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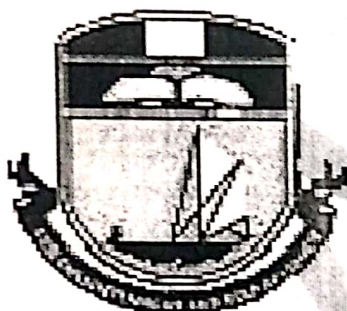
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**UNIVERSITY OF PORT HARCOURT
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**JOURNAL OF EDUCATION IN DEVELOPING AREAS
(JEDA)**

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The Journal of Education in Developing Areas (JEDA) is a journal of the Faculty of Education published twice (March and October), regularly; but occasionally thrice (November/December) in a year. The main focus of the journal is on education, with implications for developing areas. Its main objectives are:

- i. To provide a medium for the systematic analysis of contemporary educational theories and issues
- ii. To serve as a forum for the dissemination of research findings in the fields of education in developing areas
- iii. To provide a platform for the discussion of innovative ideas for the improvement of education in developing areas

In line with the above, the Editorial Board invites contributions (thoroughly researched theoretical and empirical papers) from scholars across the globe. Articles focusing on any aspect of education shall be considered for publication after being reviewed.

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**AVAILABILITY AND LEVEL OF USE OF LABORATORY FACILITIES IN
TEACHING AND LEARNING OF BIOLOGY IN SENIOR SECONDARY
SCHOOLS: IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT**

By

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Abstract

Students' poor performances in both internal and external examinations in Biology attracted concern from stakeholders in recent time. These poor performances have been linked to quality and quantity of instructions received by students and, particularly the use of laboratory facilities to enhance effective learning. This study was therefore conducted to investigate the availability and level of use of laboratory facilities in teaching and learning of biology in senior secondary schools in Ilorin, Kwara State, Nigeria. Being a descriptive study of survey type, the sample frame for the study consisted of 12 (public and private) secondary schools in Ilorin, Kwara State. The main instrument for the study was a researcher designed questionnaire which captured statements on availability and effective utilization of materials considered relevant for meaningful learning of Biology. Of all the recommended facilities as contained in the checklist obtained from West Africa Examinations Council (WAEC), fifty (50) basic facilities were investigated in this study. The findings of this study revealed that few of the facilities investigated were available in the schools. Hence, it was concluded that basic facilities were largely not available and, where available not properly utilized. Based on the findings, it was recommended that adequate use of instructional materials, particularly laboratory facilities that could enhance students' learning in secondary schools be emphasized and provided.

Introduction

Education is undoubtedly a key instrument for promoting economic development of any nation as it encompasses some processes which individuals must go through to help them develop and utilize their potentials (Adeyemi, 2011). Consequently, Nigeria, like any other country of the world placed significant importance on educating her citizenry and, in particular in sciences which is today adjudged an indicator of technological advancement and, measure of strength in the global interactions among committee of nations. According to Samba (2010), education in sciences is undeniably and unquestionably the key to national growth and prosperity being the foundation of sustainable development. Hence, the unequivocally position of science and technology in the National Policy on Education (FGN, 2004), that "a great proportion of educational expenditure will be devoted to science and technology".

Sciences, which basically comprises of Biology, Chemistry and Physics has been viewed as a body of knowledge, and a way of thinking in pursuit of an understanding of nature (Abimbola & Omosewo, 2006). These subjects, put together, are aimed at building and organizing knowledge in the form of testable explanation and prediction about the natural world. Biology is a subject that spreads across every aspect of human life, from the day of conception till death. Biology does not only serve as fundamental or requirement for further science study, but helps an individual to understand himself and the natural things in his environment. According to Adegbite (2005), Biology is defined as the basic science that deals with the study of living things. It is equally the basic science that deals with the study of living things, it attempts to understand the teeming diversity of life on earth, a diversity of level we are all part of. Life is not a simple concept, which may be one of the reasons why the teaching of biology is important (Adegbite, 2005). Biology being a core science subject serves as basis for which most of these technological advancement is built upon.

