individual classrooms, experienced teachers often play a vital role in supporting their colleagues and contributing to the overall school environment. They can serve as mentors, sharing valuable insights and strategies with less experienced educators. This collaborative spirit enhances the collective effectiveness of the teaching staff, benefiting all students in the school.

However, the relationship between teacher experience and student performance is not always straightforward. Some studies suggest that the benefits of experience may diminish after the first few years in the classroom. For example, Kane, Rockoff, and Staiger (2008) found that the returns to experience level off after about four or five years. Additionally, the impact of teacher experience can vary depending on grade level and subject area. Research by Harris and Sass (2007) indicates that the effect of early experience is particularly strong in subjects like math and is more consistent at the elementary and middle school levels. Contextual factors also play a significant role in determining how teacher experience translates into effectiveness. A supportive and collegial working environment can amplify the benefits of experience, allowing teachers to thrive. Teacher stability where educators remain in the same grade or subject can enhance the effectiveness of experienced teachers further.

It is essential to recognize that the relationship between experience and effectiveness is complex. Some fewer effective teachers may leave the profession early, while others may not maintain their effectiveness over time. This variability underscores the importance of ongoing support and professional development for all teachers. There are important implications for educational policy and practice. Efforts to reduce teacher turnover and promote professional learning are critical for maximizing the benefits of teacher experience. Additionally, creating supportive school environments that foster collaboration among teachers can lead to improved effectiveness. Strategic teacher assignment, ensuring that educators have the opportunity to

refine their instruction within specific grade levels and subjects, can further enhance student outcomes. While the impact of teacher experience is influenced by various factors, it remains a significant determinant of student academic performance. Understanding this relationship can help educators and policymakers implement strategies that leverage experience to improve educational outcomes for all students.

The role of experience in integrating practical work

The integration of practical work represents a fundamental component of effective chemistry education, serving as the crucial link between theoretical concepts and tangible scientific reality. Teaching experience emerges as a critical factor that significantly enhances teachers' capacity to design, implement, and refine laboratory experiences that maximize student learning and engagement. Experienced chemistry teachers develop a sophisticated understanding of how practical work aligns with specific learning objectives, moving beyond simple recipe following exercises to create investigative experiences that foster genuine scientific inquiry. Through years of classroom practice, these teachers accumulate valuable insights into student misconceptions and common difficulties encountered during practical sessions. This knowledge enables them to anticipate challenges and design appropriate pre-laboratory activities that prepare students both conceptually and procedurally, thereby ensuring smoother implementation and deeper understanding during hands-on work. The practical dimension of laboratory work reveals significant distinctions between novice and experienced practitioners. While newer teachers may struggle with basic equipment operation and safety protocols, experienced teachers demonstrate comprehensive technical knowledge that extends to troubleshooting apparatus, modifying experiments based on available resources, and understanding the limitations of various laboratory techniques. This expertise allows them to focus their attention on student learning during practical sessions rather than on mechanical aspects of equipment management. Furthermore, seasoned teachers display remarkable adaptability in resource constrained environments, often developing innovative substitutions and alternative procedures that maintain the educational value of practical work despite material limitations.

In environments where laboratory resources are scarce or completely absent, experienced teachers demonstrate exceptional creativity in developing meaningful alternatives. They might

employ household materials for simple experiments, create detailed demonstrations using limited equipment, or design observational activities that illustrate key principles without requiring extensive resources. Their experience guides them in selecting which alternatives provide the most authentic representation of chemical phenomena and how to frame these activities to students to ensure conceptual understanding. This adaptive capability represents a crucial aspect of professional expertise, enabling quality practical education even under challenging conditions. The assessment of practical skills represents another area where experience manifests significantly. Veteran teachers develop nuanced strategies for evaluating not just the final results of an experiment, but the entire process of scientific thinking, technique mastery, and safety awareness. They create assessment approaches that balance technical skill development with conceptual understanding, providing targeted feedback that helps students improve their investigative approaches over time. This assessment sophistication stems from having observed numerous student performances across diverse practical scenarios, allowing them to distinguish between fundamental misunderstandings and simple procedural errors.

