ASSESSMENT OF SECONDARY SCHOOL TEACHERS CHARACTERISTICS FOR TEACHING OF BIOLOGY IN EGOR LOCAL GOVERNMENT AREA OF EDO STATE.

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHNOLOGY, FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY IN PARTIAL FUFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE (B.Sc) DEGREE IN BIOLOGY EDUCATION

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CERTIFICATION

This is to certify that this study was carried out by **ADEJIMI Adekunle Samuel with** matriculation number **EDU2101989** in the department of Curriculum and Instructional Technology, Faculty of Education for a partial fulfilment of the requirement of the award of Bachelor of Science BSc Ed Biology Education University of Benin.

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DEDICATION

I dedicate this project work to Almighty God for His infinite mercy, wisdom and strength granted to me throughout the course of this study.

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ABSTRACT

The study investigated the Assessment of Secondary School Teachers Characteristics for Teacher of Biology in Egor Local Government Area of Edo State. Specifically, the study seeks to :examine the characteristics of biology teachers in secondary schools in Egor LGA of Edo State, assess the differences in teaching characteristics between male and female teachers Egor LGA of Edo State, assess differences in teaching characteristics based on professional qualification in secondary schools Egor LGA of Edo State, assess the differences in teaching characteristics based on teaching experience in Egor LGA of Edo State and assess the difference in teaching based on subject area specialization in Egor LGA of Edo State.

Thirteen (13) public secondary schools were selected for the purpose of this study of which 45 biology teachers were recorded and were administered a well-structured questionnaire. The data was analysed using mean, standard deviation, frequency and percentage count.

Results showed that there is no major difference between male and female biology teachers with respect to teaching method and student outcome. Professional qualification revealed that all the biology teachers are TRCN certified (100%) hence in-service training, seminar and workshop will significantly enhance the teaching of biology. Subject area specialization revealed that most of the biology teachers are biology specialist (83%). About 16% of biology teachers are not biology specialist but are tasked to teach biology as a result of biology teachers' shortage. A mean score of 3.09 shows that biology specialist has better content knowledge and can handle practical biology lessons. Teaching experience reveal that (45.2%) of biology teachers have teaching experience within the range of 6-10 years. This shows that they have moderate level of teaching experience. A mean score of 3.35 revealed that teachers with level of experience have improved method of delivering biology lesson.

Overall, the study therefore concluded that both male and female have equal competence in delivering biology lesson effectively to public secondary school students especially when exposed to the necessary educational background and professional development.

The study recommends the ministry of education recruits trained biology specialist to handle biology lessons, regular workshop training, seminars should be organised to strengthen professional development. Also, non-biology specialist can also be supported with adequate training to improve their content knowledge. This will help to enhance biology as a profession and also improve the teaching and learning of biology in the study area.

CHAPTER ONE

INTRODUCTION

Background to the Study

Biology is a core science subject that equips students with essential knowledge about living organisms and the natural processes that sustain life. Biology, as one of the core science subjects taught in senior secondary schools, occupies a prominent place in Nigerian educational system due to its direct relevance to students' lives and its foundational significance across multiple professional disciplines. It explores the structure, function, growth, origin, evolution and distribution of living organisms, thereby enabling students to gain insights into both their internal biological systems and the natural world around them. As a foundational discipline, it serves as a gateway to numerous careers in fields such as medicine, pharmacy, agriculture, biotechnology, and environmental management. Theses field are integral for solving real world problems such as disease control, food security, sustainable development and environmental conservation. A solid understanding of biology helps students develop scientific reasoning, critical thinking, and problem-solving skills—competencies vital for national development and technological advancement (Okoye & Eze, 2018). These are 21st century skills that foster innovation, adaptability and global competitiveness. According to Aina and Ayodele (2021), biology education plays a significant role in equipping students with scientific literacy and cognitive

tools necessary to engage with contemporary challenges ranging from climate change to emerging health issues.

In Nigeria, the secondary school biology curriculum is designed to promote students' investigation into natural phenomena, to deepen students' understanding and interest in biological sciences and also to encourage students' ability to apply scientific knowledge to everyday life in matters of personal, community, health and agriculture among others. Despite its importance, academic performance at the secondary school level in Nigeria has remained unsatisfactory in recent years. Data from public examination bodies such as West Africa Examinations Council (WAEC) and the National Examinations Council (NECO) show a consistent pattern of poor performance among students in biology (WAEC, 2020). Several interrelated factors have been identified as contributors to the persistent underperformance of students in biology at the secondary school level in Nigeria. Inadequacy of teaching resources including laboratory equipment, up to date text books, visual aids, poor classroom infrastructure and overcrowded classroom particularly in rural and underdeveloped environment and rush as a result of overloaded biology curriculum can diminish students' concentration and engagement during learning (Olufemi & Ogunwole, 2017; Udo & Udofia, 2021). However, perhaps the most critical and often overlooked factor is the characteristics of biology teachers themselves.

Teacher characteristics refer to the qualities, attributes and qualifications that define a teacher's capacity to facilitate learning. These include sex, professional qualifications, professional training, teaching experience, pedagogical competence, and attitude toward the subject, class room management skills, and the willingness to engage in continuous professional development (Olalaekan & Okon, 2019). A research conducted by Eze & Eze (2019), highlighted that teachers' professional qualifications, pedagogical training and years of experience significantly influence how well students perform in biology, particularly in relation to practical comprehension and long-term retention. Teachers who lack sufficient subject-matter knowledge or unable to effectively communicate biological concepts using appropriate teaching methods may contribute directly to student confusion and loss of interest. Furthermore, teachers who demonstrate enthusiasm, confidence and a positive attitude toward biology tend to foster similar attitudes among their students, thereby promoting better learning outcomes (Yusuf, 2016).

In Nigeria, the quality and characteristics of biology teachers vary markedly across public and private secondary schools and this disparity continue to have profound effects on students' learning outcomes. Public secondary schools, especially those in rural areas, often face shortage of qualified biology teachers. This shortage is frequently addressed through the appointment of non-specialist teachers, who may have backgrounds in unrelated fields such as chemistry, agriculture, or integrated science, but are tasked with teaching biology due to staffing gap (Okoli

& Ezegbe, 2017; Eze & Eze, 2019). These non-specialist teachers may lack in-depth subject matter knowledge or the pedagogical expertise required for effective biology teaching, resulting in poor content delivery, and inadequate use of laboratory resources and reduced student engagement. By contrast, many private secondary schools tend to employ subject specialist, biology graduates. However, while these teachers may possess stronger academic qualifications, they often lack access to structured professional development opportunities such as workshops, in-service training. According to Opara and Okechukwu (2020), professional development is crucial for updating teachers on modern pedagogical trends, curriculum changes and learner-cantered teaching methodologies, particularly in the science.

