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LABORATORY FACILITIES AND PERCEIVED EFFECTS ON STUDENTS' ACADEMIC ACHIEVEMENT IN BIOLOGY IN ILORIN SOUTH LOCAL GOVERNMENT, KWARA STATE

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ABSTRACT

This research work investigated thelaboratory facilities and its perceived effect on biology students' performance in Ilorin South Local Government Area of Kwara State.. Relevant literature related to the study was reviewed, and three research questions were formulated to guide the investigation. The study adopted a descriptive survey research design. The study population comprised Senior Secondary School (SSII and SSIII) Biology students in public and private secondary schools in Ilorin South Local Government Area of Kwara State. A sample of 100 students was selected from ten secondary schools using purposive and proportionate sampling techniques. A structured and validated questionnaire was used for data collection. The reliability of the instrument was established using the Cronbach Alpha method, yielding a reliability coefficient of 0.878.The findings revealed that Biology laboratory facilities were generally available in the sampled schools, with an average availability rate of 90.9%. The study further revealed that available laboratory facilities were frequently utilized in the teaching and learning of Biology, as indicated by the respondents' responses. In addition, 95.2% of the respondents perceived that the use of laboratory facilities positively influences their learning of Biology by stimulating creativity, curiosity, critical thinking, active learning, and engagement with scientific methods. Based on the findings, it was recommended that government and other educational stakeholders should provide and maintain adequate Biology laboratory facilities in secondary schools. Teachers and students should be encouraged to maximize the use of available laboratory facilities during Biology lessons and practical activities. Schools should improvise unavailable laboratory materials where necessary to enhance effective teaching and learning of Biology.

Keywords: Academic Achievement, Biology,laboratory facilities, Students perception.

Introduction

Biology as scientific field of study should be learnt partly through experimental method. Majority of the topics in biology cannot be considered as completely thought without including some practical work in it. Therefore, practical classes form an essential part of the learning process for biology students, cultivating both their subject-specific and generic skills that will be of value throughout their university lives and future careers. Biology laboratory is the primary place to develop skills and competences.

Laboratory is a room, building or part of a building that is specially built for teaching by demonstration of theoretical phenomenon into practical

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terms. Biology Laboratory experience enables student to translate what seems to be abstract into practical realities, thereby enhancing their understanding of the learning process. The biology laboratory has a direct effect on both students' attitudes and academic performance as regards the instructional theory of learning interaction. It is generally believed that constant practice leads to proficiency in what the learner learns during classroom instruction; hence, the dictum "practice makes perfect" (Hager, 2014). The quality of teaching and learning experience depends on the extent of the adequacy of laboratory facilities in secondary schools and the teacher's effectiveness in the use of laboratory facilities with the aim of facilitating and providing meaningful learning experiences in the learners. The laboratory is a distinctive feature in teaching and learning of biology. The extent of adequacy of laboratory facilities for biology teaching depends on the population of students in a particular school (Hofstein and Ginetta, 2015, Stuckey 2018). Stuckey 2018 further stated that for students to learn effectively, teachers should ensure that adequate laboratory facilities are provided.

The study of biology in secondary schools should takes place in the laboratories, this is to enable or give easy access and usage of materials and facilities stocked in the laboratories for teaching and learning, not only during practical classes but also during normal classroom teaching. It is of importance fact that biology teachers adopt laboratory method for teaching. The laboratory method is an individual or group activity involving two-way approach namely: the exercise approach and the experimental approach.

This can only be achieved when teachers are favorably disposed to using the appropriate methods and facilities in teaching and learning the subject. For science teachers to play their roles in teaching science effectively, laboratory facilities should be made available and utilized appropriately, this would also improve the performance of students.

Academic achievement of students in biology generally had witnessed a deplorable trend in the past decades. Science education at all levels of education in Nigeria is in a deplorable state from the primary, secondary to the tertiary institutions. There is scarcity in science facilities in the laboratories and this contributes to students' poor academic performance in biology at the secondary school level (Ihuarlam, 2018; Udo, 2016; Okafor, 2020). Today this scenario is applicable to secondary schools in Ilorin South L.G.A, Kwara State.

However, despite the numerous secondary schools in Ilorin South L.G.A, Kwara State, the level of students' academic performance is alarming especially for biology. It is on this note that this research wish to evaluate the laboratory facilities and its perceived effect on biology students' performance in science subjects in Ilorin South L.G.A, Kwara State.