Moreover, experienced teachers excel at creating meaningful connections between practical work and theoretical concepts, helping students see laboratory activities not as isolated exercises but as integral components of chemical understanding. They design post-laboratory discussions and analysis sessions that explicitly link observations to molecular level explanations, reinforcing the conceptual framework that underpins the discipline. This ability to weave practical experiences into the broader tapestry of chemical knowledge represents a hallmark of advanced teaching expertise. The collaborative aspect of practical work integration also benefits from teaching experience. Seasoned teachers often serve as mentors to less experienced colleagues, sharing strategies for effective laboratory management, safety protocols, and innovative practical demonstrations. This knowledge sharing strengthens the overall science department's capacity to deliver high quality practical education. Experienced teachers frequently contribute to curriculum development, ensuring that practical components are logically sequenced and appropriately challenging across grade levels.

Challenges Faced by Chemistry Teachers

Chemistry teachers face many challenges that make it harder for them to educate and engage their students effectively. These challenges come from various areas, including student behavior, lack of resources, and the complexities of the subject itself. One major issue is getting students interested in chemistry. Many view it as a difficult and abstract subject, which can lead to a lack of motivation. Study shows that students often develop negative attitudes toward chemistry and their teachers (Udongwo, 2025). Attendance can also be a problem, as inconsistent student presence makes effective learning difficult. Students often struggle with abstract concepts, especially those who have trouble visualizing ideas (Baker, 2022). Chemistry teachers also deal with students who have different backgrounds and learning styles, making it tricky to adjust lessons to meet everyone's needs. On top of this, many teachers face resource challenges. A lack of well equipped laboratories and necessary materials for experiments can greatly hinder practical learning, which is essential for understanding chemistry concepts (Kazeem et al., 2022). Some teachers also have limited access to technology and modern textbooks, making it hard to use tools like Information and Communication Technology (ICT) in their lessons (Ojo, 2024). Another challenge is curriculum management. Over 30% of chemistry teachers in Nigerian secondary schools do not effectively implement the curriculum and often skip difficult topics (Adewale, 2023). Teachers sometimes struggle to explain complex concepts, such as chemical kinetics and thermochemistry, which can be particularly tough for students (Samuel et al., 2022). Many teachers report feeling unprepared to develop practical skills, resulting in a reliance on lecture based teaching methods (Apampa et al., 2022).

Assessment and feedback are additional areas where teachers encounter difficulties. Many find it hard to use assessments in a way that truly supports student learning. Time management is also a concern, especially for summer chemistry teachers who need to cover a lot of material in a shorter period (Cleopas & Onwuchekwa, 2024). Classroom management can be another challenge, particularly for new teachers trying to maintain discipline. External issues add to the complexity of teaching. There's a shortage of qualified chemistry teachers, which makes it harder to provide quality education. Low motivation among teachers and limited job opportunities for chemistry graduates can affect the overall quality of teaching (Kazeem et al.,

2022). Societal attitudes toward science and the need for diversity and inclusion in chemistry education also present challenges. To tackle these issues, a comprehensive approach is needed. This includes investing in teacher training, providing adequate resources, reforming curriculums, and finding ways to engage and motivate students. By addressing these challenges, we can improve the quality of chemistry education.

Effect of Years of Chemistry Teachers in Student Academic Achievement

The effect of a chemistry teacher's experience on student academic achievement is generally positive. Study shows that more experienced teachers tend to help their students perform better. For example, students taught by experienced chemistry teachers often achieve higher scores on tests (Ogbia Local Government Area Study, 2023). As teachers gain experience, they become better at managing their classrooms and explaining complex concepts. This expertise not only helps students understand the material but also improves overall attendance and engagement (Adeyemi, 2010). Experienced teachers contribute significantly to creating a positive learning environment, which can enhance student success.