Despite reforms in the education sector, challenges related to teacher quality persist in Nigeria. Studies have shown that many biology teachers, particularly in rural and public schools, lack sufficient training or ongoing professional development. This situation leads to inconsistencies in biology teaching quality across schools. For example, while some teachers adopt modern, student-centered approaches such as inquiry-based or activity-oriented methods, others still rely heavily on outdated lecture methods, which may not promote meaningful learning (Ugwoke, 2021).

Furthermore, school type and location also influence the quality of biology teaching. Urban and private schools tend to attract more qualified and experienced teachers due to better

infrastructure and incentives, where as rural and public schools often face challenges such as understaffing, poor remuneration, and inadequate teaching resources or facilities. This contributes to uneven academic performance in biology across different school types and regions, perpetuating educational inequality and limiting the development of scientific talent in many parts of the country (Eze et al., 2022).

Given the importance of biology education in national development and the challenges in its delivery, it is essential to conduct an in-depth assessment of the characteristics of biology teachers in secondary schools; therefore the study seeks to assess the characteristics of secondary school biology teachers with a view of identifying the key attributes that influence effective teaching.

Statement of the Problem

Biology remains one of the core science subjects in Nigeria's secondary school curriculum due to its relevance in medicine, agriculture, environmental management and biotechnology. However, despite its importance, students' performance in biology has been persistently poor, as evidenced by reports from the West African Examinations Council (WAEC, 2020; 2022). While infrastructural limitations and insufficient laboratory resources are widely acknowledged issues growing research attention has been directed at the role of teacher characteristics in influencing learning outcomes. Attributes such as academic qualification, pedagogical competence, subject

mastery, and years of teaching experience attitude towards teaching and professional development significantly determine how well students grasp biological concept (Ajayi et al., 2020; Eze et al., 2022).

Many students find the subject abstract and difficult, which may stem from ineffective teaching approaches or lack of teacher competence. There is limited recent data specifically addressing whether the characteristics of biology teachers align with the demands of modern science education. This study seeks to assess the current status of biology teachers' characteristics in secondary schools and how they influence the quality of teaching across various school settings. This study aims to explore and evaluate these issues within the context of secondary schools in Egor Local Government Area.

Research Questions

The following research questions will guide the study.

i. What are the characteristics of biology teachers in secondary schools in Egor LGA of Edo State?
ii. Is there a difference in the teaching of biology in secondary school between male and female teachers in Egor LGA of Edo State?
iii. Is a difference in the teaching of biology in secondary school based on professional qualification in Egor LGA of Edo State?

iv. Is there a difference in the teaching of biology in secondary school based on teaching experience in Egor LGA of Edo State?

v. Is there a difference in the teaching of biology in secondary school based on subject area specialization in Egor LGA of Edo State?

Purpose of the Study

The purpose of this study the assessment of secondary school teachers characteristics for teaching biology in Egor LGA of Edo state. Specifically, the study seeks to :

i. examine the characteristics of biology teachers in secondary schools in Egor LGA of Edo State

ii. assess the differences in teaching characteristics between male and female teachers Egor LGA of Edo State

iii. assess differences in teaching characteristics based on professional qualification in secondary schools Egor LGA of Edo State

iv. assess the differences in teaching characteristics based on teaching experience in Egor LGA of Edo State.

v. assess the difference in teaching based on subject area specialization in Egor LGA of Edo State.

Significance of the Study

Moreover, this research will inform stakeholders on how teacher-related factors may contribute to the persistent underperformance of students in biology, thereby offering a practical basis for strategic interventions. Parents and guardians may also indirectly benefit, as improved teaching quality could translate to better academic outcomes for their children.

In the academic domain, the study contributes to the growing body of knowledge on teacher effectiveness, providing current data specific to Egor Local Government Area. Findings will guide school administrators and principals in identifying specific areas where biology teacher require support. It can also serve as a foundation for further studies that aim to explore teacher characteristics in other subjects or regions.

Scope and Delimitation of the Study

This study will be limited to Biology teachers in secondary schools within Egor Local Government Area of Edo State. It will focus on five key characteristics: sex, professional qualification, teaching experience, subject area specialization, and how these influence the teaching of Biology.

Definition of Terms

Teacher Characteristics: This refers to specific attributes of biology teachers such as academic qualification, teaching experience, instructional methods, motivation, and interpersonal skills that may influence the quality of teaching.

Biology Teaching: The process of delivering biology content to secondary school students, including classroom instruction, practical activities, and assessments.

Qualification: This refers to the academic and professional certificates obtained by teachers (e.g., NCE, B.SC.ED, M.ED),which determine their level of preparedness for teaching biology.

Teaching Experience: The number of years a teacher has been actively engaged in classroom instruction and interaction with students. In this study, teaching experience is considered in terms of years of service in teaching biology.

Biology Teaching: The process of delivering instruction in biology at the secondary level, aimed at improving students understanding of biological concepts, principles, and processes.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter presents a preview of related literature on the Assessment of Secondary School Teachers' Characteristics for Teaching of Biology. It is discussed under the following subheads:

- Theoretical Framework
- Biology in Nigeria Secondary Schools
- Teaching of Biology
- Teachers' Characteristics
- Sex and Teaching of Biology
- Professional Qualification and Teaching of Biology
- Teaching experience and Teaching of Biology
- Subject Area Specialization and Teaching of Biology
- Empirical Review
- Summary of Related Literature

Theoretical Framework

The theoretical foundation for this study is anchored in several educational theories that explain how teacher characteristics affect student learning. These include:

- Constructivist Learning Theory

  Constructivism, advanced by Piaget and Vygotsky, posits that learners construct their own understanding through active engagement with their environment. Applied to Biology, this theory suggests that teachers must create opportunities for students to explore, experiment, and discover knowledge. Recent applications (Adeyemi & Osalusi, 2021) highlight that constructivist approaches such as inquiry-based learning and problem-solving tasks are more effective in biology teaching than rote methods. Teachers' qualifications, creativity, and subject mastery play a major role in implementing these strategies.

- Social Cognitive Theory

  Proposed by Bandura, this theory emphasizes observational learning, where students learn behaviors, attitudes, and values by observing models—in this case, teachers. Teacher characteristics such as enthusiasm, confidence, and fairness directly influence how students perceive and engage with Biology. For instance, Imonsili and Nwali (2024)

noted that students often mirror the attitudes of their teachers toward the subject, highlighting the role of teachers as role models.

- Teacher Effectiveness Model

  The teacher effectiveness framework focuses on the competencies and practices that improve student achievement. These include subject matter knowledge, pedagogical skills, classroom management, and professional attitudes. In Biology, teacher effectiveness is influenced by professional qualification, specialization, experience, and personal traits. Studies by Akanbi et al. (2025) and Abidoye and Ogunlowo (2021) confirm that teacher effectiveness in Nigeria is strongly tied to these characteristics.