Statement of the Problem

General performance of students in the SSCE in Biology has not been impressive in the past few decades despite efforts by the different levels of government and all stakeholders to improve performance of the students. A number of contributing factors have been identified to this poor performance among students and inadequate/insufficient laboratory facilities in our secondary schools which cannot cater for practical lessons. This constitutes a pedagogical hindrance in the effective teaching and learning of biological concepts. This study therefore intended to evaluate the laboratory facilities and its effect on Biology students' performance in science subjects in Ilorin South L.G.A, Kwara State.

Purpose of the Study

The purpose of this study is to evaluate the laboratory facilities in Ilorin South L.G.A, Kwara State and its effect on biology students' performance in science subjects. Specifically, the study is set out;

1. To examine the level of Biology Laboratory facilities available in Senior Secondary Schools in Ilorin South L.G.A, Kwara State.
2. To determine the utilization rate of available Biology Laboratory facilities in teaching of Biology in Ilorin South L.G.A, Kwara State Secondary Schools.
3. To determine the students' perception of their level of academic performance in Biology when laboratory facilities are used in Ilorin South L.G.A, Kwara State.

Research Questions

The following research questions were raised to guide the study;

1. **what** is the level of availability of biology laboratory facilities in senior secondary school in Ilorin south?

2. **What** is the level of utilization of available biology laboratory facilities in the teaching and learning of biology in Ilorin south?

3. **What** are student's perceptions of the influence of biology laboratory facilities on their academic performance in biology?

Literature review

Theoretical Review

Constructivist Learning Theory

The constructivist learning theory basically provide the theoretical foundation for this study. Constructivist

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Learning Theory (CLT) is a prominent learning theory that explains how individual as a student's actively construct knowledge through interaction with their society, prior experiences, and participation in meaningful learning activities. The theory tell that learning is not just the passive reception of information from the teacher but a process where learners develop understanding and view by relating new concepts to their existing knowledge and experiences (Jonassen, 2018). In science education, particularly Biology, constructivism has impacted and influenced teaching approaches that emphasize active participation, inquiry, experimentation, and practical experiences as essential components of effective learning (Brown & Ryoo, 2022).

The relevance of constructivist theory to laboratory facilities lies in the fact that Biology is an experimental science that requires learners to observe, manipulate materials, conduct investigations, and draw conclusions based on evidence. Well-equipped laboratories provide opportunities for students to engage in practical activities that support knowledge construction (Ryoo, 2022). Through the use of laboratory facilities such as microscopes, specimens, models, reagents, and other instructional materials, students are able to connect abstract biological concepts with real-life observations and experiences (Tsui & Treagust, 2019). This process enhances conceptual understanding and contribute to improved academic achievement in Biology.

Conceptual Review

Concept of Laboratory

So many researchers have defined laboratory in different ways but all the definitions come to give the same meaning. Ardo (2014) defines school laboratory as an instructional facility for helping pupils to learn what science is and how scientists work. Oguntona (2021) said that nature should be a laboratory and that learning of science should be through inquiry rather than dogma. This will help for logical, critical and independent thinking. Akano and Nma (2013) defined laboratory as a place where people engage themselves in human enterprise to examine and explain natural phenomena. Laboratories have been found to be a primary vehicle for promoting formal reasoning, skills and students' understanding, thereby enhancing the desired learning outcomes in students (Ogunleye, 2019). Proeter (2015) agreed to the view that laboratory is a room or building with specific equipment for doing scientific test of teaching science or a place where chemicals and medicines are produced.

According to Hornby (2015) laboratory is a room or building used for scientific research, experiment, testing. Laboratory is a place equipped for making tests or doing experimental work (Blood, Studdert and Gay, 2017). Laboratory is a place where scientific research and development is conducted and analysis performed (Britannica Concise Encyclopedia 1994–2020). Espindle (2014) sees laboratory as a room or building where scientific work or tests are carried on. According to Lewis (2015) a laboratory symbolizes a place to experiment with one's inner feelings, beliefs and fears. Wikipedia defines a laboratory as a facility that provides condition in which scientific research, experiment and measurement may be performed.

Omosewo (2020) defined laboratory as a place equipped for experimental study. She added that the world in the minds of most people is synonymous with scientific investigation, while Kamar (2019) sees laboratory as a place where the scientists do their work. He also added that it is a room that is well equipped for the purpose of carrying out practical work and allows students to have experiences that are consistent with the goal of scientific literacy. Mohanty (2017) opined that a laboratory is essential in the secondary schools to practice various experiments by the students and get convince about the fact, events, phenomena etc. Laboratories have been found to be scientists' workshops where practical activities are conducted to enhance a meaningful learning of science concepts and theories. Laboratories have been found to be a primary vehicle for promoting formal reason skills and students understanding, thereby enhancing the desired outcome in students (Adeyemi, 2006).