While many studies highlight these benefits, some study indicates that the impact of experience is not always clear cut. For instance, one study found that the years of experience of basic science teachers did not significantly relate to student performance in science (Baker, 2022). It is important to remember that a teacher's experience is just one of many factors that affect student achievement. Other aspects, like teacher qualifications, classroom resources, and teaching methods, also play a vital role. A teacher's effectiveness can improve in a supportive and collaborative environment. Ongoing professional development and training are essential for boosting student achievement. These programs help teachers enhance their knowledge and teaching skills, regardless of how long they have been in the classroom (Kazeem et al., 2022).

Summary of Existing Literature Review

The existing literature on the impact of chemistry teachers on student academic achievement highlights several important points. Many studies show that a teacher's experience positively affects student performance. Experienced teachers tend to use better instructional

techniques and manage their classrooms more effectively, which helps students understand complex concepts. Study indicates that students taught by seasoned chemistry teachers often achieve higher test scores and show greater interest in the subject. Experience is not the only factor that matters. Other aspects, such as teacher qualifications, teaching methods, and classroom resources, also play crucial roles in student success. Some studies suggest that years of experience may not significantly affect performance, especially in basic science subjects. This points to the need for a broader understanding of how different factors work together to influence student achievement.

Ongoing professional development and training are essential for improving a teacher's effectiveness. Continuous support helps teachers enhance their knowledge and teaching strategies, no matter how long they've been in the classroom. The literature emphasizes the importance of a supportive school environment. When teachers work in a collaborative atmosphere, they are more likely to adopt effective teaching practices, which can lead to better student outcomes. While the experience of chemistry teachers is important for student academic achievement, it is essential to consider other factors like qualifications, professional development, and the overall school environment. A comprehensive approach can help improve educational outcomes in chemistry and beyond.

CHAPTER THREE

METHODOLOGY

This chapter describes the methods and procedures that will be used in conducting the study. It provides detailed information on the following subsections:

- Design of the Study
- Population of the Study
- Sample and Sampling Technique
- Research Instrument
- Validity of the Instrument
- Reliability of the Instrument
- Method of Data Collection
- Method of Data Analysis

Design of the Study

This study adopted a descriptive survey design to investigate the impact of teaching experience of chemistry teachers on the teaching and learning process of chemistry in public secondary schools in Oredo Local Government Area. The design is considered appropriate because it allows the researcher to collect data from a sample of respondents to describe existing conditions, perceptions, and relationships between variables without manipulating them.

Population of the Study

The population for the study comprises 1,223 SS II students and teachers in Oredo Local Government Area of Edo state.

Sample and Sampling Technique

The sample for this study comprised a total of 61 participants drawn from Senior Secondary School II (SS II) students and Chemistry teachers in selected public secondary schools in Oredo Local Government Area of Edo State. A simple random sampling technique was first used to select five public secondary schools from the LGA. From a total population of 1,223 SS II Chemistry students across the selected schools, a proportionate sampling technique was employed to select 5% of the students from each school, resulting in a total of 61 student respondents. In addition to the students, all Chemistry teachers in the five selected schools were included in the study based on their teaching experience and qualifications. This resulted in a total of 20 Chemistry teachers (five teachers per school).

Research Instrument

Two sets of structured questionnaires were used as the instrument for data collection in this study; one for students and one for chemistry teachers. The questionnaires were divided into two sections (A and B). Section A contains demographic information from the respondents. For teachers, this included gender, years of teaching experience, and academic qualifications. For students, this included gender, age, and class level. Section B Contains statements related to the research variables, teachers' years of experience, instructional methods, use of laboratory apparatus, and perceived impact on student academic performance.

Respondents were required to indicate the extent of their agreement with each statement using a four-point Likert scale as shown below:

Response Option	Code
Strongly Agree (SA)	4
Agree (A)	3
Disagree (D)	2
Strongly Disagree (SD)	1

Validity of the Instrument

The questionnaires were validated by the researcher's supervisor and two experts in science education and measurement and evaluation to ensure that the items accurately measure

the intended variables. Their corrections, suggestions, and recommendations were incorporated to improve the content and face validity of the instruments.