Unfortunately, the teaching and learning of biology as a core subject is yet to embrace the paradigm shift of deploying technology in education which largely is to demystifying rote learning but, encourage student-centered, activity-based and, mastery by doing learning (Owolabi, 2003). It implies drive to sustain interest contrary to Esiobu (2005) report of low interest in the subject and, produce truly scientific literate individuals given the connections of biology to disciplines such as Medicine, Pharmacy, Biochemistry, Plant Biology, Zoology and Veterinary Medicine to mention but few. This low interest of students in biology has been traced to poor achievement in examinations. In our march towards scientific and technological advancement and need nothing short of good achievement in biology at all levels of schooling. Folorunso (2004) linked poor achievement trend in biology particularly to the lack of instructional resources in schools due to poor funding of schools. The poor funding of schools has hindered the principals from providing the teachers with adequate instructional resources

Oluwole (2008), declared that only a little above fifty percent (50%) of secondary school leavers pass the Senior School Certificate Examination (SSCE) in biology at credit level. According to the scholar, poor academic achievement in Biology could also be attributed to many factors such as, low interest of students in biology, inadequate motivation from teacher, poor incentives to biology teachers, lack or inadequate supply of instructional material, inadequacy of qualified teachers and, use of abstract standardized materials. Among these factors, the poor state of laboratory facilities and inadequate use of instructional materials has constituted a cog in the wheel of students' achievement in Biology in the Senior School Examination (Mberekpe, 2013)

Isa (2007) quoted West African Examinations Council (WAEC) Chief Examiner's Report of 2002 which noted that despite the fact that there are improvements in the subject; students' performance in Biology is poor due to their inadequate exposure to practical work and their non-acquisition of relevant skills. Research works have shown that Biology enjoys much better patronage by the students

than Chemistry and Physics. However, the trends in the Senior Secondary School Certificate Examinations (SSCE) show that the failure rate is highest in Biology when compared to Chemistry and Physics. Oyedokun (2002) opined that poor result in Biology might be due to the fact that almost every students with or without ability is enrolled for the subject. It has been observed that poor performance in sciences is caused by poor quality of Science teachers, overcrowded classrooms and lack of suitable and adequate science equipment (Yusuf & Afolabi, 2010).

According to Yusuf and Afolabi, students perform poorly in Biology because Biology classes are usually too large and heterogeneous in terms of ability level. In addition to that, the laboratories are ill equipped and the syllabus is overloaded (Ajayi, 1998 & Ahmed, 2008). On the other hand, lack of adequate facilities such as textbooks, ill-equipped classrooms, laboratories, workshops and libraries are among the probable causes of students' poor performance in examination (Olubor, 1998). According to Fabayo (1998) and Oyebola, (2008) low level students' academic performance is related to the decline in the availability of teaching resources in our schools. Ugbaja (2008) observed that over the years the performance of the students has not been impressive as evidenced from the School Certificate Examination results of the West African Examinations Council (WAEC) and National Examinations Council (NECO). Ihuarulam (2008) was of the opinion that the poor performances in the Biology and in other Science subjects have been attributed to quality of teachers and available learning resources. Oyebola (2008) observed that certain factors that influence academic performances are poor physical environment, shortage of personnel, learning facilities and poor quality of teaching. Ihuarulam (2008) identified other factors that influenced poor academic performance of students as overcrowded classrooms, lack of laboratories, inadequate instructional materials and poor library facilities.

Ugbaja (2008) affirmed that there is a sharp fall in students' performance in Biology. The reason advanced for this sharp fall is due to poor qualities of some laboratories or teachers avoidance of teaching certain topics in the syllabus. Ihejirika (2010) opined that some studies have demonstrated that students' academic performance in Senior Secondary School Certificate Biology and other Science subjects examination since eighties have remained poor. The researcher quoted Ukaegbu (2006) who reported that only 34%, 32%, and 35% of the entire candidates who participated in the West African School Certificate Examination (WASCE) in 2001, 2002 and 2003 respectively obtained five credits and above. Among the reasons listed for the poor performance are poor use of Biology terminology, poor diagrams, careless drawing and labeling, incompetence and laziness on the part of the teachers.