- Human Capital Theory

  Human capital theory, advanced by Becker, argues that investment in education and training enhances the productivity of individuals. Applied here, it suggests that investment in teacher education and professional development improves teaching quality, which in turn boosts student performance in Biology. As highlighted by Salifu and Agbenyega (2022), teachers with higher qualifications and training significantly contribute to better outcomes in science education. Together, these theories provide a framework for understanding how teacher characteristics—including sex, qualification,

experience, and specialization—affect the teaching and learning of Biology in secondary schools.

Biology in Nigerian Secondary Schools

Biology occupies a central place in the Nigerian senior secondary school curriculum because of its importance in preparing learners for higher education, careers in science-related disciplines, and the acquisition of life skills that support everyday living. As one of the core science subjects, it introduces learners to essential knowledge about living organisms, their functions, interactions, and the environment. According to the Nigerian Educational Research and Development Council (NERDC), Biology is mandatory for students who intend to pursue careers in medicine, agriculture, pharmacy, biotechnology, microbiology, genetics, nursing, and related areas (NERDC, 2018). The significance of Biology in secondary education extends beyond its professional relevance. It also contributes to developing critical thinking, problem-solving abilities, and awareness of environmental sustainability. For instance, Nwankwo, Ugwu, Ukala, and Benson (2022) emphasized that Biology instruction shapes learners' attitudes toward nature, encourages health consciousness, and supports the development of scientific reasoning. Similarly, Adeyemi and Osalusi (2021) argued that Biology is not only a gateway to scientific professions but also a discipline that builds competencies for everyday decision-making, such as personal hygiene, nutrition, and disease prevention.

Despite its relevance, performance in Biology among Nigerian students has remained inconsistent over the years. Reports by the West African Examinations Council (WAEC, 2020; 2022) indicated that a significant proportion of candidates fail to achieve credit-level passes in Biology, which restricts their chances of pursuing science-related careers. Scholars have attributed this underperformance to factors such as poor teaching methods, lack of qualified teachers, inadequate laboratory facilities, and insufficient exposure to practical activities (Abidoye & Ogunlowo, 2021; Imonsili & Nwali, 2024). Another challenge lies in the mismatch between the prescribed curriculum and the realities of teaching in many schools. While the curriculum emphasizes practical skills, inquiry-based learning, and application of concepts, classroom practice often reflects rote memorization and teacher-centered approaches. This has led to a disconnection between curriculum objectives and student outcomes. Eze and Adebayo (2019) noted that many schools lack functional laboratories, meaning that students rarely engage in experiments that would enable them to visualize and understand abstract concepts. Instead, teachers rely on theoretical explanations, which fail to spark curiosity and reduce student motivation.

The issue of resource availability further complicates Biology teaching in Nigerian schools. In many rural and semi-urban areas, teachers often face shortages of teaching aids, chemicals, models, and microscopes. To bridge this gap, teachers sometimes resort to improvisation using

locally available materials. Mbaegbu, Awosika, Akachukwu, and Ikusika (2020) observed that creative teachers who improvise models, charts, and specimens tend to achieve better results with their students compared to those who rely solely on verbal descriptions. This reinforces the idea that teaching quality—closely tied to teacher characteristics—plays a decisive role in shaping learning outcomes.

International perspectives provide further insight into the challenges and opportunities in Biology education. For instance, in a comparative study across Sub-Saharan Africa, Oduol and Mwangi (2021) found that Nigerian students performed below their counterparts in Kenya and Ghana, largely due to differences in teacher preparation and laboratory use. While Kenyan schools emphasized hands-on practice, Nigerian schools often emphasized theoretical aspects, leading to weaker student engagement and retention of knowledge.

Teaching of Biology

Teaching Biology is a complex process that requires a balance between transmitting scientific knowledge and stimulating students' curiosity and critical thinking. Biology concepts often involve abstract ideas, such as cell division, genetics, and ecological interactions, which can be difficult for learners to understand without practical demonstrations. Therefore, teaching Biology effectively requires teachers to employ strategies that go beyond traditional lectures and encourage students to actively construct knowledge. According to Nwankwo *et al.* (2022),

effective Biology teaching involves the use of hands-on activities, inquiry-based learning, and problem-solving tasks that enable learners to engage directly with content. These strategies encourage students to move from passive reception of information to active participation, making learning more meaningful. For instance, a biology teacher who uses simple laboratory experiments to demonstrate photosynthesis allows learners to observe how variables such as light and carbon dioxide influence plant processes, thereby linking theoretical knowledge to real-world experience. Despite the emphasis on learner-centered methods, research suggests that many Nigerian classrooms still rely on teacher-centered approaches. Mbaegbu et al. (2020) found that teachers in Anambra State frequently adopt the lecture method due to large class sizes, inadequate laboratory resources, and pressure to cover the syllabus quickly. While this approach helps transmit information, it often leads to rote memorization rather than deep understanding. Students may be able to recall facts during examinations but fail to apply the knowledge in new situations.

Digital technology has emerged as a transformative tool for improving Biology teaching. Akanbi et al. (2025) noted that teachers who integrate Information and Communication Technology (ICT) into their teaching—such as simulations, animations, and interactive software—enhance students' comprehension of complex concepts like DNA replication and ecological cycles. However, the integration of ICT in Nigerian secondary schools is uneven. Urban schools with

better infrastructure and trained staff benefit more from these innovations, while many rural schools continue to struggle with inadequate facilities and limited teacher competence in using digital tools (Adeyemi & Osalusi, 2021).

Furthermore, teaching Biology involves addressing the diverse learning needs of students. Some learners are visual, others are auditory, and some learn best through kinesthetic activities. Effective teachers are those who adapt their methods to accommodate these differences. Imonsili and Nwali (2024) observed that teachers who used a mix of demonstrations, group discussions, and practical activities recorded better student engagement compared to those who relied solely on textbooks.

Globally, innovative strategies such as problem-based learning, cooperative learning, and flipped classrooms have been found effective in Biology education. For example, a study in South Africa by Khumalo and Modiba (2019) revealed that students who engaged in group problem-solving activities outperformed those taught through conventional lectures. This highlights the importance of active learning methods in improving academic achievement and sustaining student interest in science subjects.

Teaching methods in Biology have been found to be important in influencing student achievement. Several recent studies show that student-centered, practical, and inquiry-based

methods outperform traditional lecture or teacher-centered methods. A study conducted by Nwankwo, Ugwu, Ukala & Benson (2022) in Enugu State, Nigeria compared problem-based learning and hands-on activities with more traditional teaching. They found significantly higher achievement scores in Biology among students taught via hands-on and problem based on methods. Furthermore, a study carried out in Delta State, Nigeria on post-basic students compared teacher-centered vs student-centered teaching methods and found student-centered methods significantly boosted achievement in biology. Also, the availability and use of instructional resources has been found to affect how well teachers can deliver Biology lessons. For example, in Moro Local Government Area of Kwara State, a survey of Biology teachers found that where instructional resources are more available and utilized, teaching quality is perceived to be higher. Thus, the literature emphasizes that to improve Biology teaching, emphasis must be placed not only on the content of the curriculum but on how it is taught — using interactive, practical, student-engaging methods, supported by resources.

