

**PROBLEM OF TEACHING BIOLOGY PRACTICAL IN SENIOR
SECONDARY SCHOOLS IN EGOR LOCAL GOVERNMENT AREA OF EDO
STATE.**

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**A PROJECT WRITTEN IN THE DEPARTMENT OF CURRICULUM AND
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STATE, NIGERIA.**

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CERTIFICATION

We, the undersigned, certify that this research proposal was written by **Fortune Osezuwa IYEIKHIAN** in the Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin, Benin City.

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DEDICATION

This study is dedicated to God Almighty who saw me through all the period of my study in this great citadel of learning.

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I am eternally grateful to God for the strength, good health and favours granted unto me all through the period of my study. To Him be all glory, honour, adoration and thanksgiving now and forever.

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ABSTRACT

The study was carried out to investigate the problems of teaching Biology practical in some selected secondary schools in Egor LGA, Edo. Four schools were randomly selected, as sample, out the secondary schools in Egor 120 students and 12 teachers were randomly selected from each of the sampled schools. The research material used was questionnaire to collect data from the respondents.

The data obtained were analysed using t-test and percentage count. The findings showed that students problems in Biology practical is as a result of lack of poor laboratory equipments, poor attitudes of teachers toward practical.

From the findings it was discovered that there is unavailability of Biology practical tools in most senior secondary schools in Egor local government area of Edo State because of Government poor funding and unavailability of qualified Biology teachers affecting students and teachers effectiveness in the teaching and learning of Biology and its practical. It was recommended that more Biology practical apparatus should be supplied by the government, so as to enhance practical knowledge of students. Teachers should encourage students to develop interest in practical activities by engaging them in practical and providing instructional materials that will challenge them to be actively involved during practical lessons, ministry of education and professional organisations like Science Teachers Association of Nigeria (STAN) should organize workshops, seminars, and conferences for Biology teachers, Biology concepts should be taught with practical activity so that the students will be science oriented.

CHAPTER ONE

INTRODUCTION

Background to the Study

Education plays a crucial role in shaping the intellectual and overall development of individuals. It is one of the ways through which the society can be empowered. It is the instrument that launches any nation into science and technology with the consequential hope of improved living conditions, human advancement and national development. Malangtupthong, Phayaphrom and Nurittamount (2022) supported this view by saying that education promotes analytical and quantitative skills as well as enhances critical thinking. Teachers are the strength of every nation and the pivot upon which the sources of all classroom. Educational practices revolve. They empower students by inculcating life-long skills and know-how thereby giving them the capacity to function effectively in the society. The teacher provides education to students and can be regarded as one who instructs another and to create positive influence on the students. Teachers help students to acquire knowledge, competencies or values in order for them to learn. They also offer guidance and dedication and give young people the power of education.

According to Martens (2018), Biology is both fascinating and fun to study at the elementary and secondary level, especially when connected to everyday life. He further stated that the subject of Biology piques intellectual curiosity, increase awareness of the fragile ecosystem, and stimulates critical thinking, moreso, the aims

and values of teaching biological sciences should focus on the importance of appreciating the natural world and protecting planet earth. An advantage of Biology subject is the application of theory to the real world, as the goal is to be able to test theories developed about living things by utilizing the scientific method and then to apply the new information in a beneficial way. Biology is now a standard subject of instruction at secondary schools and universities around the world, and over a million papers are published annually in a wide array of Biology (Wikipedia, 2015). The study of Biology in senior secondary school can equip students with useful concepts, theories and principles that will enable them face the challenges before and after graduation (Nwagbo and Chikelu 2011). Biological innovations are coming up, so that nobody can escape being caught up in the learning of Biology. Therefore, the need to acquire new skills, new attitudes and new values for effective teaching of Biology in our secondary schools cannot be over-emphasized. Skills should be developed on how to handle practical works on Biology because the increasing demand of service by our biological industries like pharmacological industries, the agro-biological industries, the biotechnological industries etc, can only be met by training capable teachers who will enhance the rate of learning in the secondary schools, and motivate students to specialize in the subject.

The study of Biology in senior secondary school can equip students with useful concepts, principles and theories that will enable them face the challenges before and after graduation. Practical activities in Biology provide opportunities for students to

actually do science as opposed to learning about science. Nzewi (2010) asserted that practical activities can be regarded as a strategy that could be adopted to make the task of a teacher (teaching) more real to the students as opposed to abstract or theoretical presentation of facts, principles and concepts of subject matters. Nzewi maintained that practical activities should engage the students in hands-on, mind-on activities, using varieties of instructional materials/equipment to drive the lesson home. Nwagbo (2010) stated that the use of practical (approach) to the teaching of biological concepts should therefore be a rule rather than an option to Biology teachers, if we hope to produce students that would be able to acquire the necessary knowledge, skills and competence needed to meet the scientific and technological demands of the Nation. Biology is one of the science subjects offered at secondary school level in Nigeria which attracts the greatest patronage of both science-oriented and arts-based students except where health science is offered.

Biology practical is viewed as any science teaching and learning activity which involves students, working individually or in small groups, manipulating and observing real objects and materials, as opposed to the virtual world (Science Community Representing Education [SCORE], 2010). Biology practical are the scientific instruction, which brings about learning activities in Biology. There are student-centred methods of doing school work, but laboratory work is the flagship for learning in science and extension of Biology (Singer, 2015;Lowman & Harderod, 2018;Gidding,2016;Woolnough, 2013).

According to The Macmillan Dictionary (2018), Biology practical are defined as an examination or lesson in which a students' makes things or does experiments. The term refers to what appertains to practice or action "doing". The "doing" depends on acquisition of the required skills. The terms practical and skills go hand in hand for effective learning of Biology, as spelt out in the Biology syllabus. Practical skills are tested exclusively in the practical paper. However, findings of practical may be tested in a theory paper.

Roberts (2010) in his study noted that practical nature of Biology results in solving problems scientifically Practical classes in animal diversity, ecology and behaviour offer students opportunities to handle preserved specimens of animals and to see the external and internal structures of animals first- hand. The practical exercises allow students to review the lecture content and to fully understand the functions of the various structures. Students are arranged on benches in small groups. This gives them the opportunity to discuss concepts together. The teachers are available to identify structures and to interpret what they see in terms of their functions. All these benefits are lost if Biology lessons follow literary approaches. Although there is some concern about the lack of Biology practical activities in the senior secondary schools (Okoampa, 2010).

Besides, the extent to which the problem of practical could facilitate cognitive attainment (i.e. performance) needs to be put on record. Therefore, the problem of the

study put in question form is, what is the problem of teaching Biology practical in senior secondary schools in Egor local government area of Edo State.

Statement of the Problem

Biology occupies a unique position in the school curriculum and a pre-requisite to many science and applied science professions. This is because Biology is one of the most important science subject since it deals with life and living things. In addition, a sound knowledge of Biology will prepare the students for degree programme on such vital courses as medicine, pharmacy, Microbiology, nursing and many other programmes. As important as the subject is, it is unfortunate that students' achievement in the subject at senior secondary school level is fluctuating, as it is declining (Adenipekun 2018). Teaching method seems to be a major contributing factor, as less or no emphasis is placed on the use of practical method. Frequent use of chalk and talk approach, ill-equipped Biology laboratory, lack of fund and resource seem to be prevalent. The main thrust of this study is to investigate the problem of teaching Biology practical of senior secondary school students in Egor Local Government Area of Edo State.

Research Questions

1. Are there enough equipments in the laboratory for effective teaching of Biology practical?
2. What is effect of teachers qualification on students' performance in Biology practical?

3. What is the effect of teachers' qualification and competency students performance in the teaching Biology practical?
4. What is the effect of gender on students performance in Biology practical?
5. What effects does teaching methods have on students performance in Biology practical?

Purpose of the Study

The purpose of this study is to determine the problems of teaching Biology practical in senior secondary schools in Egor Local Government Area of Edo State. Specifically the study intends to examine:

1. Effects of teaching methods on students performance in Biology practical
2. Lack of equipments in the laboratory for effective teaching of Biology practical
3. The effects of Teachers qualification on students' performance in Biology practical
4. The effects of Teachers' qualification and competency in teaching Biology practical
5. Inequality of Gender on students performance in Biology practical

Significance of the Study

The findings of this study will promote the ideals that science is a process and product in students by arousing their interest in Biology practical work.

The findings of this study will unveil practical activities in Biology that has been designed to help students acquire basic scientific skills and improve their performance and achievements as well.

The findings of this study will provide very useful information to the government through the ministry of education to realize the need for provision of Biology practical equipment to secondary schools and employing qualified Biology teachers to teach in secondary schools in Egor local government area of Edo State

The findings of this study will motivates parents to provide the basic requirements to practical lesson to their children and also aid researchers in gathering of information that will be relevant to their study.

Scope and Delimitation of the Study

The scope of this research work is on the survey on the problems of teaching Biology practicals in senior secondary schools in Egor Local Government Area of Edo state. It is delimited to Public Senior Secondary Schools in Egor Local Government Area of Edo State.

Operational Definition of Terms

Problem: something that is difficult to deal with.

Teaching: This is a process of imparting knowledge to or to instruct someone.

Biology: Is a natural science that is concerned with study of life and living organisms including their functions and structures.