Ihejirika (2010) reported that candidates' performance was worst in Biology with 49.1% passes, compared with 55.4% passes in Chemistry and 62.5% passes in Physics. While Hills (2009) in Ihejirika (2010) attributed poor academic performance of students in Biology to poor state in which science is being taught in schools. "Chalk and talk" method has been the most widely used science teaching due to poor quality laboratory, large class size and much work load on the teachers.

Mutebi and Matora (1994) have emphasized the effect of laboratory facilities utilization on teaching and learning. In their submission, students learn and remember 10% of what they hear, 40% of what they discuss with others and, as high as 80% of what they experience directly or practice. Laboratory facilities are materials which assist teachers to make their lessons explicit to learners. Laboratory facilities are also used to transmit information, ideas and notes to learners.

Learning occurs when many different types of laboratory facilities are used each for its valuable but not necessarily unique contributions. The availability of instructional material as a factor influencing the effective utilization of instructional material in teaching and learning have shown that in a situation whereby relevant laboratory facilities are absent in a school, even if available, some do not know how to operate them. The use of laboratory facilities in the teaching and learning of biology is undoubtedly

beneficial; it makes the teaching and learning process easier, interesting and rewarding. Despite all the benefits received from the use of laboratory facilities in the classroom, some biology teachers are not keen on using them. Several reasons are responsible; some of them are teachers who do not know how to operate some of the materials like computers, projectors and PowerPoint presentation, non improvisation and inappropriate use of laboratory facilities and so on.

Biology laboratory resources had been categorized into two namely: human and material resources. These human resources include teachers, learners, resource persons, laboratory assistants and technologists together with other non-professional personnel (Okoli & Osuafor, 2010). Biology laboratory material resources also bear educational terminologies like: instructional materials, teaching materials, educational media, teaching aids, instructional facilities and instructional media.

The success of any lesson therefore depends on a resourceful teacher who plans the laboratory facilities to be used for the teaching and learning of the subject. Sadly to observe however that, laboratory facilities are not readily available in most secondary schools and so, no effective usage and the resultant effect is likely that the teaching and learning process is grossly compromised. Consequently, just very few studies seems to have established this fact, this study fills a gap in knowledge as it seeks to examine the extent of availability and utilization of laboratory facilities in teaching and learning of biology in senior secondary schools. Efforts were made to know the extent, to which teachers incorporate some of these laboratory facilities, in the teaching and learning of biology in senior secondary schools.

Research Questions

The following questions were raised to guide the study:

1. What are the recommended laboratory facilities for teaching and learning of senior school biology?
2. To what extent are the recommended biology laboratory facilities available for teaching and learning of biology?
3. To what extent are the available laboratory facilities used for the teaching and learning of biology?
4. Is there any difference in the utilization of biology laboratory facilities by private and public schools?

Methodology

The target population was all senior secondary biology class teachers in Ilorin, Kwara State, Nigeria. However, due to constraints, a total of twelve (12) schools comprising of both private and public- owned schools operating co-educational system of not less than five years of teaching experience were purposively sampled. The research was a descriptive study of survey type. The data were collected from a sample of 12 biology teachers drawn from 12 secondary schools (private and public) in Ilorin Kwara State. The instrument used for this study was a researcher developed questionnaire. The questionnaire contained two sections: section A delved on teacher's personal data while section B was on some basic laboratory facilities selected from a standard checklist as recommended by West Africa Examination Council for teaching biology. The laboratory facilities were categorized into Equipment, Reagents, Prepared slides, Charts and Plastic Models and Mammalian bones. The data collected were statistically analyzed using frequency count and percentage.

Results

Research Question One: What are the specified laboratory facilities for teaching and learning of senior school biology?

Based on the field survey and checklist obtained from WAEC Office, basic facilities and quantity required for effective teaching and learning of Biology as investigated in this study are presented in table 1.

Table 1: *Basic facilities recommended by WAEC for Biology teaching at Senior Secondary school level*

Laboratory Facility	Quantity Required
White board	1
Microscopes	5
Boiling tubes	144
Beakers	100
Filter paper	15
Dissecting kit	5
Evaporating dish	150
Hand lens	50
Watch glasses	50
Specimen bottles	50
Plant pots	40
Heating source(bunsen burner)	50
Clamps(Retort stand)	15
Flask – Vacuum	2
Glass rod	50
Bell Jars	10
Conical Flask	10
Measuring Cylinders	30
Crucible tongs	30
Round & Flat bottom Flasks 250ml	10

Source: *Checklist from West Africa Examinations Council (WAEC) Ilorin Office*

Research Question Two: To what extent are the specified biology laboratory facilities available for teaching and learning of biology?