Reliability of the Instrument

The reliability of the instrument was established using the test-retest method. The questionnaires were administered to 10 chemistry teachers and 20 students from schools outside the study area. The same instruments were re-administered after a two-week interval, and the scores were correlated to determine the stability of the instrument over time.

Method of Data Collection

The primary data for this study was collected through the administration of the structured questionnaires. The questionnaires were distributed personally by the researcher to the respondents in the selected schools with prior permission from the school authorities. The questionnaires were retrieved upon completion. This method helped ensure a high response rate and minimized the chances of data loss or incomplete responses. Respondents were assured of confidentiality and that the information obtained would be used solely for academic purposes.

Method of Data Analysis

Data collected from the respondents will be analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics such as frequency and percentage will be used to summarize the demographic data and responses. The results will be presented in tables for clarity.

CHAPTER FOUR

PRESENTATION OF RESULT AND DISCUSSION OF FINDING

Introduction

This chapter analyzes the data and presents and discusses the findings based on the responses to the research questions.

Demographics of Respondents

This section presents a descriptive analysis of the respondents' socio-demographic characteristics, including gender and age.

Table 4.1: Respondents Demographic Profile

Variable	Frequency	Percentage %
Teachers Demographic Information		
Gender		
Male	11	55
Female	9	45
Total	20	100
Years of Teaching Chemistry		
Less than 5 years	5	25
5 - 10 years	14	70
11 - 15 years	1	5
Total	20	100
Highest Academic Qualification		
B.Sc./B.Ed	15	75
M.Sc./M.Ed	3	15
Ph.D	2	10
Total	20	100
Students Demographic Information		

Gender		
Male	37	60.7
Female	24	39.3
Total	61	100
Class		
SS2	61	100
Total	61	100
Age Range		
Below 15	7	11.5
15–17	34	55.7
18 and above	20	32.8
Total	61	100

From the table, the teacher sample shows a majority male (55%) group, most with 5–10 years of experience (70%) and a Bachelor’s degree as their highest qualification (75%). The student sample, all in SS2, is majority male (60.7%) and primarily aged 15–17 years (55.7%), with a significant portion (32.8%) aged 18 and above.

1. **Research Question 1:** To what extents does teachers’ years of experiences have on the student academics performance?

Table 4.2: Showing to what extents does teachers’ years of experiences have on the student academics performance

Variable	Frequency	Percentage %
Years of Teaching Chemistry		
Less than 5 years	5	25
5 - 10 years	14	70
11 - 15 years	1	5
Total	20	100

My years of experience have helped me develop a wider range of teaching strategies for chemistry.		
Strongly Agree	16	80
Agree	4	20
Disagree	0	0
Strongly Disagree	0	0
Total	20	100

From the table, teachers' years of experience have a substantial positive effect on student academic performance. This is strongly supported by the data, which shows that **100% of teachers agree or strongly agree** that their experience has helped them develop more teaching strategies. Since most teachers (95%) have 10 or fewer years of experience—with 70% in the 5–10 year range—this indicates that even moderate experience significantly enhances instructional skill. Therefore, greater teaching experience leads to better teaching methods, which in turn improves student learning and performance.

Research Question 2: Does Availability of Laboratory apparatus influence chemistry students?

Table 4.3: Showing how availability of laboratory apparatus influence chemistry students

Variable	Frequency	Percentage %
I understand chemistry better when my teacher uses laboratory apparatus during teaching.		
Strongly Agree	26	42.6
Agree	24	39.3
Disagree	7	11.5
Strongly Disagree	4	6.6
Total	61	100

From the table, the data shows that a combined 81.9% of students (42.6% who strongly agree and 39.3% who agree) understand chemistry better when their teacher uses lab equipment during lessons. This clear majority indicates that hands on, practical demonstrations significantly improve student comprehension. In contrast, only 18.1% of students disagree or strongly disagree with the statement. Therefore, the presence of laboratory apparatus is a key factor in effective chemistry instruction and directly supports student learning.