From the above definitions, laboratory can be summarized as a place for students to practice various experiments so as to be convinced about scientific facts, events and phenomena. This place also enhances meaningful learning of science concepts and theories through hands on experiments.

Biology Laboratory and Teaching in Global perspective

In most cases science practice is governed by school curriculum and it varies from one country to another. A study made by Roth &Garnier (2016) on the methods of teaching and understanding of biology in Czech Republic revealed that students had positive attitudes towards the instructional methods as they had accurate science subject understanding.

The study carried out these approaches or methods used for teaching biology in Netherlands showed that during learning biology classes, students work independently, often on assignments and check their work as they progress (Roth &Garnier, 2016). The findings showed that students prefer these methods in teaching and learning biology because they take an active and responsible part (Ebenezer &Zoller, 2016). Students' attitudes towards performance in biology through application of these methods through individual's beliefs,

creativity and self-evaluation of the impact of the progress led them in positive way (Ajzen, 1998; Roth &Garnier, 2006).

Biology Teaching and Learning

Teaching is defined by Onwuka (2017), as the direction of the activities of learners towards worthwhile educational goals. Ngwoke (2016), defined learning in a broad sense as a process which causes a change in behavior of an individual. This change in behavior results from experience or interaction between the individual and his environment. Ngwoke also noted that learning is an activity, something the learner does and not something the teacher does for the learner.

Ajaja (2015), stated that unfortunately teaching is largely teacher- dominated and the laboratory neglected. This he noted in his investigation on evaluation of science teaching in secondary school in Delta State. All these factors and lots more contribute to ineffectiveness of biology teaching and learning. Emphasizing on the qualities of a good biology lesson Nworgu (2015), outlined the following as factors in teaching and learning biology

i. Biology lessons should have clearly stated set of instructional objectives.
ii. Involve the use of relevant activity oriented
iii. Facilitate the transfer of knowledge to the wider society.

To solidify this, objective of teaching and learning of biology can be seen in the biology curriculum. It was derived from the national policy on education (1977, 1981, 2013, 2013), these includes

i. Adequate laboratory and field skills in biology.
ii. Meaningful and relevant knowledge in biology.
iii. Ability to apply scientific knowledge to everyday life in matters of personal and community health and agriculture.
iv. Reasonable and functional scientific attitudes.

It goes to say that for effective learning of biology to occur, it has to be student - oriented and accompanied by practical activities.

Biology Laboratory and Science Education

The laboratory is widely regarded as an appropriate learning environment for promoting meaningful learning and enhancing students' understanding of scientific knowledge and the nature of science. It provides opportunities for learners to interact with materials, specimens, equipment, and models in order to observe, investigate, and understand natural phenomena. Through laboratory experiences, students gain a deeper appreciation of concepts presented in textbooks and classroom lectures by engaging directly with the principles and processes involved in scientific inquiry.

The ultimate goal of teaching is to facilitate learning, and the value of laboratory experiences can only be fully realized when students actively participate in laboratory activities. Active engagement enables learners to develop practical skills, apply theoretical knowledge, and gain firsthand experience in scientific procedures. Laboratory activities should therefore go beyond written exercises and provide opportunities for hands-on learning and experimentation.

The laboratory is often considered the focal point of science education because it serves as the environment where scientific investigations are conducted. For biology teaching to be meaningful and effective, classroom instruction should be complemented by practical laboratory experiences. Within the laboratory, students perform measurements, verify observations, gather information, manipulate instruments, become familiar with scientific equipment and materials, and develop competence in experimental procedures. Such experiences expose learners to the practices of scientists and foster the development of scientific skills.

Meaningful learning in the laboratory occurs when students are given opportunities to manipulate equipment and materials in an environment that encourages exploration, inquiry, and knowledge construction. However, many schools do not make adequate use of laboratory facilities in the teaching of biology. In some cases, practical activities are organized only shortly before external examinations, limiting students' opportunities to acquire essential scientific skills through continuous practice. Effective biology education requires that laboratories be properly equipped and that students engage regularly in practical activities throughout their course of study.