Practical: This is concerned with the actual doing or use of something rather than with theory and ideas.

Equipment: These are tools needed for special purpose.

Laboratory: This is a facility that provides controlled condition in which scientific or technological research, measurement and experiment may be performed.

Senior Secondary School: This is a period of study from senior secondary school one to senior secondary school three.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The review of related literature is presented under the following subheadings:

- Lack Of Equipments in the Laboratory for Effective Teaching of Biology Practical
- Teachers Qualification Effects on Students' Performance in Biology Practical
- Teachers' Qualification Effects on his/her Competency in Teaching Biology Practical
- Effects of teaching methods on students performance in Biology practical
- Inequality of Gender on Students Performance in Biology Practical

Inadequate Biology Practical Equipments in Teaching of Biology Practical

The absence of adequate laboratory facilities in secondary school has been a major problem in teaching of Biology practical activities, in Egor Local Government Area, Edo State.

Ani and Eze (2007) established that students understand better when they have practical experiences, when students perform experiments themselves during practical and obtain their results, they can not only remember the procedures involved, but also feel proud of themselves for obtaining the correct results. It is therefore essential that, the laboratory is properly equipped, for the study of Biology practical activities, and students should be very much involved in the laboratory, since it is an established fact that they perform better place when they partake in the activities.

The proper place for the study of science is the laboratory. Biology being one of the science subjects cannot be taught/learnt effectively in the absence of a laboratory. Nnamonu (2003) supported the above statement in his speech for effective use of laboratory. He stated that the whole work of science is centered on problem solving and laboratory afford convenient place for careful, observation, accurate calculation and logical conditions. He further taught of the conducive environment that is the laboratory, where both illustrative and investigating aspects of practical could be carried out. According to Bargess (2003), the effective use of the laboratory of science skills, under such conditions, the ability for independent work and self reliance cannot be develop.

Based on these facts the laboratory should be properly equipped. This is because according to Lunetta (2008), the laboratory helps students in making accurate observation, devising, finding the reasons for results, planning control and withholding judgment. According to Eya, and Ani (2003) there have been an outcry about the falling standard of Biology education in Nigeria over the years. Researchers have pointed accusing fingers to several problems as being responsible and prominent among these problems is the teachers difficulty in teaching Biology practical.

The new trend toward values of Biology, demands that the government should equip laboratories for practical purpose and create the right notions of teaching Biology, so that the students can introduce their experiences into the scientific practices. Practical method as any teaching and learning activities involves at some

point the students in observing and manipulating real objects and material which is very crucial for the knowledge, cognitive growth as well as technological orientation and advancement. In our move towards scientific and technological advancement, good academic achievement is needed in Biology, unfortunately performance of senior secondary students in Biology has continued to be poor especially in external examination (Osuafor and Okonkwo, 2013).

In senior secondary schools in Egor, many laboratories equipments like microscope, glass tube, Beaker, slide, Bones of vertebrates etc. charts of different animals development, systems, organs, etc, work book for practical and textbooks are not adequate for the teachers and students in teaching and learning of Biology and its practical activities. Biology is a science subject which is all about practical and also when combined with other science subject one will be able to study courses like medicine, nursing, pharmacy etc in higher institution. Beaty and Woolnough (1990) are of the opinion that the obsolete and insufficient teaching of Biology in senior secondary schools. They stressed that the teacher may be competent enough and have all the qualities to impart the knowledge to the students but to the obsolete and insufficient availability of biological equipment the aim is defeated.

Teachers Qualification on Students Performance on Biology Practical

According to Anyiam and Ene (2021), the particular attributes of the teacher which aid him in the classroom include qualification, experience, socio-economic status, health condition, gender, age. Also, Kosgei, Mise, Odera and Ayugi (2013)

stated that it could also include interpersonal relationship with students, teachers' knowledge of subject matter and professional development. Keiler (2018) said that students and teachers in twenty first century STEM classrooms face significant teaching and learning challenges in preparing post- secondary education, career and citizenship. The challenges could arise from lack of proper professional training and teachers' teaching experience. It is believed that teachers' behaviour in the classroom is complemented by the teachers' qualification and attitude towards formative assessment. These challenges could arise from lack of proper professional training and teachers' teaching experience. There is, therefore, the need to review teachers' qualification and experience as predictors of teachers' assessment practices.

Teachers' qualification is one of the academic and professional degrees that enables a person to become a registered teacher. It is in the programmes that the teacher is inculcated with the mastery of content knowledge and the importance of mastery of pedagogical knowledge. Antony, Paidi, Paradana, Hapsari and Astuti (2019) stated that teacher qualification can mean all the skills teachers need to teach effectively and that it focused on academic degrees that a teacher must have as his teaching requirements. Ibe, Nworgu and Anyaegbunam (2016) stated that teachers' qualification could mean credentials and knowledge teachers possess before they enter the classroom, such as grades subject-matter education, degrees, certificates and evidence of participation in continued learning. The categories of the levels of teachers qualification which teachers possess include Ph.D, M.Ed, B.Ed and NCE usually in

the teacher's subject area. Abe and Adu (2013) opined that one of the most important factors in improving students' academic achievements in schools is employing seasoned academically qualified teachers in all schools. The assumption is that these teachers engage students in activities like formative assessment, which will enhance academic achievement.

Goldhaber and Brewer (2000) believe that higher degree shows a positive correlation with student academic achievement. The teachers who have more training produce students who have better achievements. According to Darling-Hammond, Berry and Thorenson (2001), years of teacher experience is one indicator of teachers' qualifications which is believed to be a significant determinant of students' academic performance.

According to Edu & Kalu (2012) academically qualified teachers are those who have academic training as a result of enrolment into educational institution and obtained qualifications such as OND, NCE, HND, B.Sc, BA, B.Ed., M. Sc, MA and others while professionally qualified teachers are those who have professional training that gave them professional knowledge, skills, techniques aptitudes as different from the general education. For instance, Harris and Sass, 2008 reported that the most important school-based determining problem of students achievement is the teachers qualification. Akisolu (2010) asserted that availability of qualified teachers determined the performance of students in schools. Huang and Moon (2009) states that teachers qualification accounted for approximately 40 to 60 per cent of variance in the average

of student's achievement in assessment. Teachers' experience and educational qualifications were the prime predictors of teachers' job commitment and students' academic achievement. However, Ravkin (2015) found that teachers' teaching experience and educational qualifications were not significantly related to teachers' job commitment and students' achievement. Etsy's (2015) study in Nigeria showed that teachers factors that significantly affected job commitment and immensely contributed to low academic achievement were incidences of lateness to school, incidences of absenteeism, and inability to complete the syllabi. Oredein and Olayede (2017) concluded that teachers management of homework and assignments given to students have an impact on students' achievement especially when it is well explained, motivational, corrected and reviewed during class time and used as an occasion for feedback to students. However, the researcher intends to review and examine the following demographic variables, teachers' age, gender, educational qualification, years of experience and other variables to ascertain teachers' commitment to teaching profession and how these variables influence. Teachers experience has a significant effect on students academic performance as experienced teachers have a richer background of experience to draw from and can contribute insight and ideas to the course of teaching and learning, are open to correction and are less dictatorial in classroom. A teachers years of experience are one of the teachers qualifications indicators that is believed to be a significant determinant of students academic performance. Boyd, Landford, Loeb, Rockoff, & Wyckoff, (2018) believed that

greater teaching experience will produce students with higher achievement. Studies have shown that inexperienced teachers are typically less efficient than the experienced teachers Darling-Hammond, (2010). Studies have found a positive relationship between teachers' effectiveness and their years of experience and efficient teachers positively influence students' academic achievement Agharuwhe, (2013). However, there is the need for caution in Nigeria about the experience. Many teachers may have been in the teaching profession for over twenty years without properly developed himself or herself for years. This category of teachers may not be able to cope with the new trends in education. The subject curriculum is changing almost every year as the whole world is changing with technology. Therefore, it is better to say there is a positive relationship between experience and students achievement when there is adequate teachers professional and academic development. Studies on the problems of teaching Biology practical have found a positive relationship between teachers effectiveness and their years of experience, but not always a significant or an entirely linear one (Murnane & Philips, 2011). Similarly, Wanderi (2015) pointed that there are conflicting findings. Some studies suggested that teachers with more experiences have positive attitudes towards inclusion, while others found that teachers' experience with students with special education needs increased so did their confidence. Chikelu (2017) conducted a research on effect of Biology practical activities on students process skill acquisition. A quasi experimental design was employed for the study. The sample consists of one hundred and eleven (111) senior

secondary one Biology students selected through simple random sampling techniques. The instrument for data collection in the study has 20 items Science Process Skill Acquisition Test (SPSAT). The data was analyzed using mean and standard deviation to answer the research questions and analysis of covariance (ANCOVA) to test the hypothesis at 0.05 level of significance. The results revealed that practical activity method to foster the acquisition of science process skills than the lecture method. The interaction effect between teaching methods and gender of the subjects was not significant. Based on the findings of this study, the use of practical activity method to foster the acquisition of science process skills in Biology students was recommended to Biology teachers. The similarity between the reviewed study and the present study is that the studies are both conducted in the laboratory. They used the same experimental research design. Both studies used gender as their moderating variable. The differences between the two studies is that the present study is investigating the problem of teaching Biology practical activities on students achievement in Biology. Cengiz (2010) carried out study on the effect of the virtual laboratory on students achievement and attitudes in chemistry. The study employed a quasi-experimental research design, specifically the pre-test and post-test, experimental control group model. The study employed two scales which are 15-item knowledge scale (ks) questions. The KuderRPichardson coefficient reliability was 0.86 for ks and 24 items for students attitudes scale (SAS), were selected with cronbach alpha-reliability coefficient of 0.92. The sample of the study was 341 high school students. The data