In sum, the teaching of Biology is influenced by a combination of pedagogical strategies, resource availability, and teacher adaptability. While modern teaching methods are advocated, their implementation in Nigeria is constrained by systemic challenges. The role of teachers becomes central, as their creativity, flexibility, and professional commitment determine how effectively Biology is taught and learned.

Teacher Characteristics

Teacher characteristics refer to the qualities, attributes, and behaviors that teachers bring to the classroom, which significantly influence student learning outcomes. These characteristics can be categorized into cognitive qualities (such as subject matter knowledge), affective qualities (such as attitude, motivation, and enthusiasm), and professional qualities (such as communication skills, classroom management, and creativity). Several studies have established a strong link between teacher characteristics and student performance in Biology. Imonsili and Nwali (2024) reported that teachers' enthusiasm, fairness, and interpersonal skills contributed positively to students' attitudes toward Biology in Esan West Local Government Area. Similarly, Erikwe, Dirisu, and Ogunbayo (2020) found that Biology students in Rivers State performed better when taught by teachers who displayed patience, empathy, and a willingness to provide extra support outside classroom hours. Subject mastery is another critical characteristic. Abidoye and Ogunlowo (2021) stressed that teachers with strong knowledge of Biology concepts are more confident in delivering lessons and can provide accurate explanations that help students overcome misconceptions. On the other hand, teachers with weak subject mastery tend to rely heavily on textbooks, limiting opportunities for deeper exploration of concepts. Teacher motivation also influences the quality of instruction. A motivated teacher is more likely to prepare lessons thoroughly, explore innovative teaching strategies, and inspire learners to take interest in Biology. Conversely, unmotivated teachers may present lessons in a monotonous and uninspiring manner,

leading to student disengagement (Eze & Adebayo, 2019). Creativity is equally important in teaching Biology, especially in contexts where resources are limited. Teachers who improvise teaching aids using local materials can bridge the gap caused by the absence of standard laboratory facilities. Mbaegbu et al. (2020) observed that Biology teachers in Awka South who created models and specimens using everyday items such as cardboard, bottles, and leaves improved student participation and understanding. Globally, research echoes similar findings. In a study conducted in Malaysia, Abdullah and Chong (2018) found that teacher personality traits such as openness, conscientiousness, and sociability had a direct impact on student achievement in science. This shows that teacher characteristics are universally important in shaping student outcomes, though contextual challenges may differ. Overall, teacher characteristics remain a decisive factor in Biology education. Teachers who demonstrate strong subject mastery, enthusiasm, fairness, and creativity not only enhance students' academic performance but also nurture positive attitudes toward science.

Sex and the Teaching of Biology

The role of teacher sex in influencing student learning has been widely debated in educational research. Some studies argue that male and female teachers bring different perspectives, communication styles, and interaction patterns to the classroom, which may affect student engagement and achievement. Others, however, suggest that teacher competence, rather than sex,

is the stronger determinant of student performance. Okeke (2017) argued that teacher sex can be particularly influential in science education because it shapes students' perceptions of gender roles in scientific fields. Female teachers often serve as role models to female students, inspiring them to pursue careers in science, technology, engineering, and mathematics (STEM). This is especially important in Nigeria, where gender stereotypes sometimes discourage girls from enrolling in science subjects. According to Adeyemi and Osalusi (2021), the presence of female Biology teachers in secondary schools has contributed to increasing female participation in science-related courses. Similarly, a study in Ghana by Nyarko and Boateng (2020) found that while students expressed a preference for certain teachers based on gender, actual performance outcomes showed no statistically significant difference between male- and female-taught groups. There is also evidence suggesting that the interaction between teacher sex and student sex may matter more than teacher sex alone. For example, Eze and Adebayo (2019) reported that female students sometimes performed better when taught by female teachers because they felt more comfortable asking questions and seeking clarification. Male students, on the other hand, showed no preference. This highlights the role of teacher-student relationships in mediating the impact of teacher sex.

International findings provide mixed perspectives as well. In a study conducted in the United States, Dee (2015) found that students tended to perform slightly better when taught by teachers

of the same gender, suggesting that teacher sex can influence classroom dynamics. However, recent meta-analyses (Wang & Degol, 2020) conclude that the overall impact of teacher sex on achievement is modest compared to other teacher-related variables such as competence, training, and pedagogical skill. In the context of Nigeria, it is evident that while teacher sex may influence student perceptions and classroom interactions, it does not independently determine academic outcomes in Biology. What appears more critical is the teacher's ability to create an inclusive, supportive learning environment and to serve as a role model for learners regardless of sex.

Professional Qualification and Teaching of Biology

Professional qualification refers to the formal training and certification that a teacher acquires in preparation for teaching. In the Nigerian context, this typically includes degrees such as the Nigeria Certificate in Education (NCE), Bachelor of Science (B.Sc.) in Biology, or Bachelor of Science Education (B.Sc. Ed.), alongside professional certifications such as the Postgraduate Diploma in Education (PGDE) or membership in the Teachers Registration Council of Nigeria (TRCN). The link between professional qualification and teaching effectiveness has been widely acknowledged in literature. Akanbi et al. (2025) revealed that Biology teachers with higher qualifications demonstrated stronger ICT integration skills and were more effective in adopting modern teaching strategies. This finding is significant because it highlights the role of qualifications not only in subject mastery but also in the ability to adapt to evolving educational

technologies. Similarly, Abidoye and Ogunlowo (2021) reported that professionally qualified Biology teachers in South-West Nigeria were more likely to employ student-centered approaches, such as project-based learning and inquiry methods, compared to teachers with limited professional training. These approaches encouraged critical thinking and improved retention of scientific concepts among learners. In contrast, teachers without adequate professional training often resort to traditional, lecture-based teaching methods that emphasize memorization. Eze and Adebayo (2019) found that such teachers struggled with effective classroom management and assessment strategies, which negatively affected student engagement. The lack of professional development opportunities further compounds the problem, as many teachers are unable to update their skills in line with modern pedagogical demands. Teachers Registration Council of Nigeria (TRCN) has emphasized the importance of professionalization in teaching, mandating that only qualified and registered teachers should be allowed to teach in schools (TRCN, 2019). This policy underscores the recognition that professional qualifications are essential for improving the quality of science education, particularly Biology, which requires both subject expertise and pedagogical competence.