Research Question 3: How does teaching experience affect chemistry teacher's choice of instructional materials?

Table 4.4: Showing how teaching experience affect chemistry teacher's choice of instructional materials

Variable	Frequency	Percentage %
My years of experience have helped me develop a wider range of teaching strategies for chemistry.		
Strongly Agree	16	80
Agree	4	20
Disagree	0	0
Strongly Disagree	0	0
Total	20	100
I find it easier to manage my classroom and engage students now than when I started teaching.		
Strongly Agree	14	70

Agree	6	30
Disagree	0	0
Strongly Disagree	0	0
Total	20	100
With more experience, I am more confident in adapting my lesson plans to suit different learning styles.		
Strongly Agree	10	50
Agree	10	50
Disagree	0	0
Strongly Disagree	0	0
Total	20	100
I frequently use student-centered methods (e.g., inquiry-based learning) in my chemistry classes.		
Strongly Agree	7	35
Agree	9	45
Disagree	3	15
Strongly Disagree	1	5
Total	20	100

From the table, teaching experience significantly improves a chemistry teacher's choice of instructional materials by increasing their skill and confidence. All teachers (100%) agreed that experience helps them develop better teaching strategies, manage classrooms more easily, and adapt lessons for different learners. This suggests experienced teachers are more capable of selecting and using varied, effective materials. Only 80% of teachers frequently use highly student-centered materials like inquiry-based learning, indicating that the choice to adopt the most interactive materials may also depend on other factors beyond just experience.

Research Question 4: Does teacher years of experience have effect on academic achievement of chemistry student?

Table 4.5: Showing how teacher years of experience have effect on academic achievement of chemistry student

Variable	Frequency	Percentage %
I have observed that my students' academic performance has improved as I have gained more teaching experience.		
Strongly Agree	14	70
Agree	6	30
Disagree	0	0
Strongly Disagree	0	0
Total	20	100
I can better identify and address students' misconceptions in chemistry due to my experience.		
Strongly Agree	15	75
Agree	5	25
Disagree	0	0
Strongly Disagree	0	0
Total	20	100
Experienced teachers are better at preparing students for chemistry examinations like WAEC and NECO.		
Strongly Agree	11	55
Agree	7	35

Disagree	2	10
Strongly Disagree	0	0
Total	20	100
My ability to explain complex concepts simply has improved with years of practice.		
Strongly Agree	13	65
Agree	7	35
Disagree	0	0
Strongly Disagree	0	0
Total	20	100
I believe there is a strong positive relationship between a chemistry teacher's experience and their students' academic achievement.		
Strongly Agree	13	65
Agree	7	35
Disagree	0	0
Strongly Disagree	0	0
Total	20	100
I effectively link theoretical concepts to real-world applications in my teaching.		
Strongly Agree	7	35
Agree	13	65
Disagree	0	0
Strongly Disagree	0	0
Total	20	100
My teaching experience has significantly enhanced the overall teaching and learning process of chemistry in my school.		
Strongly Agree	10	50
Agree	10	50
Disagree	0	0

Strongly Disagree	0	0
Total	20	100

From the table, teachers report that their experience directly improves student achievement. 100% of teachers agree that with more experience, they explain concepts better, correct student misunderstandings more effectively, and see improved student performance. A strong majority (90%) also believe experienced teachers better prepare students for major exams. Hence, teaching experience builds essential instructional skills that lead to higher academic achievement in chemistry.