Science laboratories play a vital role in science education because they provide learners with opportunities to connect theory with practice. Laboratory experiences contribute significantly to scientific advancement by helping students understand scientific concepts, develop investigative skills, and cultivate positive attitudes toward science. Through practical activities, learners gain

experiences that support deeper understanding and long-term retention of knowledge.

Modern science education emphasizes the laboratory as a setting for scientific inquiry and discovery. One of its major functions is to provide students with opportunities to investigate scientific questions, explore relationships among variables, and discover principles through observation and experimentation. The laboratory is therefore a place where students learn to apply scientific skills and attitudes in the process of acquiring knowledge.

Laboratory instruction in science focuses not only on the acquisition of factual knowledge but also on the development of inquiry skills, critical thinking, problem-solving abilities, and scientific reasoning. Students rely on laboratory experiences both to observe demonstrations by teachers and to conduct practical activities independently. Since biology is fundamentally an experimental science, practical work remains an indispensable component of biology education.

High-quality laboratory programs have the potential to stimulate students' curiosity, motivation, creativity, and scientific thinking. They contribute to the preparation of future scientists, engineers, health professionals, and informed citizens who are capable of addressing scientific and environmental challenges. Laboratory experiences also support the broader goals of biology education by promoting scientific literacy, technological competence, and the practical application of knowledge in everyday life.

The functions and benefits of laboratory activities can be grouped into several broad areas, including the development of practical skills, enhancement of conceptual understanding, promotion of scientific inquiry, cultivation of positive attitudes toward science, and preparation for future scientific and technological endeavors. These contributions demonstrate the importance of laboratory instruction in advancing the teaching and learning of biology within a rapidly developing scientific and technological society.

Biology Practical and Effective Teaching

It is widely acknowledged that many teachers naturally incorporate essential learning experiences into their teaching practices. They recognize the need for relevant knowledge and skills within specific subject areas and utilize opportunities that arise both within and outside the classroom. Evidence from the literature suggests that effective teaching of biology depends on several factors, including teacher qualification, teaching methods, effective use of laboratory facilities, and mastery of subject content.

Effective teaching of biology requires well-trained and professionally competent teachers. The attainment of educational objectives depends largely on the availability of qualified, efficient, satisfied, and dedicated teachers. Teachers are often regarded as the backbone of the educational system because the quality of education provided in schools is closely linked to the quality of teachers. Consequently, highly qualified teachers are more likely to impart knowledge effectively and maintain high educational standards. Professional training is therefore essential for biology teachers, as it equips them with the skills and competencies needed for effective classroom instruction.

Many scholars have emphasized that the teaching methods employed during science lessons significantly influence the effectiveness of biology teaching. Among these methods, the laboratory approach is widely recognized as one of the most effective strategies for teaching and learning science subjects, particularly biology. Laboratory activities involve practical experiences carried out individually or in groups for the purpose of learning. Through such activities, students acquire scientific process skills and develop a deeper understanding of scientific concepts.

Studies have shown that classroom practices sometimes differ from the approaches recommended in science curricula. Nevertheless, laboratory and fieldwork remain central to science education. Without practical activities, the teaching of science may become less effective. Laboratory work provides opportunities for students to relate scientific concepts to inquiry processes, observation, experimentation, and the interpretation of data.

Despite the importance of practical methods, many teachers still rely heavily on the lecture method. However, meaningful learning is more likely to occur when students participate in purposeful practical activities. Teachers are therefore encouraged to employ a variety of instructional techniques to capture students' attention, sustain their interest, and motivate them to learn. The use of laboratory methods helps to prevent biology from becoming merely a subject of memorization and promotes deeper understanding of scientific principles. Schools that

effectively utilize laboratory facilities often record better student performance in science subjects.

The techniques used in presenting information to students can also influence their perception of biology. Appropriate teaching methods can create positive impressions of the subject and stimulate learners' interest and participation.

Another important factor influencing effective teaching is mastery of subject matter. Teachers who demonstrate a thorough understanding of what they teach inspire confidence in their students. Knowledge of subject content enables teachers to explain concepts clearly, use appropriate language, and provide concrete examples that facilitate understanding. Effective teaching therefore requires not only sound knowledge of the subject but also the ability to apply suitable teaching strategies and scientific terminology during instruction.

Furthermore, continuity between previous and new learning experiences is essential. New knowledge should be linked to prior learning so that students can build meaningful connections between concepts. Since biology is largely practical in nature, the laboratory remains an indispensable environment for teaching and learning. Every biology teacher should therefore become familiar with instructional methods that help students achieve the intended learning objectives.