Tables 2, 3, 4 and 5 provided relevant information on analysis carried out with respect to the extent of availability of the recommended facilities investigated in this study. In line with the instrument, the analysis was done based on categorization of the facilities (equipment, reagents, prepared slides and charts/plastic model) and, on the basis of school proprietorship (public and private). Specifically, table 2 reveals similar pattern in the availability of the facilities irrespective of the school proprietorship. This is particularly for equipment and reagents. The implication of this is that many of the schools sampled may not be exposing students to required practical sessions that could aid students' understanding and mastery of concept(s) been taught in preparation for internal and external examinations.

On prepared slides as shown on table 4, it could be inferred that most schools have poor disposition towards making available prepared slides for teaching and learning process as the schools sampled have less than quantity required with respect to prepared slides. This finding is similar to that of charts/plastics model. Hence, supply of needed knowledge for mastery of concept taught may be difficult and, in turn hindered desired good performance on the part of the students.

Table 2: Analysis of availability of recommended biology laboratory facilities for teaching and learning of Biology based on school proprietorship

Laboratory facility	QRD	Public Schools						Private Schools					
		A	B	C	D	E	F	A	B	C	D	E	F
White board	1	3	3	1	2	0	0	0	2	20	1	0	2
Microscopes	5	10	10	14	4	10	8	8	6	5	15	50	2
Boiling tubes	144	150	60	250	20	100	200	100	100	50	138	10	40
Beakers	100	50	60	250	15	80	80	50	50	50	200	3	20
Filter paper	15	10	20	5	20	2	4	4	10	5	20	4	10
Dissecting kit	5	3	2	5	2	0	2	2	2	2	4	0	4
Evaporating dish	150	100	80	70	1	50	0	60	60	5	80	4	30
Hand lens	50	50	20	100	10	10	10	10	10	20	8	0	15
Watch glasses	50	50	0	10	0	25	0	20	20	4	40	5	20
Specimen bottles	50	100	40	180	20	20	50	40	20	10	35	0	15
Plant pots	40	20	5	0	0	0	40	15	10	0	0	2	10
Heating source(bunsen burner)	50	20	15	15	2	10	2	30	10	30	13	3	10
Clamps(Retort stand)	15	10	10	35	30	25	40	20	10	50	30	0	5
Flask – Vacuum	2	1	4	1	1	0	0	3	0	1	4	1	3
Glass rod	50	50	30	30	1	100	0	40	10	1	10	0	15
Bell Jars	10	4	5	2	1	4	0	5	5	1	4	0	5
Conical Flask	10	20	5	10	3	25	20	15	10	50	15	6	5
Measuring Cylinders	30	15	10	50	2	15	20	20	10	15	22	3	5
Crucible tongs	30	20	15	10	4	2	5	20	10	15	25	1	5
Round & Flat bottom Flasks 250ml	10	10	10	2	1	30	5	20	20	4	20	0	2

Source: Researchers' fieldwork, 2016 ; key : QRD – Quantity Required

Table 3: Analysis of available laboratory facilities (Reagents) for teaching and learning of Biology

Laboratory facility	QRD	Public Schools						Private Schools					
REAGENTS		A	B	C	D	E	F	A	B	C	D	E	F
Fehling solution	2.5L	2	1	2.5	1	0	0	2	2	0.5	4	1	2.5
Millions reagents	1L	1	1	500	0.5	0	0	2	2	2	2	1	1
Hydrochloric acid	2.5L	5	2	5	1	3	0	1	2	0.5	1	2	2.5
Agar powder	500g	100	300	0	150	0	0	200	200	10	200	500	0
Potassium Iodide	500g	100	500	0	200	2	0	200	200	10	300	200	500
Sodium sulphate	500g	150	200	500	200	25	0	200	200	10	500	300	500
Starch soluble	250g	150	200	250	100	0	0	100	100	10	100	0	250
Xylene	500ml	100	200	0	50	0	0	300	100	0	500	0	500