Teaching Experience and Teaching of Biology

Teaching experience is another factor that shapes the quality of instruction in Biology. Experienced teachers often possess a deeper understanding of the curriculum, greater familiarity

with common student difficulties, and more effective strategies for addressing them. Over time, experience enhances a teacher's ability to manage classrooms, assess learning outcomes, and adapt teaching to different student needs. Imonsili and Nwali (2024) found that Biology teachers with over five years of teaching experience in Edo State were more effective in motivating students and using varied instructional strategies compared to less experienced teachers. Their ability to link abstract concepts to real-life examples was particularly valued by learners. Similarly, Erikwe et al. (2020) reported that experienced teachers in Rivers State displayed stronger classroom management skills, enabling them to maintain discipline and maximize learning time.

Experience also influences how teachers approach practical lessons. Novice teachers may feel overwhelmed by the logistics of setting up laboratory activities, while experienced teachers are better able to plan, improvise, and guide students through experiments. This contributes to a richer learning experience for students. However, it is important to note that teaching experience does not automatically guarantee effectiveness. Some teachers may rely on outdated methods, especially if they have not engaged in continuous professional development. As Adeyemi and Osalusi (2021) noted, years of teaching without retraining can result in teachers becoming resistant to adopting new approaches, which limits innovation in the classroom. Internationally, similar patterns have been observed. In a study conducted in Kenya, Wambugu and Changeiywo

(2018) found that experienced Biology teachers produced higher student achievement, but only when they combined their experience with updated pedagogical practices. Likewise, in the United States, Kini and Podolsky (2016) concluded that while experience positively affects student outcomes, the most significant gains occur during the first five years, after which growth depends on professional learning opportunities.

Subject Area Specialization and the Teaching of Biology

Subject area specialization refers to whether teachers are trained specifically in the subjects they teach. In Biology, specialization is particularly important because the subject requires both strong content knowledge and the ability to design practical, inquiry-based learning activities. Teachers with specialized training in Biology or Biology Education are more likely to demonstrate deeper understanding of concepts, confidence in teaching, and the ability to clarify misconceptions. Nwankwo et al. (2022) found that students taught by teachers with Biology specialization achieved higher scores in examinations compared to those taught by general science teachers. Specialist teachers demonstrated a stronger ability to explain abstract concepts, such as DNA replication, genetics, and ecological interactions, using practical examples and hands-on experiments. Similarly, Mbaegbu *et al.* (2020) observed that Biology specialists in Anambra State used creative teaching methods that engaged students, such as improvising teaching aids

and integrating local examples to make lessons relatable. Akanbi et al. (2025) also emphasized that specialization influences how teachers integrate ICT into lessons. Biology specialists were more confident in using digital tools such as animations, simulations, and interactive diagrams to explain processes like photosynthesis and mitosis. In contrast, non-specialist teachers often relied on textbooks and verbal explanations, which limited student understanding. The importance of specialization is further supported by international evidence. In a study conducted in South Africa, Khumalo and Modiba (2019) found that learners taught by subject specialists in science demonstrated higher achievement and retention compared to those taught by teachers with general science backgrounds. Likewise, in the United States, Darling-Hammond (2017) reported that teacher specialization was directly linked to improved student performance in STEM subjects, as it enabled teachers to use discipline-specific strategies.

In Nigeria, the shortage of Biology specialists in many schools means that general science teachers are often deployed to teach the subject. This creates gaps in content delivery and undermines the goals of the curriculum. The Teachers Registration Council of Nigeria (TRCN, 2019) has stressed the importance of ensuring that teachers are not only qualified but also specialized in the subjects they teach. Therefore, subject area specialization is a critical determinant of Biology teaching effectiveness. Teachers who are specifically trained in Biology

are better equipped to engage students, simplify complex concepts, and improve learning outcomes.

Empirical Review

- Research on Gender and Biology Teaching

  Several studies have explored whether the gender of a teacher has any impact on students' learning in Biology. For instance, Abidoye (2020) found that female Biology teachers often create more supportive and interactive classrooms, which may help students learn better. However, male teachers were seen as more authoritative, which can influence student behavior and attention. Similarly, Onovroghene and Onosetale (2018) reported no major differences between male and female Biology teachers in terms of teaching method or student outcomes. Their study suggests that gender alone may not be a strong determinant of teaching effectiveness. Similarly, Akuche et al. (2021) found that certified and professionally trained Biology teachers demonstrated a higher level of lesson organization, content delivery, and student assessment skills. These qualities translated into improved performance among students, especially in public schools. Furthermore, Okonkwo and Nwachukwu (2019) emphasized that professional development workshops and certifications in teaching methodology significantly enhance Biology teachers' competence, which, in turn, supports deeper student understanding.

- Further Studies on Professional Qualification

  Global research also supports the importance of professional qualification. For example, Darling-Hammond (2017) demonstrated that teacher preparation programs significantly enhance teacher competence in classroom management, subject delivery, and student assessment. More recently, Salifu and Agbenyega (2022) in Ghana emphasized that professional qualifications are directly linked to improved student achievement in science subjects, reinforcing the argument that teacher preparation is a critical investment in education systems.

- Studies on Teaching Experience

  Teaching experience remains one of the most consistent predictors of instructional effectiveness. According to Ige and Chukwu (2021), Biology teachers with more than 10 years of experience were more adept at classroom management, adapting curriculum content, and handling student diversity. Their study in South-Western Nigeria concluded that experienced teachers exhibited a more confident and flexible approach to teaching complex Biology topics like genetics and ecology. Adesina and Olatunbosun (2022) also found that long-serving Biology teachers used varied instructional aids, drew from practical classroom experience, and were more comfortable integrating technology into lessons compared to novice teachers. However, Eke and Yusuf (2019) pointed out that

experience alone is not sufficient unless accompanied by continuous professional development. Their findings suggest that older teachers who do not update their skills may struggle with modern pedagogical techniques.

- Studies on Subject Area Specialization

  Subject specialization is crucial for content mastery and teaching confidence. Oladele (2019), in a comparative study, showed that Biology teachers who graduated with degrees specifically in Biology or Biology Education outperformed those with general science or unrelated qualifications in lesson delivery, assessment techniques, and use of laboratory exercises. Eze and Nwankwo (2020) also revealed that students taught by specialized Biology teachers scored higher in WAEC practical and theory exams than those taught by teachers from other science backgrounds. This suggests that in-depth subject knowledge enhances the ability to simplify complex concepts, use correct scientific terminology, and answer student questions accurately. Similarly, Bello and James (2021) concluded that teachers with Biology specialization were better equipped to utilize teaching aids like specimens and models, further enhancing students' understanding and interest. Few studies also examined the combined effect of gender, experience, qualification, and subject area specialization within a single framework. This study addresses these gaps by holistically assessing the characteristics of Biology

teachers and how they influence teaching effectiveness across different school types in Egor LGA

Summary of Literature Review

This chapter has reviewed relevant literature on teachers' characteristics and their impact on the teaching of Biology. The conceptual framework clarified the meaning of teachers' characteristics, covering qualifications, experience, attitudes, and classroom management skills. The theoretical framework drew upon Constructivist Theory, Human Capital Theory, and Social Learning Theory to explain how these characteristics influence the teaching-learning process. The empirical review presented evidence from both local and international studies that established a significant link between teacher characteristics and students' academic performance in Biology. The reviewed literature therefore provides a strong foundation.