In summary, teachers play a vital role in bringing about positive change in society. Such change can only occur when teachers are well educated, competent, industrious, and disciplined. Effective teaching and effective learning are closely related, and the quality of learning outcomes depends largely on the quality of instruction provided by teachers.

Biology Laboratory and Effective Learning

Effective learning is closely linked to effective teaching. Since practical activities occupy a central position in biology instruction, they also contribute significantly to effective learning. Many students express enthusiasm and interest in practical exercises, and learners who enjoy science practicals often perform better in science subjects.

There is a strong relationship between biology practical activities and effective learning. Because biology is a science subject, schools are expected to provide adequate equipment and appropriate instructional methods to support practical work. Students' attitudes and interest toward practical classes contribute significantly to their learning outcomes.

Research has shown that laboratory experiences rank highly among the factors that promote effective learning in science. Students who participate actively in practical work tend to develop more positive attitudes toward science, improve their understanding of scientific concepts, and achieve better academic results. Where laboratory facilities and practical experiences are readily available, they can play a major role in shaping students' attitudes and enhancing academic achievement.

One challenge that may limit the effectiveness of laboratory learning is the use of highly structured practical activities that require students to follow predetermined procedures without opportunities for independent thinking. Such approaches may restrict creativity, ownership of learning, and meaningful engagement with scientific inquiry.

Practical activities also have positive effects on students' motivation. They enhance skill acquisition and improve the quality of learning because students learn by doing, observing, discussing, and reflecting on their experiences. Constructive laboratory experiences can lead to higher academic achievement, increased interest in learning, greater enjoyment of science, and improved awareness of scientific concepts.

Practical laboratory experiences are unique because they provide students with direct, hands-on interaction with biological materials and processes. Through these experiences, learners become actively involved in the learning process, develop scientific skills, and improve their academic performance in biology.

Research Methodology

This study evaluates the laboratory facilities and its perceived effect on science students' performance in biology in Ilorin South Local Government Area of Kwara State. The following are discussed in this chapter; research design, area of the study. population of the study, sample and sampling technique, instrument for data collection, validation of the instrument, reliability of the instrument, method of data collection, method of data analyses and decision rule.

The design for this study is descriptive design survey which aimed at investigating the laboratory facilities available to schools and its effect on science

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students' performance in science subjects Ilorin South Local Government Area of Kwara State.

The population of the study consists of all Senior Secondary Schools (SSII) and (SSIII) students and science teachers in the public and private secondary schools in Ilorin South Local Government Area of Kwara State.

The sample consisted of one hundred (100) Biology students, and ten (10) students are selected from ten (10) senior secondary schools each, five from (SSII) and five from (SSIII) in Ilorin South Local Government Area of Kwara State. A multi-stage sampling procedure was adopted for the sample.

Firstly, purposive sampling procedure was used to select schools that offer Biology and possess functional Biology laboratory facilities, due to the objectives of the study. Secondly, simple random sampling technique was used to select Biology students from the selected schools to ensure equal opportunity of participation among eligible respondents.

The sample size of 100 students was considered adequate based on statistical considerations. According to sample size determination principles, a sample of this magnitude is sufficient for a descriptive survey involving a defined population, providing reliable estimates while maintaining feasibility for data collection and analysis. The sample is also appropriate and consider based on the accessibility of respondents and the necessity to obtain representative information from the selected schools.

The instrument used was researcher-developed structured questionnaire titled "Laboratory Facilities and Students' Academic Performance Questionnaire (LFSAQ)". The questionnaire consisted of close-ended questions designed to obtain information on the availability of Biology laboratory facilities and students' perceived effects of these facilities on academic performance.

To determine the reliability of the instrument, a test re-test technique was employed. This was administered to twenty (20) respondents outside the targeted sample. The interval between the 1st and 2nd administration was two weeks. Cronbach Alpha formula was used to calculate the reliability of the instrument and the reliability coefficient of 0.878 was obtained.

The instrument was subjected to construct, content and face validation by experts in Science Education and Measurement and Evaluation. The experts critic's and examined the items in relation to the purposes and research questions of the study, ensuring that the items were clear, and also capable of measuring the intended variables. Their suggestions and corrections were incorporated before the final administration of the instrument.