Commercial Yeast	200ml	100	250	0	50	0	0	200	100	0	500	0	200
Zinc sulphate	250g	100	150	0	100	0	0	100	200	250	250	150	250

Source: Researchers' fieldwork, 2016 ; key : QRD – Quantity Required

Table 4: Analysis of available laboratory facilities (Prepared slides) for teaching and learning of Biology

Laboratory facility	QRD	Public Schools						Private Schools					
Prepared slides		A	B	C	D	E	F	A	B	C	D	E	F
T.S dicotyledonous root	50	25	0	10	0	0	0	1	2	1	12	0	20
Spirogyra	50	30	0	10	0	0	0	0	1	1	12	0	20
T.S monocotyledonous root	50	15	0	10	0	0	0	1	0	1	12	0	20
Plant cell	50	30	0	10	0	0	0	0	0	1	12	0	10
Animal cell	50	30	0	10	0	0	0	0	0	1	12	0	10
Paramecium	50	30	0	10	0	0	0	0	0	1	12	0	5
Amoeba	50	25	0	10	0	0	0	0	0	1	12	0	5
Blood cells	50	20	0	10	0	0	0	0	0	1	12	0	2
Euglena	50	25	0	10	0	0	0	0	0	1	12	0	2
T.S of Leaf	50	30	0	10	0	0	0	1	0	1	12	0	10

Source: Researchers' fieldwork, 2016 ; key : QRD – Quantity Required

Table 5: Analysis of available laboratory facilities (Charts / Plastic Model) for teaching and learning of Biology

Laboratory facility	QRD	Public Schools						Private Schools					
Charts/plastic model		A	B	C	D	E	F	A	B	C	D	E	F
Human Skeleton	1	2	2	1	1	1	1	1	1	1	2	1	0
Ear	1	1	1	1	1	1	1	1	1	1	1	2	0
Eye	1	1	1	1	1	1	1	1	1	1	1	2	0
Baby in the uterus	1	1	1	0	1	0	0	1	0	1	1	1	0
Human brain	1	1	1	2	1	0	0	1	1	1	1	1	0
Arms bones	1	1	2	0	1	0	2	2	0	1	1	1	0
Scapula	1	1	2	0	1	1	10	2	0	1	1	1	0
Leg bones	1	1	2	0	1	0	1	2	0	1	1	1	0
Pelvic girdle	1	1	2	0	1	0	1	2	1	1	1	1	0
Vertebra columns	1	1	1	1	10	0	1	2	0	0	1	1	1
Types of Joint	1	1	1	0	10	0	1	0	0	0	1	1	0
Reproductive systems	1	1	1	0	1	0	1	1	1	0	1	1	0
Flower structure	1	1	1	1	1	1	1	1	1	0	2	0	1
Parts of a flowering plant	1	1	1	1	1	1	1	1	0	0	2	0	1

Source: Researchers' fieldwork, 2016 ; key : QRD – Quantity Required

Research Question 3: To what extent are the available laboratory facilities used for the teaching and learning of biology?

Tables 6, 7, 8 and 9 summarized various levels of use of the facilities. Based on responses on the equipment which represents over 50% regular use of items listed, it could be deduced that there is an appreciable level of use of laboratory equipments as revealed in the responses of the sampled schools. On reagents, respondents varied significantly on the use of the available facilities as over 41.7% of the respondents agreed only on either the regular use or seldom use of the following reagents: Fehling solution; Millions reagents; Hydrochloric acid and Potassium Iodide.

As shown on table 8, over 50% of the respondents agreed to the none use of the following prepared slides which means that there is generally poor /low use of prepared slides for the teaching of biology as obtained from the responses of the sampled schools while similar results were obtained in the case of use of charts/plastic models where only over 50% also agreed to the regular use of the charts/plastic models; commonly used charts includes Human Skeleton, Ear, Eye and, Baby in the uterus. This implies that the use of charts/ plastics models for the teaching of Biology is very encouraging as demonstrated from the responses of the sampled schools.