CHAPTER THREE

METHODOLOGY

In this chapter, the procedures that were employed in this study was organized under the following sub-headings:

- 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

Research Design

The study employed a descriptive survey research design**,** which was considered appropriate because, it provided a systematic and reliable approach for assessing the characteristics and teaching practices of biology teachers within Egor Local Government Area of Edo State. It further enabled the examination of possible differences in teaching effectiveness based on variables such as gender, professional qualification, teaching experience, and subject area

specialization. The use of a descriptive survey design facilitated the direct collection of data from biology teachers in public secondary schools through the administration of a structured questionnaire. According to Creswell (2014) and Nworgu (2015)**,** the descriptive survey design is suitable for educational research as it allows the researcher to collect and analyze data that describe existing conditions, opinions, and practices without manipulating any variables.

Population of the Study

The population of the study consist of thirteen (13) public secondary schools in Egor Local Government Area of Edo State (State Universal Basic Education Board, SUBEB (2024). Therefore, all the biology teachers in the thirteen (13) public secondary schools provided the data for the study.

Sample and Sampling Technique

Based on the study, a sample size of forty-five (45) biology teachers was obtained from the thirteen (13) public secondary school within Egor Local Government Area of Edo Statefor the purpose of this study The sampling technique adopted for the study is a simple random sampling technique (balloting).

Research Instrument

The instrument that was used for the collection of data was four (4) point Likert scale questionnaire designed by the researcher titled Assessment of Secondary School Teachers' Characteristics for Teaching of Biology Questionnaire (AoSSTCTBQ). The questionnaire consists of a close-ended items divided into two sections A and B. Section Acomprises of personal details of the respondents while section B consists of a point Likert four-point rating scale with twenty (20) short questions structured to determine within Egor Local Government Area of Edo State. Response was based on a Likert scale ranging from Strongly Agee (SA), Agree (A), Disagree (D), Strongly Disagree (SD). The instrument was scored as followed SA=4, A=3, D=2 and SD=1 for positively worded items while negatively worded items was scored SA=1, A=2, D=3 and SD=4.

Validity of the Instrument

The researcher designed AoSSTCTBQ questionnaire was validated by the researcher's supervisor and two other lecturers from the Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin. Their correction, criticisms, suggestions, modification and recommendations were incorporated into the final draft of the instrument.

Reliability of the Instrument

The reliability of the instrument was determined using the Cronbach's Alpha (α) method. This statistical technique measures the internal consistency of items within the questionnaire, that is, how closely related a set of items are as a group. The instrument was administered once to a group of biology teachers outside the study area but who share similar characteristics with the respondents. The responses obtained was analyzed using the Statistical Package for the Social Sciences(SPSS) to compute the Cronbach's Alpha coefficient for each section of the questionnaire. A reliability coefficient (α) of 0.70 and above was considered acceptable, indicating that the questionnaire items are internally consistent and reliable for data collection.

Method of Data Collection

The questionnaire was administered by the researcher and personally visited the thirteen (13) public secondary schools in Egor Local Government Area to administer the questionnaires to (45) biology teachers. Respondents were given adequate time to complete the instrument, and all copies were retrieved on the spot from the respondents to avoid the problem of mortality of the instrument.

Method of Data Analysis

The data collected was analyzed using descriptive statistics of mean, frequency, percentage and standard deviation to answer the research questions.

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

This chapter deals with the presentation of findings of the research. The data obtained were analysed quantitatively and qualitatively using the statistical procedure discussed earlier in chapter three. The analysis of the data is presented in two sections, the first section deals with presentation of results and the second section presents the discussion of the findings.

Presentation of Results

A total of 45 questionnaires were administered to biology teachers in public secondary school in the study area. A total of 42 questionnaires was filled and retrieved by the researcher. A total of 3 questionnaires was not properly filled hence they were regarded as irrelevant for the study while only responses considered to be relevant to the purpose of the study was subject to descriptive and inferential statistical analysis. They were filled by those involved in the teaching of biology irrespective of area of subject specialization and professional qualifications.

Research Question 1: What are the characteristics of biology teachers in secondary schools in Egor LGA of Edo State?

Table 1: Characteristics of Biology Teachers

Characteristics	Freq	Percent
Sex		
Male	18	42.9
Female	24	57.1
Total	**42**	**100**
Professional Qualification		
TRCN Certified	42	100
Total	**42**	**100**
Teaching Experience		
1-5	3	7.1
6-10	19	45.2
11-15	14	33.3
>16	6	14.3
Total	**42**	**100**
Subject Area Specialization		
Biology Education	35	83.3
Chemistry	7	16.7
Total	**42**	**100**

Source: Field Survey, 2025

From table 1, the characteristics of biology teachers in secondary schools in Egor LGA of Edo State was outlined. From the table, the sex, professional qualification, teaching experience and subject arear specialization were indicated. The table highlights variation in both sexes. The results indicated that 57.1% percent biology teachers constitute females while 42.9% constitute male. This shows that female biology teachers are slightly predominant compared to the male counterpart in the biology teaching profession of that study area.

Also, The Professional qualification of the biology teachers indicates that they are all TRCN certified. This suggest that the teachers are professionals in the field of teaching biology.

Further findings as recorded in the table showed that the majority of the biology teachers 45.2% falls within 6-10 years of teaching experience. It is followed by 33.3% for 11-15 years of teaching experience, 14.3% for those under the category of 16 years and above with the least 7.1% under 1-5 years teaching experience. This suggest that the biology teachers in the study area have moderately years of teaching experience.

The subject area specialization of biology teacher showed that most biology teachers 83.3% are biology education graduates and are specialized to teach biology. Other biology teachers

presented showed that 16.7% are chemistry education graduates but as a result of shortage of biology teachers' they are tasked to teach biology as a subject in the study area.

Research Question 2: Is there a difference in the teaching of biology in secondary school between male and female teachers in Egor LGA of Edo State?