The researcher visited the sampled schools with an introductory letter seeking the permission of the principals to carry out the collection of data on the research work. The administration and the collection of the instrument were carried out by the researcher with the assistance of the assigned biology teachers by the school's principal. The laboratory facilities were check to see the Level of Availability of Biology Laboratory Facilities and equipment that the school has was distributed to the students as well as questionnaire was administered to sampled students in the selected schools in order to test the understanding of Biology Laboratory facilities. After sorting out the scores, the data were analyzed based on class and gender.

For ethical considerations the researcher obtained permission from the school authorities and informed the respondents about the purpose of the study. Participation was voluntary, and confidentiality of respondents' information was maintained throughout the research process.

Responses from the questionnaire were tabulated according to the information the researcher sought to establish. Simple percentage and mean method were made use of to summarize the frequency of the responses and to measure the validity of the research questions raised during the investigation.

Results and Discussion

This chapter presents analysis and findings of the study as set out in the research method. The study attempted to evaluate the laboratory facilities and its effect on biology students' performance in Ilorin South Local Government Kwara State. The data was gathered exclusively with the questionnaire as the research instrument. The questionnaire was designed in line with the objective of the study. One hundred copies of questionnaires were distributed among Senior Secondary School Students in Ilorin South Local Government Area Kwara State.

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Table 1: Gender and Class Distribution of Respondents

Variables		Frequency (n=100)	Percentage (%)
1	Male	44	44
2	Female	56	56
	Total	**100**	**100**
	SS 2	60	60,0
	SS 3	40	40.0
	Total	**100**	**100**

Source: ***Field Survey, 2025***

The table 1 revealed the demographic information of the respondents based on gender and class. Out of 100 respondents, 44% were male while 56% were female. The table also revealed that 60.0% of the respondents were in SS2 and 40.0% were in SS3 respectively.

Research Question One: Are there adequate biology laboratory facilities in senior secondary schools in Ilorin South Local Government Area of Kwara State?

Table 2: A descriptive table showing available and non-available of laboratory facilities in Ilorin South LGA Senior Secondary Schools

S/N	ITEMS	Available	Not available	Mean	Std. D
1	Thermometer	85%	15%	0.85	12.75
2	Microscopes	83%	17%	0.83	14.45
3	Skeleton. (Model)	82.0%	18.0%	0.82	14.76
4	Demonstration table and chair	98%	2%	0.98	19.6
5	Litmus paper	99%	1%	0.99	9.9
6	Test tube and Racks.	88%	12%	0.88	10.56
7	Beaker	88%	12%	0.88	10.56
8	Safety googles	98%	2%	0.98	19.6
9	Stirring rod	99%	1%	0.99	9.9
10	Bunsen burner	100%	0%	1	0
11	Tripod stand	91%	9%	0.91	81.9
12	Evaporating dish	80%	20%	0.80	16
	N= 100 AVAILABLE = 90.9% AVERAGE NOT AVAILABLE 9.4% Average Mean= 0.9092				

Source: ***Field Survey, 2025***

From table 2, availability of equipment in laboratory 85% of the respondents agreed with the availability of thermometer. 83% of respondents agreed with availability of microscopes. In item 3, 82% of the respondents agreed with availability of skeleton (Model). Item 4 shows that 98% agreed with availability of Demonstration chair and table. Item 5 reveals that 99% of respondents agreed with availability of litmus paper, Item 6 reveals that 88% of the respondents agreed with availability of test tubes and racks, Item 7 reveals that 88% of the respondents agreed with availability of beakers, Item 8 reveals that 98% of the respondents agreed with availability of safety googles, Item 9 reveals that 99% of respondents agreed with availability of stirring rod, Item 10 reveals that 100% of respondents agreed with availability of Bunsen burner, Item 11 reveals that 99% of respondents agreed with availability of tripod stand, Item 12 reveals that 99% of respondents agreed with availability of evaporating dish.

This finding therefore indicated that thermometer, microscopes, skeleton (model), demonstration table and chair, litmus paper, test tube and racks, beaker, safety googles, stirring rod, Bunsen burner, tripod stand and evaporating dish are the laboratory facilities available with the range between 82% to 100% for teaching and learning of biology subjects in senior secondary schools in Ilorin south local government area of kwara state. Based on the foregoing interpretation and analysis, it becomes clear that items 1,2,3,4,5,6.7,8,9, 10, 11 and 12 are accepted as there are adequate biology laboratory facilities in senior secondary school in Ilorin South LGA senior secondary schools.

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Research Question Two: Do students make use of laboratory facilities in learning of biology subjects in Ilorin south local government area of kwara state?

Table 3: A descriptive table showing extent of usage of laboratory facilities in learning of biology subjects.