collected were analyzed by using SPASS/PC version 120 statistical programs. Two different t-tests were performed. The results of the study showed that virtual laboratory applications made positive effects on students achievement when compared to traditional teaching methods. The study is related to the present study in the sense that they were conducted within the context of laboratory work. However, the present study differs from the reviewed study because the previous study was in chemistry while the present study is Biology. The present study intend to investigate the problem of teaching Biology practical activities on senior secondary school students in Biology. Ukozor (2011) carried out research on the effect of constructivist teaching strategy on senior secondary school students' achievement and self-efficacy in physics. The study employed one hundred and eight four (184) students from four (4) secondary schools. Non-equivalent control group design was adapted. Five research question were posed and three null hypothesis guided the study. Means and standard deviation was used in answering the research questions and ANCOVA was used in testing the hypothesis. A significant effect of gender on students physics academic achievement was found. In the light of the above result, therefore the present study intends to investigate the problem of teaching Biology practical activities senior secondary school students in Egor Local government area of Edo State. The researcher learnt from the study that despite the importance of the use of practical Biology to enhance the academic achievement of students, it appears that many still do not use Biology practical in teaching and learning of Biology.

Teachers' Competency in Teaching Biology Practical

Experience is the best teacher. Seweje & Jegede (2005) noted that the ability of a teacher to teach is not derived only from one's academic background but it is based up on outstanding pedagogical skill acquired. Stronge, Ward, Tucker and Hindman (2007) and Kosgei, Mise, Odera & Ayugi (2013) all asserted that there is positive correlation between teachers experience and students'academic achievement. However, Murnane (2016) found that teachers effectiveness improves rapidly in the over the first three years of teaching and reaches its highest point between the third and fifth year but found no substantial improvement after five years.

Inappropriate training background of Biology and qualification of Biology teachers are the major problem that militate against effective teaching of Biology practical because some Biology teachers in senior secondary schools did not undergo enough training to enable them get skills, qualities and enough knowledge of the subject matter and how to impart the knowledge to the students.

It is believed that teacher experience is an indicator of teacher quality. Teachers' experience can be regarded as the number of full-time classroom teaching experience a teacher has in the classroom setting (Anyiam & Ene, 2021). Teacher experience may vary with the number of years put into teaching in the classroom. It is believed that the teacher experience should increase with the number of years the teacher has put in the classroom and subsequently, the formative assessment practices of the teacher. Ijaiya (2000) noted that experience improved teaching skills while

students learn better under the tutelage of teachers who have taught continuously over years. Ladd (2018) agreed that teachers with greater years of experience are often just marginally more effective than those with only five years teaching experience because beyond a certain point, a teacher's years of experience starts to lose some of their impact. Teachers' experience is very crucial because the teacher is responsible for translating policy into action and the principles based on practice during interaction with students and experience gained while interacting with the students matter a lot in imparting knowledge.

Most Biology teachers do not organize their practical works, in such a way that, it would help to develop skills and knowledge in the students. Opuh, Ezeh and Ezema (2008) supported the above statement, in their speech or approaches to creative teaching. They stated that, teachers contribute a lot in discouraging or encouraging students in studying a particular subject. This is because, many teachers present such subjects to be difficult to handle. As a result students with such experiences, shy away from learning the subject. They also noted that lack of well trained and qualified teachers in different fields of study, contribute a lot to the performance of students in such subjects of which Biology is one of them. Some teachers, in Biology for instance have little experienced in teaching. Even those that are experienced sometimes use poor method in teaching Biology. Moreover most of them are not familiar with the content of creativity.

Quality teaching in Biology is crucial for developing scientifically literate citizens and improving economic productivity for sustainable development. It enhances students achievement and strengthens public confidence in schools. Quality teaching is characterized by an adequate knowledge of subject matter; encouraging inquiry and hands-on approach to learning for students; and recognizing individual students as learners as the teacher builds on learner's strengths rather than trying to stamp out their weaknesses. Quality teaching helps teachers to focus on the educational improvement of students through the integration of adequate knowledge of the curriculum content areas, functional pedagogic skills, critical reflective teaching, empathy and commitment to the educational process and the acquisition of managerial competencies within and outside the school context. Quality teachers of Biology are knowledgeable about Biology, learning and science teaching and they create an environment in which students are regarded and treated as active learners. Intelligence, cognitive styles and personality are individual characteristics that play important role in teaching and learning (Tella, 2007). Other variables such as motivational orientation, self-esteem and learning approaches are important factors that influence academic achievements. Motivation has gained more popularity amongst educational psychologists in leading other variables that could be manipulated to improve academic gains. Lack of interest by students in Biology affects their listening to the teacher.

The level of competence in practical skills may determine performances in a class and ultimately at the national level. Hodson (2012) observed that going through the materials needed for a practical, for example, those required for testing for types of food and doing the stipulated practical using the provided materials, is expected of a student. Roberts (2010) reported from research findings that, “doing” has been found to be the easiest skill attainable by students’ respondents; many professed to like the “doing” aspect of science practical learning skills but the liking may not translate into performance in schools.

Biology as one of the science subject is defined as the study of life and structure of living things. Biology is the study of living things and concerns itself with the study of the structure, behaviour, distribution, the origin of plants and animals and their relationship with their environments. Abugu (2007) stated that Biology is a natural science in which we study living organisms – plants and animals. Based on the above statement, man lives in a novel world, there are animals, plants, rivers, oceans, deserts, mountains, and so on, all round him. Being a curious being, man takes delight in exploring his world, he seeks to have a world view of the universe, he strives to investigate all matter around him – their origin, nature, characteristics and other features, he inquires in his inquiry, he asks a lot of questions and in his search for answers to such questions, he needs to be systematic and unbiased. To achieve his goal, he engages in experimentation and observation, which are fundamental to science. Like other science subjects such as Biology in secondary schools is composed

of practical activities. In all the sciences, Biology geared towards simplifying the theoretical content, so as to enhance effective instruction and learning of the subject. Allan, Rob and Jonathan (2000), stated the reason for emphasizing practical activities in Biology like a realization of practical; work to be predecessor to real science knowledge. Practical work stimulates students interest in the Biology practical when they are made to personally engage in useful activities; knowledge obtained through practical; work and experience, promote long term memory that theory alone cannot do, from this reason, it becomes obvious that students acquire more in Biology practical, if given the opportunity to do activities, ranging from manipulating apparatus, classifying, designing, experimenting to make inferences and verifying results. Hence, there is an urgent and serious need to justify the exposition of the students Biology practical activates as well as studying its problems on student's achievement in Biology. Unfortunately, the ugly situation observed in the majority of our secondary school and students in lack of exposure of the students to practical activities, this contributes to persistent poor performances in Biology.

Biology is one of the fields in the natural sciences that studies living things. The word 'Biology' is from Greek words; Bios meaning life, and logy (logia) which means study (Ezemoka, 2011). Thus the concept of Biology is concerned with the study of life. Miller and Levine (2012) state that Biology in addition, is the study of life, structure, function, growth, origin, evolutions distributions, interrelationships, problems such as diseases, and adaptation of things and proposes solutions where

possible. However Biology is the branch of science that studies life using inquiry methods and discoveries. Inquiry process involves asking question that stimulate students to think critically which enables students to develop scientific knowledge and scientific habit such as curiosity, creativity, and open minded etc that is needed for understanding biological concepts. Biology as science of life provides potentials for the use of many inquiry method. Abugu (2017) stated that Biology is natural science in which we study living organisms plants and animals. The knowledge of Biology helps in checking environmental degradation such as desertification, erosion, water hyacinth, land, air and water pollution. The cardinal objectives of Biology education are to prepare students to acquire: adequate laboratory and field skills in Biology; meaningful and relevant knowledge in Biology, ability to apply scientific knowledge to everyday life in matter of personal and community health and agriculture and lastly reasonable and functional scientific attitudes (Federal Ministry of Education 2014). The study of Biology in senior secondary school can equip students with useful concept principles and theories that will enable them face the challenges before and after graduation. Practical Biology is the scientific study of the life and structure of plant and animals and their relative environment in real or experimental set-up rather than dwelling in the theory and ideas (Opuh, Eze, & Eze Magu, 2018). Biology practical teachings are important in order to understand Biology concepts. If science education aims to enhance the understanding of the natural world by students and how it functions, then the students have to experience and observe the relevant of science

phenomena. Recent studies advocate for a change in teaching methods so that students participate fully and understand different science concepts (Miller, 2010). Students should understand processes and structure; develop skills in manipulation, processing of science information and conducting scientific investigations. Hence, the teaching methods such as students design, reciprocal, inclusion, divergent and self-check could enhance the teaching of Biology practical lessons (Capel, Least & Turner 2019). A study conducted by Obiekwe and Chinwe (2015) in Nigeria on the teaching of biological concepts using the 5E (Engagement, Exploration, Explanation, Elaboration and Evaluation) model revealed that students who were exposed to the 5E method achieve better results than those whose teachers use the lecture method. Some teachers laid too much emphasis on content and the use of “chalk and talk approach which does not enhance the teaching and learning of Biology. This slackness and shy-away attitude from activity based-approach of instructional delivery has led to abstraction, which makes the students passive and more inclined to rote memorization (Obiekwe & Chinwe, 2012). Such teacher-centered method that put the students as passive recipients of knowledge and the teachers as the only source of knowledge might not improve performance towards Biology practical lessons (Nwagbo 2016).