Discussion of Findings

This study evaluated the impact of teaching experience on instructional quality and student learning in chemistry in Oredo LGA, Edo State. The findings reveal a strong, positive relationship between a teacher's years of experience and their perceived effectiveness. The vast majority of teachers (95%) have 10 or fewer years of experience, yet 100% agree that this experience has helped them develop a wider range of teaching strategies. Furthermore, all teachers (100%) report greater ease in classroom management, increased confidence in adapting lessons for different learners, and an improved ability to explain complex concepts simply. This aligns with recent research by García-Martínez et al. (2023), which found that experiential learning in teaching directly translates to refined pedagogical content knowledge and more flexible instructional decision-making. Teachers totally observe a link between their growing experience and improved student performance. Specifically, 100% of teachers agree they can better identify and address student misconceptions, and 90% believe experienced teachers are more effective at preparing students for standardized examinations (WAEC/NECO). This perception is supported by the work of Ogunniyi and Abah (2024), whose study in Nigerian secondary schools concluded that teacher experience was a critical factor in students' higher-order thinking skills and examination success in science subjects. While experience builds foundational skills, the data suggests its effect on adopting specific advanced methods is nuanced. A strong majority of students (81.9%) report understanding chemistry better when teachers use laboratory apparatus, underscoring the importance of practical resources. Although 80% of teachers frequently use student-centered methods, the remaining 20% do not, indicating that experience alone may not guarantee the use of all interactive pedagogies. This corroborates the findings of Mamlok-Naaman & Eilks (2022), who argue that while experience fosters confidence, the consistent implementation of inquiry-based learning often requires targeted professional

development and institutional support alongside classroom practice. Teaching experience is a significant factor in enhancing chemistry education. It builds essential instructional competencies, increases teacher efficacy, and is strongly perceived to boost academic achievement. The findings suggest that supporting teachers in translating their experience into the consistent use of practical, student-centered methods through access to laboratory apparatus and ongoing training could further maximize the positive impact of experience on student learning outcomes.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

SUMMARY

This study investigated the relationship between chemistry teachers' experience and student academic achievement in selected public secondary schools in Oredo LGA, Edo State. The research, involving 20 teachers and 61 SS2 students, revealed several key findings. Firstly, teacher experience significantly enhances pedagogical skills, with 100% of teachers agreeing that their years of practice have helped them develop wider teaching strategies, better explain complex concepts, and address student misconceptions. Secondly, teachers overwhelmingly perceive a direct link between their experience and improved student outcomes, with all respondents observing student performance improvement and 90% believing experienced teachers better prepare students for major examinations. Thirdly, while experience builds strong foundational teaching competencies, its influence on adopting specific student centered methods like inquiry based learning is slightly less uniform, with 80% frequently using such approaches. Finally, students strongly prefer practical instruction, as 81.9% report understanding chemistry better when teachers use laboratory apparatus, highlighting the critical role of resource availability in the learning process.

CONCLUSION

Based on the findings, it is concluded that teaching experience has a substantial positive effect on the academic achievement of chemistry students. This effect operates indirectly by enhancing teachers' instructional competencies including pedagogical flexibility, explanatory clarity, and adaptive assessment preparation which in turn improve student learning outcomes. The study confirms that experienced chemistry teachers are more skilled, confident, and effective in their roles. However, experience alone does not guarantee the consistent use of all advanced, student centered methodologies, indicating that other supportive factors are necessary. Furthermore, the availability of laboratory apparatus remains a crucial complementary factor that significantly influences student comprehension and engagement. Therefore, teacher experience is a key determinant of instructional quality and student success in chemistry.

RECOMMENDATIONS

Based on the conclusions, the following recommendations are made:

- **School Administrators & Policy Makers:**
Implement structured mentoring for less experienced teachers and prioritize funding for laboratory resources.
- **Teacher Training & Professional Development:**
Provide continuous training on student centered, inquiry based teaching, classroom management, and adaptive lesson planning.
- **Future Research:**
Conduct longitudinal studies linking teaching experience to students' exam performance and expand studies to rural and private schools.
- **Teachers:**
Share effective teaching practices with colleagues and consistently use practical laboratory demonstrations to enhance learning.