S/N	ITEMS	Always	Occasionally	Rarely	Never	Mean	Std. D
13	Thermometer	74%	8%	10%	8%	2.48	0.677
14	Microscopes	30%	39%	15%	16%	1.83	0.877
15	Skeleton. (Model)	62%	20%	10%	8%	2.36	0.639
16	Demonstration table and chair	20%	60%	10%	10%	1.90	0.739
17	Litmus paper	69%	12%	10%	9%	2.41	0.679
18	Test tube and Racks.	46%	40%	7%	7%	2.25	0.686
19	Beaker	64%	28%	7%	1%	2.55	0.563
20	Safety googles	50%	38%	8%	4%	2.34	0.707
21	Stirring rod	50%	20%	18%	12%	2.08	0.770
22	Bunsen burner	21%	71%	5%	3%	2.10	0.682
23	Tripod stand	65%	25%	10%	0%	2.55	0.641
24	Evaporating dish	62%	19%	15%	4%	2.39	0.667
	N= 100Average Mean= 2.71						

Source: ***Field Survey, 2025***

From table 3, showing the extent of usage of equipment in biology laboratory 74% of the respondents agreed to always use thermometer in Item 13. 30% of respondents agreed to always use microscopes. In item 15, 62% of the respondents agreed to always use of skeleton (Model). Item 16 shows that 20% agreed to always use Demonstration chair and table. Item 17 reveals that 69% of respondents agreed to always use litmus paper, Item 18 reveals that 46% of the respondents agreed to always use test tubes and racks, Item 19 reveals that 64% of the respondents agreed to always use f beakers, Item 20 reveals that 50% of the respondents agreed to always use safety googles, Item 21 reveals that 50% of respondents agreed to always use stirring rod, Item 22 reveals that 21% of respondents agreed to always use Bunsen burner, Item 23 reveals that 65% of respondents agreed to always use tripod stand, Item 24 reveals that 62% of respondents agreed to always use evaporating dish.

This finding therefore indicated that thermometer, microscopes, skeleton (model), demonstration table and chair, litmus paper, test tube and racks, beaker, safety googles, stirring rod, Bunsen burner, tripod stand and evaporating dish are the laboratory facilities always used with the range between 60% to 70% for teaching and learning of biology subjects in senior secondary schools in Ilorin south local government area of kwara state. Based on the foregoing interpretation and analysis, it becomes clear that items 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24 are accepted as student make use of laboratory facilities in learning of biology subject in Ilorin South LGA of Kwara State.

Research Question3: What is the students' perception of their level of academic performance when laboratory facilities are used?

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Table 4: A descriptive table showing the perception of students on their academic performance when laboratory facilities are used

S/N	ITEMS	SA	A	D	SD	MEAN	Std. D
25	The use of laboratory facilities for biology practical stimulates creativity, curiosity and critical thinking towards biology subjects.	58%	30%	5%	3%	3.15	0.85
26	The use of laboratory facilities promotes student engagement with scientific method	38%	40%	12%	10%	3.10	0.61
27	Laboratory facilities encourage active learning and promote problem solving skills in biology subjects	50%	25%	20%	5%	2.97	0.56
28	The use of laboratory facilities develops students' interests, attitudes and value	58%	22%	15%	5%	3.12	0.81
29	Demonstration in the laboratory with adequate facilities promotes socio-academic interaction among learners and their teacher.	64%	13%	19%	4%	3.10	0.61
N=100	Average Mean= 3.10		SD= 0.55				
	Agreed = 95.2%		Disagreed = 4.8%				

Source: ***Field Survey, 2025***

The result in table 4 revealed the student perception on their level of academic performance when laboratory facilities are used. the average mean of 3.10 which is considered to be above the cut-off mean of 2.50. 58% strongly agreed with, 30% agreed, 5% Disagree and 3% Strongly disagree item 25 The use of laboratory facilities for biology practical stimulates creativity, curiosity and critical thinking towards biology subjects while. 38% strongly agreed with, 40% agreed, 12% Disagree and 10% Strongly disagree item 26 The use of laboratory facilities promotes student engagement with scientific method. 50% strongly agreed with, 25% agreed, 20% Disagree and 5% Strongly disagree item 27 Laboratory facilities encourage active learning and promote problem solving skills in biology subjects. 58% strongly agreed with, 22% agreed, 15% Disagree and 5% Strongly disagree item 28 The use of laboratory facilities promotes student engagement with scientific method. 64% strongly agreed with, 13% agreed, 19% Disagree and 4% Strongly disagree item 29 Laboratory facilities encourage active learning and promote problem solving skills in biology subjects.