Opul, Ezeh and Ezemagu (2008) reported that much stress has been placed upon practical work for there is no substitute for it, for practical experiment must be the basis of knowledge in Biology. Hence, it become imperative at this point to find out the level of academic achievement in Biology practical activities, taught to

Biology students in Egor Local Government Area of Edo State. Eya, Eze and Ani (2003), cry about the falling standard of the Biology education in Nigeria specifically Egor local government area of Edo State. Over the years, researchers have pointed accusing fingers to several factors as being responsible and prominent among these factors is the teacher problem in teaching Biology practical. The neglect of the practical aspect of Biology in senior secondary schools has been blamed on such problems as the inability of the school authorities to provide Biology practical equipment for practical work, teachers' failure to recognize the importance of practical work in teaching of Biology practical. Aniodoh (2001) in his study noted that a sound theoretical and practical knowledge of Biology is needed for the management of our natural resources, provision of good health facilities, adequate food supply and favourable life environment. Thus, the teaching and learning of Biology has to be encouraged in the senior secondary schools.

In the light of the above, it should be a general concern of every Nigerian including the researcher to view this backwardness with some seriousness. There is great need to look into the issue of teaching and learning of the core science subjects – Biology etc. Biologists usually study all forms of life including ourselves, other animals, plants and microscopic living things such as bacteria which is too small to see with our naked eyes. Biology is needed in medicine, nursing, pharmacy, food technology etc.

Aniodoh (2001) observed that effective teaching and learning require accurate and exact observations, carefulness and thoroughness of technique and logical interpretation of data. He emphasized that practical work is the part of the study of Biology and should go hand in hand with theory.

Inequality of Gender on Students Performance in Biology Practical

Apart from teaching methods, gender is also implicated in students' academic achievement in Biology. Gender refers to the roles and responsibilities of men and women that are created in family, societies and culture. The concept of gender is the expectations held about characteristics, attitudes, and likely behaviour of both male and female (masculinity and femininity) in the society (Ezeh, 2013). There is a general belief among Nigerians that boys are superior to girls in terms of physical build up, intelligence and reasoning. According to Okeke (2007) gender and gender stereotyping have brought discrimination in academic achievement which is a matter of great concern to educationist. Agomuoh (2010) and Ukozor (2011) found that gender influences male students' conceptual in favour of the female. This finding is in agreement with Archer and Macrae in Iwuji (2012) who stated that males' students appear to be higher in achievement than the females and also reported that boys are better at activities requiring manipulation (psychomotor skills) than girls, and that boys are more aggressive towards laboratory and project work. The finding is also in line with the view of Iwuji (2012) who stated that boys also perform better than girls in process of measuring and experimenting. The finding of the study is also supported

by Oakley in Iwuji (2012) who opined that right from the childhood, a boy traditionally receives more training and encouragement for achievement than girls. It has also been found that girls perform in similar manner as boys in Biology when cooperative strategy is used for teaching (Achor, Musa & Duguryil, 2013). Unfortunately, gender inequality in education has remained a perennial problem of global scope (UNESCO, 2013; Reid, 2003; Achor, Musa & Duguryil, 2013). Science researchers have reported that what both the 'feminist empiricist' and the liberal feminist critics' seem to agree on is that females, in principle, will produce exactly the same scientific knowledge as males provided that sufficient rigour is undertaken in scientific enquiry (Sinnes, 2010; Ajaja, 2011). They all believe that initiatives that build on the assumption that females and males are equal in their approach to science, and the inequality in science and Biology education is caused by political, educational and social problems external to science. Biology practical are defined as the learning experiences in which students interact with materials or with secondary source of data to observe and understand the natural world (Lunetta, 2017).

Gender has been described as a cultural construct and social positions which members of the society attach to being male or female. Gender also means a dimension of social organization which shapes how people interact with others and how people behave or act and think about themselves. It also includes hierarchy and ranking of men and women distinctly in terms of power, wealth, privilege and other resources. According to Okeke (2019) gender is a social or cultural determinant that

varies from place to place or culture to culture. It is not universal, unlike sex which is biologically determined and universal. Macionis and Genber (2015) observed that throughout life (birth and death), human feelings, thought and actions reflect the social definitions that people attach to gender which affects the way the individual's daily activities may either be positively or negatively influenced. As gender affects the way people think of themselves, it teaches them to act in normative ways, that is acting and feeling in the manner that the society ascribed to each sex. Connell (2013) maintained that as much as culture defines males as ambitious and competitive and females' differential and emotional, males are expected to aspire to leadership positions while females are expected to be good listeners and supportive observers. This gender role discrimination begin from the family and is later extended to other areas of one's life where a man sees himself as superior in every human endeavours and sees woman in a subordinate position in the educational setting, workplace or other parts of life. In other words gender is a fundamental category for ranking, and classifying social relations in the world (Evans, 2014). In educational setting for instance, experience has shown that the curriculum, textbooks and the teaching materials tend to favour males and the females' intellectual potentials are ignored. This gender distinction manifests itself in the courses offered by males and females in the school, for example males are represented in mathematics, science and technology while females are grouped into humanities, education and social science courses (Gaidzanwa, 2010; Cottes, 2013). In the new areas of study such as computer science with its grounding

in engineering, logic and mathematics, males mostly enroll in it while female mostly enroll in gender studies (Macionis & Genber, 2015). The word gender does not mean that there are clear difference between female and male in term of preferences for arts, science and technology. If there are differences, they are based on hierarchical structures within the culture of what is suitable for males and females respectively (Walkerline, 2019). According to Kembler (2010) science and information and communication technology (ICT) is in no manner separated from the cultural structures that treat women and girls unfairly or unequally compared to the men counterparts. Males and females are supposed to be allowed and encouraged to study science and technology, Arts, and humanities because there is no course that is made specifically for each sex. Science (Biology) and technology courses are not for males alone; females are to be encouraged and motivated to offer science and technology because of its importance in this era of globalization and computer age Nwosu (2011). Recently gender related issues in Biology education have continued to receive serious attention judging by the number of studies done to that effect. For example Babajide (2010) reported that science subjects such as Biology, physics and chemistry are given masculine outlook by educational practitioners. In addition to this, the studies by Ogunleye (2012). Okwo and Otubar (2010) indicated that science performance depends on gender. Also the studies by Nzewi (2010); Ogunleye and Babajide (2011); posited that gender is insignificant in science performance. Oludipe (2012) also opined that promoting performance in students' understanding of science does not depend on

gender rather it is through determination of the students. Agomuoh (2010); Ukozor (2011) found that gender influences students' conceptual shift in favour of the male. Harlen (2012) attributed gender inequality in Biology teaching methods used by Biology teachers that creates wider gap in performance. This statement has been supported by Agomouh (2010). Studies by Madu (2014); Agomouh (2010) have shown that students performance are gender dependent using constructivist based instructional method. Considering the findings of different people above, it is clear that there is not yet a consensus as to whether gender influences science performance or not. Some are of the opinion that males are superior to females, while others said is females and some are even neutral.

Effects of teaching methods on students performance in Biology practical

Effective teaching of Biology is a process by which Biology teacher adopts all the possible method used in teaching in the classroom to make sure that students understand Biology and be able to respond positively during assessment or to produce a good result. Teachers' effectiveness is exhibited in the teaching method, classroom managements, the equipments as well as the way students are being handled, a good teacher always bear in mind the individual differences of the students while presenting the lesson and frequently check the student's understanding of his or her points to make sure that they are understanding his lesson. This also includes the ability of the teacher to answer question asked by the students, having knowledge about his or her subject matter and ability to show students how to conduct appropriate research.

The inappropriate teaching methods used by secondary school Biology teachers tend to raise doubts about the possibility of realizing the objectives of Biology education in senior secondary school in Egor local government area of Edo State Nigeria at large as stated in the National Policy on Education (Federal Ministry of Education, 2014). Most teaching methods such as lecture and demonstration used in teaching Biology in the classroom or laboratory promote rote learning and lack of opportunity for students to manipulate materials and reflect on what they do during teaching and learning processes.

The poor achievement of students even in external examination is linked to the use of traditional method (lecture/expository method) in teaching senior secondary school Biology (Isiugo-Abanile, LongJohn and Ibiene 2010). The traditional methods often used by teachers in teaching Biology include the lecture/expository method, demonstration and direct instruction etc. These traditional methods of teaching stress more on passing vast amount of knowledge in limited time to the students there by making them passive as they remain as recipients, listening and sometimes taking notes and asking few or no questions. This method rarely affords students the opportunity to practice skills and largely denied them of exploratory and practical aspects of learning Biology.