Table 2: Difference in Teaching of Characteristics between Male and Female Teachers

Difference in Teaching of Characteristics between Male and Female Teachers	Sex	N	Mean	S.D
Gender influences how teachers interact with students in biology classes	Male	18	3.0556	.63914
	Female	24	3.1250	.53670
Male and female teachers have equal competence in teaching biology effectively.	Male	18	3.3333	.68599
	Female	24	3.1667	.56466
Students respond differently to male and female biology teachers.	Male	18	2.8889	.47140
	Female	24	3.0417	.46431
Gender has no impact on students' academic performance in biology.	Male	18	2.8889	.47140
	Female	24	3.0833	.65386
There should be no preference for male or female teachers in assigning biology subjects.	Male	18	3.2778	.57451
	Female	24	3.2083	.41485

Source: Field Survey, 2025

Table 2 outlines the difference in teaching biology between male and female teachers in the study area. It was recorded that female biology teachers (3.12) agree that gender influences how teachers interact with students in biology class. Also, the male biology teachers (3.33) believed that male and female biology teachers have equal competence in effectively teaching biology compared to the female teachers. Also, from the table, it shows that female biology teachers (3.04) believe that students respond differently to male and female biology teachers. Furthermore, female biology teachers (3.08) still believe that teacher's gender has no impact on students' performance in biology. Lastly the male biology teachers (3.27) believe that there should be no gender preference in assigning biology subjects to teachers. This result suggests that there is no difference in teaching biology between male and female gender

Research Question 3: Is a difference in the teaching of biology in secondary school based on professional qualification in Egor LGA of Edo State?

Table 3: Difference in Teaching Characteristics Based on Professional Qualification

Difference in Teaching Characteristics Based on Professional Qualification	N	Mean	S.D
My professional qualification improves my ability to teach biology effectively.	42	3.2619	.44500
I received adequate training in biology teaching methods during my professional studies.	42	3.1190	.63255
Professional qualifications enhance my confidence in delivering biology lessons.	42	3.1905	.45468
Biology teachers without formal teaching qualifications struggle with classroom delivery.	42	3.1190	.63255
Professional development (e.g., workshops, in-service training) improves biology teaching.	42	3.2143	.41530

Source: Field Survey, 2025

From table 3, the difference in teaching biology in secondary school based on professional qualification was recorded. It shows that professional qualification improves the teaching ability of biology teachers having a mean score of (3.26). also, professional development in form of workshops, in-service training serves as means of improving the teaching ability of biology teachers with a mean score of (3.21). Furthermore, a mean score of 3.19 highlight that professional qualification enhances teachers' confidence in delivering biology lesson. These results therefore suggest that obtaining professional qualifications such as TRCN and seeking professional development through workshop trainings helps to foster the effective teaching of biology.

Research Question 4: Is there a difference in the teaching of biology in secondary school based on teaching experience in Egor LGA of Edo State?

Table 4: Difference in Teaching Characteristics Based on Teaching Experience

Difference in Teaching Characteristics Based on Teaching Experience	N	Mean	Std. Deviation
My years of teaching experience have improved how I deliver biology lessons.	42	3.3571	.48497
Experience teachers are more confident in teaching difficult biology topics.	42	3.1667	.53723
Inexperienced teachers may struggle with practical or laboratory-based biology teaching	42	3.0476	.53885
Students perform better when taught by more experienced biology teachers.	42	3.0952	.57634
Years of experience impact the ability to connect biology to real-life situations.	42	3.1429	.60773

Source: Field Survey, 2025

From table 4, difference in the teaching of biology in secondary school based on teaching experience was recorded. It shows that most biology teachers 3.35 indicated that their years of teaching experience have improved how they deliver biology lessons. This shows that their level of improvement in delivering biology lessons is in respect to their number of years of teaching. Similarly, a mean score of 3.16 shows that eexperienced teachers are more confident in teaching difficult biology topics. This suggests that biology teachers have mastered how they deliver effectively difficult biology topics as a result of their years of exposure in teaching biology. Also, mean score of 3.14 shows that years of experience impact the ability to connect biology to real-life situations. These results shows that years of teaching experience has positively impacted the delivering of biology lessons. It shows that biology teachers with years of experience can adequately teach and deliver biology lessons in the study area.

Research Question 5: Is there a difference in the teaching of biology in secondary school based on subject area specialization in Egor LGA of Edo State?

Table 5: Difference in Teaching Based on Subject Area Specialization

Difference in Teaching Based on Subject Area Specialization	N	Mean	Std. Deviation
Biology specialists have better content knowledge for teaching biology.	42	3.0952	.61721
Teachers from other science disciplines (e.g., Chemistry, Agriculture) can teach biology effectively.	42	2.6190	.69677
Subject area specialization affects how well teachers handle practical biology lessons.	42	3.0952	.29710
Training can help non-biology specialists improve their biology teaching.	42	3.1667	.37720
My subject specialization influences how effectively I teach biology	42	3.0000	.38255

Source: Field Survey, 2025

From table 5, difference in the teaching of biology based on subject area specialization was recorded. The table indicates a similar mean score of 3.09 shows Biology specialists have better content knowledge for teaching biology and Subject area specialization affects how well teachers handle practical biology lessons. This suggest that subject area affects how effectively teachers deliver biology lesson. It suggests that biology specialist deliver more effectively when compared to other biology teachers who are not specialist in the field but are tasked to teach biology as a result of shortage of biology teachers in that study area. A mean score of 3.16 was recorded that training can help non-biology specialists improve their biology teaching. This shows that non-biology specialists can deliver effectively biology lesson to students if exposed to necessary training. Overall, biology specialist can deliver effectively biology topics to students when compared to non-biology specialist. Thes non-biology specialist, when exposed to required training and professional development may as well deliver biology lessons effectively.

Discussion of Findings

This study examined the assessment of secondary school teachers' characteristics for teaching of biology in Egor Local Government Area of Edo State. Data collected were collected and analysed using mean, standard deviation, frequency and percent count. Results from the study proved that there was no significant difference in gender with respect to delivering biology lessons. This finding aligns with the works of Onovroghene and Onosetale (2018), whose study reported no major differences between male and female Biology teachers in terms of teaching method or student outcomes. This further highlight that there should be no gender difference in assigning biology lessons to teachers. This also buttress the findings of Onovroghene and Onosetale (2018), whose works suggests that gender alone may not be a strong determinant of teaching effectiveness of biology.

The study also revealed the value of professional qualifications and certification and in-service training in form of seminars, workshop significantly enhance the teaching of biology. This aligns

with the findings of Okonkwo and Nwachukwu (2019) emphasized that professional development workshops and certifications in teaching methodology significantly enhance Biology teachers' competence, which, in turn, supports deeper student understanding. It also supports the works of Akuche et al. (2021) who found that certified and professionally trained biology teachers demonstrated a higher level of lesson organization, content delivery, and student assessment skills. These qualities translated into improved performance among students, especially in public schools. It was also revealed that majority of the biology teachers in this study area have served for just 6-10 years. Hence, they have moderate years of experience on the teaching of biology. These finding counters the study of Ige and Chukwu (2021), whose study recorded that Biology teachers with more than 10 years of experience were more adept at classroom management, adapting curriculum content, and handling student diversity. Although years of experience is imperative but continuous professional development is pivotal to the teaching of biology as justified by Eke and Yusuf (2019). Results from the study indicate that sstudents perform better when taught by more experienced biology teachers.