The student perception on their level of academic performance when laboratory facilities is further seen in the mean scores of 3.15, 3.10, 2.97, 3.12 and 3.10 respectively. The finding therefore indicated that availability and adequate use of laboratory facilities stimulate creativity, curiosity, critical thinking, promotes students' engagement with scientific method, encourage active learning and promotes socio-academic interaction among learners and their teachers in teaching and learning of biology subjects in senior secondary schools in Ilorin South Local Government Area of Kwara State.

Discussion of Findings

Research Question one, indicated that thermometer, microscopes, skeleton (model), demonstration table and chair, litmus paper, test tube and racks, beaker, safety googles, stirring rod, Bunsen burner, tripod stand and evaporating dish are the laboratory facilities available for teaching and learning of biology subjects in senior secondary schools in Ilorin south local government area of kwara state. The finding of this study is in contrast with the findings of Okoli and Osuafor (2010) who reported that almost all the required biology laboratory resources are not available in the schools. Among the resources they reported not available are: flask, tripod stand, models, fire extinguishers, filter papers, litmus papers, test tube stands and laboratory assistant, wall charts and dissecting kits. Furthermore, the finding is also in contrary with the findings of Mohanty (2007) who reported in his work on essential facilities for quality Bio-biology teaching in Secondary schools was undertaken to analyze the status of Bio-biology education in Secondary of Orissa.

Research Question 2 revealed that the available laboratory facilities such as thermometer, microscopes, skeleton (model), demonstration table and chair, litmus paper, test tube and racks, beaker, safety googles, stirring rod, Bunsen burner, tripod stand and evaporating dish are constantly used in teaching and learning of biology subjects in senior secondary schools in Ilorin south local government area of kwara state.. This finding against the finding of Onwachu (2011) who reported in her research work on Biology teacher's perception on the utilization of material resources as a way forward for effective Biology

education that material resources in Biology are rarely available in Secondary Schools and the available ones were rarely utilized.

Research Question 3 revealed that adequate use of laboratory facilities by students and teachers in teaching and learning of biology subjects stimulate creativity, curiosity, critical thinking, promotes students' engagement with scientific method, encourage active learning, and promotes socio-academic interaction among learners and their teachers, hence, a better performance in biology subjects.

This finding is in agreement with earlier findings by Pwal (2000), Rebecca (2010) and Udo (2011). According to Pwal laboratory equipment enhances learners' scientific understanding and interaction, with events and objects of performance of scientific interest' which in turn influences the performance of learners. Exposing students to adequately equipped laboratory leads to activity-based lesson in which case individuals will be able to actively participate and interact, thereby engaging in knowledge construction and acquisition of biology process skills and scientific attitudes. Furthermore, the finding is also in line with Okafor (2000), Adeyemi (2008), Cynthia and Megan (2008) and Ado (2009) who in their various reports asserted significant relationship between available laboratory facilities and performance of students in the SSCE.

Conclusion

Based on the summary of the findings, the following conclusions were made;

One of the findings revealed that 90.9% laboratory facilities and equipment's are available for teaching and learning of biology subjects in schools. From the point above, the researcher concluded that laboratory facilities are available for teaching and learning of biology subjects in senior secondary schools in Ilorin South Local Government area of Kwara State.

From the findings, it was revealed that laboratory facilities and equipment's are constantly in use for teaching and learning of biology subjects. From this point, the researcher concluded that laboratory facilities are constantly in use for teaching and learning of biology subjects in Ilorin South Local Government area of Kwara State.

Finally, one of the findings revealed that 95.2% the use of laboratory facilities stimulate creativity, curiosity, critical thinking, promotes students' engagement with scientific method, encourage active learning and promotes socio-academic interaction among learners and their teachers in teaching and learning of biology subjects. The researcher therefore concluded that the use of laboratory facilities stimulate creativity, curiosity and promotes socio-academic interaction among learners and their teachers.

Recommendations

The following recommendations were offered based on the findings of this study:

1. Government and school authorities should continue to provide and adequately maintain laboratory facilities and equipment in secondary schools in Ilorin South Local Government Area of Kwara State.
2. Biology teachers should be encouraged to sustain the regular and effective utilization of available laboratory facilities during practical and classroom instruction. 3. Students should be actively involved in laboratory practical activities to promote creativity, curiosity, critical thinking, and active learning.

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