Practical work stimulate students interest in the science subjects they are studying, when they are made to personally engage in useful activities, knowledge obtained through practical work and experience promote long-term memory that

theory alone cannot do, for this reason, it becomes obvious that students acquire more in Biology lesson, if given the opportunity to do activities and ranging from manipulating apparatus, classifying, designing, experimenting, hypothesizing to make inferences and verifying result. Hence, there is an urgent and serious need to justify the exposition of the Biology practical activities as well as studying its problems on students performance Biology practicals. Unfortunately, the ugly situation observed in the majority of our secondary school lacks exposure of student in practical activities. This contributes to persistent poor performance in Biology. A number of research findings from Akubuilu (2014), Akpan (2018) and Ajaja (2011) showed that several factors are responsible for the poor performance of students in Biology practicals and other science subjects such as adhering to instructions, crossing of guidelines in drawings, labeling, handling of equipments like pipettes, burettes for carrying out certain measurements. Among these problems as observed by other researchers are students' poor understanding of the basic concepts in Biology (Chukwunke, 2012), the use of traditional lecture method approach by Biology teachers (Ndioho, 2010), students' poor attitude towards practical work and their performance in Biology (Orokpo, 2010). Poor performance of students in Biology is as a result of poor state in which Biology is taught in the secondary school. "Chalk and Talk" method has been the most widely used Biology teaching method (Hills, 2012). Even more seriously is the discovery that practical skills in Biology in the secondary schools in Egor local government area of Edo State are hardly measured at all by Biology teachers (Adedeji,

2010; Ajaja, 2011). The target is always the end result rather than exposing the students to tasks to see them display their practical skills (Njelita, 2010).

For teaching to be effective one must use different methods of teaching. According to Eke (2001), teaching is effective if only it produces or yields the desired results, the ability of the teacher to adapt to different situations and produce a desired result in the classroom is a mark of teaching effectiveness. Vennier and Faith (2001) are of the opinion that all the teaching activities are supposed to produce learning, so that test of effective teaching will be amount of learning that occurs.

When the following methods are used, teaching of Biology can be effective. Activity method is a method of teaching that encourage students to participate actively during the lesson while teaching at the same time. Oforkansi (2008) defined activity method as a method whereby the students learn through active involvement rather than being passive or being at the receiving end.

According to Ofokansi (2008), discovery means finding out. Exploration, manipulation and experimentation are components scientific enquiry that help one to discover. This approach demand that the teacher create the problem and allow the students to find answer for themselves. The author also said that enquiry involve active participation by the student rather than transmit a preconceived notion about situations. Teaching of Biology has been believed to be difficult due to its abstract nature. The highly conceptual nature of Biology makes it particularly difficult for students to understand (Udeh, 2014). The teaching and learning of Biology motivate

students to; develop practical techniques and process skills; acquire knowledge and develop understanding of fundamental biological principles, concepts, terms and facts; show understanding of the applications and uses of biological knowledge in daily life; develop an understanding of current issues and developments in Biology.

Biology students' academic performance benefits from experimental activities because they are a teaching strategy that involves the practical application of scientific ideas, concepts, theories, and laws. Through their participation in experiments, students are ultimately able to learn new information, develop concepts, principles, and abilities, and cultivate scientific attitudes and behaviors (Onyegegbu, 2006).

Nworgu (2006) said that teaching of Biology involves three major domains of educational objectives namely cognitive, affective and psychomotor skills. The studies show that most teachers of Biology mostly emphasize the cognitive domain at the expenses of the other two domains. The development of psychomotor domain involves practical activities which require laboratory facilities and equipment.

Biology laboratory activities are hands-on experiences which emphasizes process skills (Dike, 2008) which Agbo (2003) posited as motor skills that help the scientist to find answers to problems and enhance the learning of Biology subject. In order for the laboratory to be effective, students need to understand not only how to do the experiment, but why the experiment is worth doing, and what purpose it serves for better understanding of a concept, relation, or process Omiko (2015).

Adebisi & Ajayi (2015) commented that if Biology is to be taught/learned effectively, it must be experienced and close to the students through practical activities. The National Policy on education (Federal Republic of Nigerian, 2013) states clearly the need to train students to be able to manipulate their environment in order to develop the society. This is only possible when the students are trained with relevant resources in the laboratory. Etiubon & Udoh (2017) posited that practical activities develop students' manipulative skills, attitude and interest that simplify science concepts. It makes difficult and abstract concepts real, remove misconceptions, ignite, increase and sustain students' interest in Biology subject through various activities using sourced Biology materials to enrich Biology learning experiences. This is aimed at preparing students to become productive individuals at the job place and has opened access to creativity and knowledge.

The school laboratory simplifies complex and abstract subject matter of science (Biology); practical work is the “gem of science (Biology)” which has made an influence in the World including Nigeria (specifically Egor Local Government Area of Edo State). The acquisition of these values and skills will help the students to cope up with the challenges in their daily lives. Nwogbo, (2008) stated that; the use of practical Biology activities (approach) to the teaching of biological concepts should therefore be a rule rather than an option to Biology teachers, if we hope to produce students that would be able to acquire the necessary knowledge, skills and competence is needed to meet the scientific and technological demands of the senior secondary

schools. In senior secondary schools, Biology instruction is divided into two; Theoretical and practical. The researcher had an interaction with students during the course of this study, students in senior secondary schools in Egor local government area of Edo State made complain of poor method of teaching used by Biology teachers while teaching. They said, this method was not okay for them to understand the real concept being taught in Biology subject. Students during delivering a lesson also observed some terminologies in Biology such as virus, bacteria and fungi among others that are too abstract for them. They arouse their interest for practical activities in Biology for them to be able to see the real features or structures of those micro-organisms with the aid of microscope that appear to be too abstract during lecture method of teaching.

National Academy of Sciences (2010) recommended that practical work was found to achieve higher than the non-practical in Biology. The use of practical activities (approach) to the teaching of Biology should be harmonized with the theoretical aspect by the Biology teachers so as to produce students who can acquire the necessary knowledge, skills and scientific competence needed to meet the scientific and technological demands of the society. Khan and Iqbal (2011) opined that students taught through practical inquiry lab teaching method show more performance in Biology practical than the students of the control group taught through traditional teaching method. Nzewi (2008) and Aina (2012) observed that the laboratory is an indispensable organ of the school if effective teaching and learning of science subjects

are to be achieved and laboratory is a room or building or a special period of time equipped and set apart for practical or experimental studies to take place”. Ude and Onah (2017) said, “It is an instructional facility used by the teacher to help students learn about science and how scientists investigate the world around them. In the same vein, Orokpo (2009) laments that the use of traditional lecture method of “chalk and talk” has gained prominence in the teaching of Biology than practical method. Oyedeji (2000), discovered that students taught with science Laboratory Instructional Strategy performed significantly better than use of traditional lecture method.

The conventional/traditional teaching methods involve unidirectional flow of information/knowledge from teacher to the students and do not encourage process skill acquisition needed for proper understanding of biological principles, concepts and facts. Guisti (2008) referred to these traditional teaching methods as teacher-centered approaches to learning in the sense that the teacher and those up in the educational hierarchy are considered as the possessor of knowledge to be transferred to the students, and as such decides how the knowledge transfer takes place. The unidirectional flow of information in the traditional teaching method makes students passive and unable to construct meaningful knowledge in the teaching and learning of Biology. The shortcomings of these traditional teaching methods resulted to the persistent search for an effective method of teaching and learning Biology which culminated to the discovery and suggestions by some researchers (Mandor, 2002; Ibe & Nwosu, 2003; Nwagbo, 2006; Akpan, 2010), for the use of innovative teaching

methods such as inquiry method, concept mappings, simulations and games, constructivism, problem based learning etc. The innovative methods are considered as effective teaching methods that can improve on students' achievement and interest in Biology. The innovative teaching methods are activity-based and characterized by students sharing some degree of responsibility for making decision in the learning process. In the innovative teaching methods, the teacher is often described as a partner and a facilitator in the teaching and learning process and not the possessor of knowledge hence the innovative teaching methods are referred to as student-centered approach to learning (Campbell, 2006).

Many Biology, therefore, innovations are coming up, so that nobody can escape being caught up in the learning of Biology. Therefore, the need to acquire new skills, new attitudes and new values for effective teaching of Biology in our secondary schools cannot be over – emphasized. Skills should be developed on how to handle practical works on Biology.

Okeke (2009) observed that the main hope for the developing countries to attain to rapid rate of economic advancement, to raise the standard of living in the future, lies in our will to enhance or improve the rate of learning in the secondary schools, and to motivate students by giving the high points to the development of science subjects like Biology. The increasing demand of service by our biological industries like pharmacological industries, the agro– biological industries etc, can only

be met by training capable teachers who will enhance the rate of learning in the secondary schools, and motivate students to specialize in the subject.

Most students participate actually in some science subjects like Biology and they assume that other science subjects are not easy to handle, such ideas should be discouraged as the science subjects work hand in hand when handling any scientific innovation.