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APPENDIX

DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHNOLOGY

UNIVERSITY OF BENIN

BENIN CITY.

IMPACT OF TEACHING EXPERIENCE OF CHEMISTRY TEACHERS ON THE TEACHING AND LEARNING PROCESS OF CHEMISTRY IN SECONDARY SCHOOLS IN OREDO LOCAL GOVERNMENT.

I am Osawaru Jessica Uwaila, a student of the Department of Curriculum and Instructional Technology, University of Benin, conducting a study on the impact of teaching experience of chemistry teachers on the teaching and learning process.

This questionnaire is designed to collect information from teachers/students. Please respond honestly to the items below. Your answers will be treated with the utmost confidentiality and used solely for academic purposes.

Thank you for your cooperation.

Yours faithfully,

Osawaru Jessica Uwaila

TEACHERS' QUESTIONNAIRE

Section A: Demographic Information

1. **Gender:** Male [] Female []
2. **Years of Teaching Chemistry:**
 - Less than 5 years []
 - 5 - 10 years []
 - 11 - 15 years []
 - Above 15 years []
3. **Highest Academic Qualification:**
 - [B.Sc./B.Ed.](#) []
 - [M.Sc./M.Ed.](#) []
 - Ph.D. []

- Other (Specify) _____ []

Section B: Teachers' Responses

SA = Strongly Agree A = Agree D = Disagree SD = Strongly Disagree

S/N	ITEMS	SA	A	D	SD
	A. Teaching Experience and Instructional Methods				
1	My years of experience have helped me develop a wider range of teaching strategies for chemistry.				
2	I find it easier to manage my classroom and engage students now than when I started teaching.				
3	With more experience, I am more confident in adapting my lesson plans to suit different learning styles.				
4	I frequently use student-centered methods (e.g., inquiry-based learning) in my chemistry classes.				
	B. Teaching Experience and Use of Laboratory Apparatus				
5	My experience has made me more proficient in using available laboratory apparatus, even if limited.				
6	I am skilled at improvising laboratory materials when standard apparatus is not available.				
7	I regularly conduct practical sessions to demonstrate chemistry concepts.				
8	The availability of laboratory apparatus influences how often I incorporate practical work into my teaching.				
	C. Teaching Experience and Student Academic Performance				

9	I have observed that my students' academic performance has improved as I have gained more teaching experience.				
10	I can better identify and address students' misconceptions in chemistry due to my experience.				
11	Experienced teachers are better at preparing students for chemistry examinations like WAEC and NECO.				
12	My ability to explain complex concepts simply has improved with years of practice.				
13	I believe there is a strong positive relationship between a chemistry teacher's experience and their students' academic achievement.				
14	I effectively link theoretical concepts to real-world applications in my teaching.				
15	My teaching experience has significantly enhanced the overall teaching and learning process of chemistry in my school.				

STUDENTS' QUESTIONNAIRE

Section A: Demographic Information

1. Gender: Male Female
2. Class: SS2
3. Age Range: Below 15 15–17 18 and above

Section B: Students' Responses

SA = Strongly Agree A = Agree D = Disagree SD = Strongly Disagree

S/N	ITEMS	SA	A	D	SD
1	My chemistry teacher uses different methods to make the lessons				

	understandable.				
2	My teacher is able to explain complex topics in a simple way.				
3	My teacher regularly uses the laboratory to demonstrate experiments.				
4	I understand chemistry better when my teacher uses laboratory apparatus during teaching.				
5	My teacher is good at using laboratory equipment, even when some items are missing				
6	The way my teacher teaches helps me perform better in chemistry tests and exams.				
7	My teacher links what we learn in class to real-life situations.				
8	I feel more confident in answering chemistry questions because of how my teacher explains the subject.				
9	My teacher's experience in teaching chemistry is evident in the way he/she handles the subject and the class.				
10	I believe my academic performance in chemistry is positively influenced by my teacher's skill and experience.				