Biology specialists have better content knowledge for teaching biology as seen in the study. This shows that biology specialists possess significantly stronger subject-matter knowledge than teachers trained in other science disciplines. This finding goes in line with the works of Oladele (2019), in a comparative study, showed that biology teachers who graduated with degrees

specifically in Biology or Biology Education outperformed those with general science or unrelated qualifications in lesson delivery, assessment techniques, and use of laboratory exercises. Also, the works of Eze and Nwankwo (2020) confirmed that students taught by specialized Biology teachers scored higher in WAEC practical and theory exams than those taught by teachers from other science backgrounds.

Overall, the study demonstrates that both male and female biology teachers have the competency to effectively deliver biology lessons especially when given the appropriate professional qualification, partaking in relevant in-service training and workshops for self-development. Also, when basic needs and facilities are met, it will foster learning outcomes of the students.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary, conclusion and the recommendation of the study.

Summary

The purpose of this study was to assess secondary school teachers' characteristics and their influence on the teaching of Biology in Egor Local Government Area of Edo State. The study specifically examined teacher characteristics such as gender, teaching experience, professional qualification, and subject area specialization. Five research questions guided the study. A descriptive survey design was used to collect data from Biology teachers across selected secondary schools. Data were analyzed using frequency counts, percentages, mean and standard deviation.

The findings revealed the demographic characteristics of Biology teachers, the extent to which gender influences teaching, and whether professional qualifications, teaching experience, and subject specialization significantly affect the teaching of Biology.

1. **Characteristics of Biology Teachers:**

   Most Biology teachers in Egor LGA were female. All were TRCN certified, with moderate teaching experience mainly between 6–10 years. Majority specialized in

Biology Education, while a few were Chemistry graduates teaching Biology due to teacher shortage.

2. **Difference in Teaching Based on Gender:**

   There was no significant difference in the teaching of Biology between male and female teachers. Both genders showed comparable levels of competence, interaction style, and classroom performance.

3. **Difference in Teaching Based on Professional Qualification:**

   Professional qualifications positively influenced teachers' ability to teach Biology. Teachers agreed that their qualification and professional development activities improved their teaching effectiveness.

4. **Difference in Teaching Based on Teaching Experience:**

   Teaching experience did not produce significant differences in the quality of Biology teaching. Teachers across all experience levels showed similar competence, suggesting that experience alone does not guarantee superior teaching.

5. **Difference in Teaching Based on Subject Specialization:**

Subject specialization significantly influenced Biology teaching effectiveness. Biology specialists demonstrated stronger content knowledge and perceived themselves to be more effective. However, both specialists and non-specialists performed similarly in practical-based teaching.

Coclusion

Based on the findings of this study, to assess secondary school teachers' characteristics and their influence on the teaching of Biology.It concludes that while gender and teaching experience do not significantly influence the teaching of Biology, professional qualification and subject specialization remain critical determinants of effective Biology instruction in secondary schools. Teachers who are professionally trained and possess relevant subject specialization demonstrate higher levels of confidence, competence, and content mastery. Therefore, improving teacher qualification and providing subject-specific training can enhance the overall quality of Biology education.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. **Prioritize Recruitment of Biology Specialists:**

   School authorities and the Ministry of Education should ensure that teachers with Biology Education background are employed to teach Biology in secondary schools.

2. **Strengthen Professional Development:**

   Regular workshops, seminars, and in-service training programs should be organized to keep teachers updated on modern teaching methods and curriculum changes.

3. **Support Non-Specialists Through Training:**

   Teachers from related science fields who are assigned to teach Biology should be given targeted training to improve their content knowledge and pedagogical skills.

4. **Promote Continuous Teacher Certification:**

   TRCN certification should continue to be enforced to ensure that only professionally qualified teachers handle Biology instruction.

5. **Enhance Practical Teaching Resources:**

   Since both specialists and non-specialists perform similarly in practical lessons, schools should provide adequate laboratory resources to strengthen practical engagement.

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APPENDIX

DEPARTMENT OF CURRICULUM INSTRUCTIONS AND TECHNOLOGYY

FACULTY OF EDUCATION

UNIVERSITY OF BENIN

BENIN CITY, NIGERIA

Dear Respondents,

I am a final year student the above department. The purpose of this research is to conduct an **ASSESSMENT OF SECONDARY SCHOOL TEACHERS' CHARACTERISTICS FOR TEACHING BIOLOGY IN EGOR LGA OF EDO STATE.** Kindly answer as correctly to ensure reliable data collection for the study.

The research is clearly for academic purpose and your response will be treated as confidential.

Thanks for your anticipated co-operation.

Yours faithfully

Adejimi Adekunle Samuel

INSTRUCTIONS: Please tick (✓) the appropriate option.

SECTION A: **Personal Data of Respondents**

1. **Sex** : Male ☐ Female ☐

2. **Professional Qualification** : TRCN certified ☐Not TRCN certified ☐

3. **Teaching Experience**:1–5 years☐6–10 years☐ 11–15 years☐16 years and above☐

4. **Subject Area Specialization:** Biology Education ☐ Integrated Science ☐ Chemistry ☐ Physics ☐ Others (Specify): _____

SECTION B: Please indicate the extent to which you agree or disagree with the following statements:**SA – Strongly Agree | A – Agree | D – Disagree | SD – Strongly Disagree**

S/N	Statement	SA	A	D	SD
1	Gender influences how teachers interact with students in biology classes.				
2	Male and female teachers have equal competence in teaching biology effectively.				
3	Students respond differently to male and female biology teachers.				
4	Gender has no impact on students' academic performance in biology.				
5	There should be no preference for male or female teachers in assigning biology subjects.				
6	My professional qualification improves my ability to teach biology effectively.				
7	I received adequate training in biology teaching methods during my professional studies.				
8	Professional qualifications enhance my confidence in delivering biology lessons.				
9	Biology teachers without formal teaching qualifications struggle with classroom delivery.				
10	Professional development (e.g. workshops, in-service training) improves biology teaching.				
11	My years of teaching experience have improved how I deliver biology lessons.				

12	Experienced teachers are more confident in teaching difficult biology topics.				
13	Inexperienced teachers may struggle with practical or laboratory-based biology teaching.				
14	Students perform better when taught by more experienced biology teachers.				
15	Years of experience impact the ability to connect biology to real-life situations.				
16	Biology specialists have better content knowledge for teaching biology.				
17	Teachers from other science disciplines (e.g., Chemistry, Agriculture) can teach biology effectively.				
18	Subject area specialization affects how well teachers handle practical biology lessons.				
19	Training can help non-biology specialists improve their biology teaching.				
20	My subject specialization influences how effectively I teach biology				