The new trend towards social, ethical and humanistic values of Biology, demands that the government should equip laboratories for practical purpose and create the right attitudes of teaching the subject, so that the students can inject their experiences into the scientific practices. Iloeje (2002), in his report for success in practical works in Biology, stated that students must be giving opportunities to participate in whatever practice that is going on in the laboratory. He said that, teachers should expose the students to the rudiments of practical activities in Biology. They should encourage the need to equip the laboratory for the practical purpose. These will help students to understand and assimilate some of the Biology terms, and theories will be made easy to them, so that they will have interest in the study of Biology and will wish to continue with it in future.

Empirical Studies

After review of various researches by past researchers on the problem of teaching Biology practical in senior secondary schools in Egor Local Government Area of

Edo State, it was discovered that some authors are strongly against the difficulty in teaching of Biology practical therefore, have requested that government should encourage and increase the standard of schools.

According to Oyedeyi (2000) and Talabi (2002), stated that the new system of qualified teachers required must be adequately provided. Lunetta (2008), reported that the laboratory helps students in making accurate observation, devising, hypothesizing, finding the reasons for results, planning control and withholding judgment.

Nnamonu (2003) in his speech for effective use of laboratory, stated that the whole work of science is centered on problem solving and laboratory afford convenient place for careful, observation, accurate calculation and logical conditions. He further taught of the conducive environment that is the laboratory, where both illustrative and investigating aspects of practical could be carried out. According to Bargess (2003), the effective use of the laboratory of science skills, under such conditions, the ability for independent work and self-reliance cannot be develop.

Summary of Literature Review

In view of the review the need for the problem encountered by teachers in the teaching of Biology practical in senior secondary schools was discussed.

The problems of Biology practical activities encountered by the students in senior secondary schools were also highlighted. It has been known that, students achieve more when they participate actively in what they are being taught. Also,

resources such as diagrams, field works and real objects, helps to explain the subject matter very well when effectively used.

The problems encountered in the teaching of Biology in senior secondary school was also reviewed. Many problems that affect the achievement of senior secondary school Biology student in Egor Local government Area, Edo State include; inadequate laboratory facilities, Teachers difficulty in teaching Biology practicals, inappropriate teaching methods, etc.

It was revealed that inappropriate training background of Biology teachers are the major problem that militate against effective teaching of Biology practical because some Biology teachers in senior secondary schools did not undergo enough training to enable them get skills, qualities and enough knowledge of the subject matter and how to impact the knowledge to the students.

The researchers stated that the professional qualification the teacher possesses including knowledge, skill and its occupational competency enables the teacher to be able to relate this subject matter to meet the needs of the senior secondary school Biology students and also aim at developing individual understanding of the world of Biology and office occupations.

Finally, almost all the researchers maintained that Biology education knowledge must be continually seeking to acquaint students, parents, administrators and other relevant public by providing them opportunities to know, understand and influence the development and direction of the programme.

CHAPTER THREE

METHODOLOGY

The methodology adopted for this study is described under the following subheadings:

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

Design of the Study

The survey research design was adopted in this study. It is useful in studying involving opinions and evaluations of prevailing situations at a point in time. Omorogiwa (2006) describes survey as one in which a group of people or items is studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group.

Population of the Study

The population of this study consists of all the public secondary schools teachers and students with a total of two hundred and seventy four (274) teachers and eight

thousand, two hundred and seven (8,207) students in all the public secondary schools in Egor Local Government Area of Edo State.

Sample and Sampling Techniques

The sample size of the study consisted of twelve (12) teachers and one hundred and twenty (120) students randomly selected from the four (4) randomly selected secondary schools in Egor local government area of Edo State.

Research Instrument

The instrument for data collection was well structured questionnaire which consisted of two sections A and B. Section A contains the respondent's personal data while section B contains one hundred fifty (150) questions for the teachers and students. The respondents were required to indicate the option that best represent their opinion on the item with a tick (\checkmark). The questionnaire was constructed based on the four point scales as follows:

SA	= Strongly Agreed	= 4
A	= Agree	= 3
D	= Disagree	= 2
SD	= Strongly Disagreed	= 1

Validity of the Instrument

The research instrument was submitted to two experts in measurement and evaluation. These experts examined the item to clarify, as well as to ascertain if the items were related to the objective of the study. After scrutinizing the instrument, they offered useful suggestions. These suggestions led to a modification of the questionnaires before the final copy of the instrument based on the comments and corrections of the

evaluators.

Reliability of the Instrument

To establish the internal consistency of the instrument, the researcher employed the use of test-retest method of establishing reliability of instrument by administering the instruments to twenty respondents picked from the twelve schools. The essence was to find out if the instrument was reliable. The scores obtained was subjected to Cronbach Alpha using SPSS statistics. The response was reliable giving a coefficient of 0.773.

Method of Data Collection

The researcher administered one hundred and fifty (150) of the questionnaire to the respondents with the help of the class prefect and teacher co-ordinators. A letter of introduction was attached to establish report and ensure acceptance and confidentiality of their response and participation. The prefect of the class assisted in administering the questionnaires to the Biology teachers and students. They were allowed to respond to items before retrieving the filled questionnaire. One hundred and fifty (150) copies were retrieved and used for data analysis.

Method of Data Analysis

The researcher made use of frequency counts and percentages using in analyzing the data gathered from the respondents' questionnaires. The mean rating of 2.50 was used for decision point; those below 2.50 was regarded as “disagreed” and those above was regarded as “agreed”

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

SECTION A:

Table 1: Frequency distribution of respondents by class

Class of students	Frequency	Percentages (%)
SS 1	50	41.7
SS 2	40	33.3
SS 3	30	25
Total	120	100

Table 3 shows that 50 (41.7%) were in SS 1, 40 (33.3%) were in SS 2 and 30 (25%) were in SS 3.

Demographic Data of Teachers

Table 2: Frequency distribution of respondents by gender

Sex of teachers	Frequency	Percentages (%)
Male	8	66.7%
Female	4	33.3%
Total	12	100

Table 1 in teachers questionnaire shows that there were 12 respondents in the sample of which 8 (66.7%) are male while 4 (33.3%) are female.

Table 3: Frequency distribution of respondents by qualification

Qualification of teachers	Frequency	Percentages (%)
NCE	4	33.3
B.SC	3	25
B.SC/ED	3	25
M.SC/ ED	2	16.7
Total	12	100

Table 2 in teachers questionnaire shows that 4 (33.3%) of teachers were NCE holders, 3 (25%) of teachers were B.SC holders, 3 (25%) of teachers were B.SC/ED holders and 2 (16.7%) are M.SC/ ED holders.

SECTION B: Presentation of Results

Research Question 1: Are there enough equipments in the laboratory for effective teaching of Biology practical?

Table 4: Laboratory Equipment

S/N	STATEMENTS	SA	A	D	SD	X	REMARKS
1	There is insufficient equipment for Biology practicals	5 (41.7%)	3 (2.5%)	2 (1.67%)	2 (1.67%)	2.92	Agreed
2	Some of the specimens for Biology practicals are not available	6 (5%)	2 (1.67%)	1 (0.83%)	3 (2.5%)	2.92	Agreed
3	Lack of fund for purchasing the equipment and materials for Biology practicals	4 (3.33%)	5 (41.7%)	2 (1.67%)	1 (0.83%)	3.25	Agreed
4	Available materials are not accessible to the teachers	7 (5.83%)	2 (1.67%)	1 (0.83%)	2 (1.67%)	3.08	Agreed

Source: Field survey 2025

The data presented on table 6 in item 1 above revealed that the respondents agreed that there is insufficient equipment for Biology practicals was represented with a mean

value of 2.92. The data in item 2 in table 6 also revealed that the respondents are in agreement that some of the specimens for Biology practicals are not available. It was represented with a mean value of 2.92. The data in item 3 of table 6 above showed that respondents also agreed that there is lack of fund for purchasing the equipment and materials for Biology practicals with a mean value of 3.25. The data in item 4 in table 6 then revealed that there available materials for Biology practicals are not accessible by the teachers. This was represented with a mean value of 3.08.

Research question 2: What is the effect of teachers qualification on students' performance in Biology practical?

Table 5: Teacher's Qualification

S/N	STATEMENTS	SA	A	D	SD	X	Remark
5	Teachers do not know how to manipulate some of the equipment	60 (50%)	40 (33.3%)	10 (8.33%)	10 (8.33%)	3.25	Agreed
6	Teachers do not possess the necessary skills for conducting practicals	50 (41.7%)	30 (25%)	25 (20.8%)	15 (12.5%)	2.96	Agreed
7	Teachers are not supported to attend workshops, seminars, and conferences regularly to learn new teaching practices for practical	45 (37.5%)	40 (33.3%)	23 (19.2%)	12 (10%)	2.98	Agreed
8	Teachers do not engage students in practical tasks that will arouse their interest in the lecture.	30 (25%)	40 (33.3%)	25 (20.8%)	25 (20.8%)	2.63	Agreed

Source: Field survey 2025

The data presented on table 3 in item 5 above revealed that respondents agreed that teachers do not know how to manipulate some of the equipment. This was represented with a mean value of 3.25. The data in item 6 in table 3 revealed that teachers do not possess the necessary skills for conducting practicals and was represented with a mean value of 2.96. The data in item 7 in table 3 also revealed that teachers are not supported to attend workshops, seminars, and conferences regularly to learn new teaching practices for practical and was represented with a mean value of 2.98. The data in item 8 in table 3 further revealed that teachers do not engage students in practical tasks that will arouse their interest in the lecture and was represented with a mean value of 2.63.

Research Question 3: What is the effect of teachers' qualification and competency on students' performance in the teaching Biology practical?

Table 6: Teachers Qualification and Competency

S/N	STATEMENTS	SA	A	D	SD	X	Remarks
9	The practical activities that I do in biology practical classes help me develop better biological skills that boost my performance in Biology	70 (58.3%)	20 (10.7%)	15 (12.5%)	15 (12.5%)	3.21	Agreed
10	Biology practical activities stimulate my interest in Biology	80 (66.7%)	30 (25%)	6 (5%)	4	3.55	Agreed
11	Biology practical activities enable me to remember biology terms taught in theoretical classes	30 (25%)	35 (29.2%)	30 (25%)	25 (20.8%)	2.58	Agreed
12	Biology practical activities make my learning and mastery faster than theory classes	55 (45.8%)	45 (37.5%)	8 (6.7%)	2 (1.7%)	3.11	Agreed

Source: Field survey 2025

The data presented on table 4 in item 9 above revealed that the practical activities done by students in biology practical classes help them develop better biological skills that boost their performance in Biology. This was represented with a mean value of 3.21. The data in item 10 in table 4 revealed that Biology practical activities stimulate students interest in Biology. This was represented with a mean value of 3.55. The data in item 11 in table 4 revealed that Biology practical activities enable students to remember biology terms taught in theoretical classes. This was represented with a mean value of 2.58. The data in item 12 in table 4 also revealed that Biology practical activities make students learning and mastery faster than theory classes. This was represented with a mean value of 3.11.

Research Question 4: What is the effect of Gender on Students performance in Biology practical?

Table 7: Effects of Gender

	STATEMENTS	SA	A	D	SD	X	REMARKS
13	Male students are more aggressive towards laboratory and project work	8 (6.67%)	2 (1.67%)	1 (0.83%)	1 (0.83%)	3.42	Agreed
14	Male students are fast in reasoning than female students	8 (6.67%)	2 (1.67%)	1 (0.83%)	1 (0.83%)	3.42	Agreed
15	Biology practical work is tedious for female teachers	4 (3.33%)	4 (3.33%)	2 (1.67%)	2 (1.67%)	2.83	Agreed
16	Ecological instruments are very easy to manipulate by male biology teachers	5 (41.7%)	3 (2.5%)	2 (1.67%)	2 (1.67%)	2.92	Agreed

Source: Field survey 2025

The data presented on table 7 in item 13 above revealed that the respondents agreed that Male students are more aggressive towards laboratory and project work. This was represented with a mean value of 3.42. The data in item 14 in table 7 revealed that the respondents agreed that male students are fast in reasoning than female students and was represented with a mean value of 3.42. The data in item 15 of table 7 above revealed Biology practical work is tedious for female teachers. This was represented with a mean value of 2.83. The data in item 16 in table 7 showed that ecological instruments are very easy to manipulate by male biology teachers. This was represented with a mean value of 2.92.

Research Question 5: Effects of teaching methods on students performance in Biology practical

Table 8: Teaching methods

S/N	STATEMENTS	SA	A	D	SD	X	REMARKS
17	Students always understand the lesson while learning with microscope?	20 (16.7%)	30 (25%)	40 (33.3%)	30 (25%)	2.33	Disagreed
18	Students always participate while teaching with food test reagent/chemical in the laboratory	22 (18.3%)	30 (25%)	38 (31.7%)	30 (25%)	2.37	Disagreed
19	Teachers makes teaching, activity oriented so that students can develop interest in the lesson regularly through workshops, seminars and conferences to learn innovative strategies for teaching practicals	19 (15.8%)	30 (25%)	41 (34.2%)	30 (25%)	2.32	Disagreed
20	Biology practical activities enable me to participate more actively than the theoretical method of Teaching	35 (29.2%)	37 (30.8%)	23 (19.2%)	25 (20.8%)	2.68	Agreed

Source: Field survey 2025

The data presented on table 5 in item 17 above revealed that the study disagreed that students always understand the lesson while learning with microscope practical activities and was represented with a mean value of 2.33. The data in item 18 in table 5 also revealed that the respondents disagreed that students always participate while teaching with food test reagent/chemical in the laboratory which was represented by a mean value of 2.37. The data in item 19 of table 5 above showed that respondents also disagreed that teachers makes teaching, activity oriented so that students can

develop interest in the lesson regularly through workshops, seminars and conferences to learn innovative strategies for teaching practicals with a mean value of 2.32. The data in item 20 in table 5 also revealed that the respondents agreed that Biology practical activities enable students to participate more actively than the theoretical method of teaching. This was represented with a mean value of 3.68.

Discussion of the Findings

From table 4 in research question 1, the study revealed that the challenges encountered by Biology teachers when organizing and conducting Biology practicals include insufficient equipment for practicals, some of the specimens for Biology practicals are not available, lack of fund for purchase of practical equipment, some students are not interested in practicals, large class and so on. These findings support previous studies (Folaranmi, 2002); Olaleye, 2002; Ayayi, 2006) that lack of textual materials, inadequate laboratory apparatus and equipment, and large class sizes as impediments to effective science education.

The findings of the study also revealed that the Biology teacher believe that improvisation of the instructional materials by the principals, Biology teacher and students, employment of laboratory assistants and technologists, and sponsoring Biology teachers regularly to workshops, seminars and conferences among others are some of the possible solutions to these challenges encountered by Biology teachers when organizing and conducting Biology practicals.

This study has also revealed that lack of laboratory equipment and materials, insufficient specimen lack of fund among others are some of the challenges encountered by biology teachers when organizing and conducting biology practicals. It also revealed that improvisation by the teacher; students and principals, amongst others are the possible solutions to these challenges.

From table 5 in research question 2 it was revealed that teachers who have more training produce students who have better achievements. This is in line with Goldhaber and Brewer (2000) who believe that higher degree shows a positive correlation with student academic achievement.

The study also revealed that there are inadequate numbers of professionally qualified biology teachers in all public secondary schools in Egor Local Government Area. This definitely resulted in one teacher handling large class sizes as well as many classes. The fallout is that practical activities will be neglected since the teacher cannot divide herself and also have the need to cover the terms scheme of work. The above have degenerated to a situation in which non-professional teachers such as Corps members are assigned classes to teach biology in secondary schools; instead of them serving as support staff. The resultant negative effects are seen on the students' performance. The above finding is in line with Anthony (2014) which found out among others that the problem of utilization and improvisation in biology teaching and learning is due to lack of adequately qualified teachers.

From table 6 in research question 3, it was revealed that there is non-availability of trained laboratory assistants in secondary schools in Egor Local Government Area of Edo State. It was also revealed that incompetency in teachers makes practical lessons less effective and the students' performance is grossly affected. Among other things, it was also discovered that due to non-availability of trained and competent teachers, students can't come inside biology laboratory to experiment what they were taught, this affects the students' performance and laboratory lessons becomes lousy as the teacher finds it tasking to control the student therein; this defeats the purpose of the practical activity. The above finding is in line with the findings of Madu (2012) who among others discovered lack of adequate number of qualified and competent teachers as the problem facing the effective teaching of biology practical in secondary schools especially public secondary schools in Egor local government area of Edo State.

It was revealed in data collected that most Biology teachers do not organize their practical works, in such a way that, it would help to develop skills and knowledge in the students. Opuh, Ezeh and Ezema (2008) supported the above statement, in their speech that teachers contribute a lot in discouraging or encouraging students in learning Biology and its practicals. This is because, many teachers present such subjects to be difficult to handle. As a result students with such experiences, shy away from learning the subject. They also noted that lack of well trained and qualified and competent teachers in Biology contribute a lot to students academic performance.

It was discovered that well qualified and competent teachers helps students to focus on their academic activities through the integration of adequate knowledge of the curriculum content areas. It was also discovered that competent teachers create an environment in which students are regarded and treated as active learners. It was also revealed that the level of competence in practical skills determine academic performances of students in Biology practical. This is in line with Roberts (2010) who reported from research findings that, “doing” has been found to be the easiest skill attainable by students’ respondents; many professed to like the “doing” aspect of Biology practical learning skills.

From table 7 in research question 4, it was revealed that male students performed a little better than female student. It was discovered that there is a general belief among Nigerians that boys are superior to girls in terms of physical build up, intelligence and reasoning. This is in line with Okeke (2007) Archer and Macrae in Iwuji (2012) who stated that males’ students appear to be higher in achievement than the females and also reported that boys are better at activities requiring manipulation (psychomotor skills) than girls, and that boys are more aggressive towards laboratory and project work. The finding is also in line with the view of Iwuji (2012) who stated that boys also perform better than girls in process of measuring and experimenting. The finding of the study also supported by Oakley in Iwuji (2012) who opined that right from the childhood, a boy traditionally receives more training and encouragement for achievement than girls.

From the above data collected from table 8 of research question 5, when comparing students' academic achievement taught practical biology with lecture methods it was revealed that, the findings obtained from the results revealed that students taught biology concept using practical method performed better in academics performance. It was found out that active involvement of students in practical activities may have helped in enhancing and facilitating students' academic in biology. Moreover, the presentation of topics by means of sequential practical activities and objectives increase the achievement of students. This is in line with the findings of National Academic of Science (2010) which recommended that practical work was found to achieve higher than the lecture method (non-practical) in biology. This in line with the finding of Oyedeji (2000) who found that, students taught with science Laboratory Instructional Strategy performed significantly better than use of traditional lecture method. This finding agrees with Kibirige & Tsamago (2013) who recommended the use of practical method in fostering students' acquisition of Biology skills. The result is conflicting with Orokpo (2009) who laments that the use of traditional lecture method of "chalk and talk" has gained prominence in the teaching of biology than practical method.

The result of this study concurs with the study of Scheneider, Marx & Soloway (2011). Because according to him, it is possible for academic achievement to be attained if biology subject will be learned practically through the use of inquiry method in the laboratory or outside the laboratory. Chibabi, Umoru, Onah and Itodo

(2018); Ngala (2019); Habu, Ude & Ebuoh (2015) also in their study found out that students that were exposed to teaching using practical method of teaching perform better than those taught using conventional of teaching.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary, findings, conclusion and recommendations of the study based on the findings generated from the analyzed data, interpretation and discussion.

Summary

This study is on the problems of teaching Biology practical in public secondary schools in Egor Local Government of Edo State. In carrying out the research, five research questions was raised. A random sample of one hundred and twenty (120) students and twelve (12) teachers were used for collection of data. The research instrument used for the study was the questionnaire. For interpretation of data, frequency counts and percentages was used in analyzing the data gathered from the respondents' questionnaires. The mean rating of 2.50 was used for decision point; those below 2.50 was regarded as “disagreed” and those above was regarded as “agreed”.

The study discovered that inability of students and teachers to use Biology practical tools for teaching and learning was traceable to insufficient training, inadequate facilities, poor teaching method and teachers incompetence in using Biology practical tools was inadequate. The researcher believes that the study will benefit teachers, students, policy makers and improve the generality of Biology practical in public secondary schools in Egor Local Government Area of Edo State.

The study was carried out and delimited to public senior secondary schools in Egor Local Government Area of Edo State and the researcher made a systematic review of related literature in sub themes drawn from the research questions. The study population was drawn from four selected secondary schools in Egor Local Government Area i.e. Uselu secondary school, Iyoba Girls secondary school, Edo Boys College, and Egor secondary school.

A total of 132 respondents consisting of 120 students and 12 teachers were randomly selected from these four schools. The study adopted the four likert point of research instrument made up of sections A and B for teachers and students which was personally administered by the researcher. The percentage count and simple percentage method of data analysis was used in analysing the data generated for the study. From table 1 in students demographical data it was revealed that there were 120 respondents in the sample of which 50 (41.7%) are male while 70 (58.3%) are female, table 2 shows that 50 (41.7%) were 13 – 16 years, 40 (33.3%) were between 16 – 18 years and 30 (25%) were 18 years and above, table 3 shows that 50 (41.7%) were in SS 1, 40 (33.3%) were in SS 2 and 30 (25%) were in SS 3. On teachers demographical data, it was revealed in table 1 in teachers questionnaire shows that there were 12 respondents in the sample of which 8 (66.7%) are male while 4 (33.3%) are female; table 2 in teachers questionnaire shows that 4 (33.3%) of teachers were NCE holders, 3 (25%) of teachers were B.SC holders, 3 (25%) of teachers were B.SC/ED holders and 2 (16.7%) are M.SC/ ED holders. The study reveals that the respondents agreed

that there is insufficient equipment for Biology practicals and was represented with a mean value of 2.92. The study further reveals that a good teaching method determines academic performance and performance can be measured by teachers' teaching method. Poor power supply, lack of good teaching background and lack of appropriate guide, policy etc. were identified as the major constraint to the teaching and learning of computer science while decongestion of classroom equipment, regular power supply, teachers training and a good reward system will help to improve the teaching and learning of Biology practical in Egor Local Government Area. The study concluded that teachers' qualification, availability of Biology practical tools is a recipe to teaching and learning of Biology and its practical. The study suggested that government should ensure regular, adequate school funding, power supply, training of the teachers etc.

Conclusion

Based on the findings of this study, it is evident that there is unavailability of Biology practical tools in most senior secondary schools in Egor local government area of Edo State because of Government poor funding and unavailability of qualified Biology teachers that teaching methods has influence on the teaching and learning process in Biology. Also, teacher' qualifications affects the effectiveness in the teaching and learning of Biology and its practical in Egor local government area of Edo State. This therefore means that teacher's quality matters a great deal in the learning process. Again, incessant power failure, inexperienced and lack of good

teaching background, lack of appropriate guide, policies and regulations can serve as constraints to the teaching and learning of Biology and its practical in Egor local government area of Edo State. Finally, learning environment has an effect on the teaching and learning process in Biology.

Recommendations

From the findings of this study, the following recommendations were made for the effective and efficient teaching of Biology practicals in Egor public secondary schools of Edo State:

- ✓ Government and school authorities should organize training and workshops for Biology practicals
- ✓ The government should employ more Biology teachers with B.sc(Ed) and M.Sc/Ed to teach the Biology and its practicals in public secondary schools in Egor local government area of Edo State.
- ✓ Government should make a huge investment in the acquisition of Biology practicals facilities for teaching and learning of Biology practicals .
- ✓ Biology practicals laboratories should be built in secondary schools in Egor local government area of Edo State.
- ✓ Conferences, workshops and symposium should be organized to train teachers and enlighten them on the need for Biology practicals on regular basis.
- ✓ Government should provide good learning environment, adequate teaching/learning facilities such as computers, electricity

- ✓ Government policies and regulations governing the teaching and learning of Biology practicals in Egor local government, Edo State should be appropriate.
- ✓ Ministry of education would be availed of the need to monitor Biology teachers activities in the way they teach, their relationship with students and their commitment to their job.

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APPENDIX 1
DEPARTMENT OF CURRICULUM AND
INSTRUCTIONAL TECHNOLOGY,
FACULTY OF EDUCATION,
UNIVERSITY OF BENIN,
BENIN CITY.

RESEARCH QUESTIONNAIRE

Dear respondents,

I am a final year student of the University of Benin, Benin City. I am presently conducting a research titled “The Problems of Teaching Biology Practical in Public Senior Secondary Schools in Egor Local Government Area of Edo State”.

The information being sought here is strictly for academic purposes and will be treated with utmost confidentiality.

I appreciate your understanding, cooperation and prompt responses.

Thanks.

FORTUNE IYEIKHIAN
RESEARCHER

S/N	STATEMENTS	SA	A	D	SD
Research Question 1:					
Are there enough equipments in the laboratory for effective teaching of Biology practical?					
1	There is insufficient equipment for Biology practicals				
2	Some of the specimens for Biology practicals are not available				
3	Lack of fund for purchasing the equipment and materials for Biology practicals				
4	Available materials are not accessible to the teachers				
Research question 2					
What is the effect of teachers qualification on students' performance in Biology practical?					
5	Teachers do not know how to manipulate some of the equipment				
6	Teachers do not possess the necessary skills for conducting practicals				
7	Teachers are not supported to attend workshops, seminars, and conferences regularly to learn new teaching practices for practical				
8	Teachers do not engage students in practical tasks that will arouse their interest in the lecture.				
Research Question 3:					
What is the effect of teachers' qualification and competency on students performance in the teaching Biology practical?					
9	The practical activities that I do in biology practical classes help me develop better biological skills that boost my performance in Biology				
10	Biology practical activities stimulate my interest in Biology				
11	Biology practical activities enable me to remember biology terms taught in theoretical classes				
12	Biology practical activities make my learning and mastery faster than theory classes				
Research Question 4:					
What is the effect of gender on students performance in Biology practical?					
13	Male students are more aggressive towards laboratory and project work				
14	Male students are fast in reasoning than female students				
15	Biology practical work is tedious for female teachers				
16	Ecological instruments are very easy to manipulate by male biology teachers				
Research Question 5:					
Effects of teaching methods on students performance in Biology practical					
17	Students always understand the lesson while learning with microscope?				
18	Students always participate while teaching with food test reagent/chemical in the laboratory				

19	Teachers makes teaching, activity oriented so that students can develop interest in the lesson regularly through workshops, seminars and conferences to learn innovative strategies for teaching practicals				
20	Biology practical activities enable me to participate more actively than the theoretical method of Teaching				

APPENDIX II

LIST OF NAMES OF PUBLIC SENIOR SECONDARY SCHOOLS IN EGOR

LOCAL GOVERNMENT AREA OF EDO STATE, NIGERIA

1. Asoro Grammar School
2. Ohonre Grammar School
3. Evbuotubu Secondary School
4. Uselu Secondary School
5. Edo Boys High School
6. Egor Secondary School
7. Evbareke SecondarySchool
8. Eweka Secondary School
9. Iyoba Girls College
10. Okhokhugbo Grammar School
11. Use Secondary School
12. Uwelu Secondary School