Table 6: Level of utilization of laboratory facilities (equipment) for teaching and learning of Biology

Equipment	Regularly used		Not used		Seldom used		Total	
	Fre	%	Fre	%	Fre	%	Fre	%
White board	7	58.3	4	33.3	1	8.3	12	100
Microscopes	8	66.7	1	8.3	3	25	12	100
Boiling tubes	11	91.7	0	0	1	8.3	12	100
Beakers	11	91.7	0	0	1	8.3	12	100
Filter paper	9	75	0	0	3	25	12	100
Dissecting kit	7	58.3	2	16.7	3	25	12	100
Evaporating dish	6	50	3	25	3	25	12	100
Hand lens	8	66.7	0	0	4	33.3	12	100
Watch glasses	5	41.7	3	25	4	33.3	12	100
Specimen bottles	10	83.3	0	0	2	16.7	12	100
Plant pots	10	83.5	0	0	2	16.7	12	100
Heating source (Bunsen burner)	10	83.3	1	8.3	1	8.3	12	100
Clamps (Retort stand)	10	83.3	0	0	2	16.7	12	100
Flask – Vacuum	5	41.7	5	41.7	2	16.7	12	100
Glass rod	7	58.3	2	16.7	3	16.7	12	100
Bell Jars	3	25	5	41.7	4	33.3	12	100
Conical Flask	10	83.3	1	8.3			12	100
Measuring Cylinders	10	83.3	0	0	2	16.7	12	100
Crucible tongs	8	66.7	2	16.7	2	16.7	12	100
Flasks (Round bottom & Flat bottom)	10	83.3	1	8.3	1	8.3	12	100
250ml								

Source: Researchers' Fieldwork, 2016

Table 7: Level of utilization of laboratory facilities (reagents) for teaching and learning of Biology

Reagents	Regularly used		Not used		Seldom used		Total	
	Fre	%	Fre	%	Fre	%	Fre	%
Fehling solution	5	41.7	2	16.7	5	41.7	12	100
Millions reagents	5	41.7	2	16.7	5	41.7	12	100
Hydrochloric acid	8	66.7	1	8.3	3	25	12	100
Agar powder	4	33.3	4	33.3	4	33.3	12	100
Potassium Iodide	5	41.7	1	8.3	6	50	12	100
Sodium sulphate	3	25	2	16.7	7	58.3	12	100
Starch soluble	4	33.3	4	33.3	4	33.3	12	100
Xylene	4	33.3	4	33.3	4	33.3	12	100
Commercial Yeast	3	25	3	25	6	50	12	100
Zinc sulphate	2	16.7	5	41.7	5	41.7	12	100

Table 8: Level of utilization of laboratory facilities (prepared slides) for teaching and learning of Biology

Prepared Slides	Regularly used		Not used		Seldom used		Total	
	Fre	%	Fre	%	Fre	%	Fre	%
T.S dicotyedonous root	4	33.3	5	41.7	3	25	12	100
Spirogyra	4	33.3	6	50	2	16.7	12	100
T.S monocotyedonous root	3	25	6	60	3	25	12	100
Plant cell	2	16.7	6	50	4	33.3	12	100
Animal cell	2	16.7	6	50	4	33.3	12	100
Paramecium	2	16.7	6	50	4	33.3	12	100
Amoeba	2	16.7	6	50	4	33.3	12	100
Blood cells	2	16.7	6	50	4	33.3	12	100
Euglena	2	16.7	6	50	4	33.3	12	100
T.S of Leaf	2	16.7	5	41.7	5	41.7	12	100

Source: Researchers' Fieldwork, 2016

Table 9:

Level of utilization of laboratory facilities (charts/plastic model) for teaching and learning of Biology

Charts/plastic models	Regularly used		Not used		Seldom used		Total	
	Fre	%	Fre	%	Fre	%	Fre	%
Human Skeleton	9	75	1	8.3	2	16.7	12	100
Ear	9	75	1	8.3	2	16.7	12	100
Eye	9	75	1	8.3	2	16.7	12	100
Baby in the uterus	5	41.7	5	41.7	2	16.7	12	100
Human brain	6	25	3	25	3	25	12	100
Arms bones	7	58.3	3	25	2	16.7	12	100
Scapula	8	66.7	2	16.7	2	16.7	12	100
Leg bones	7	58.3	3	25	2	16.7	12	100
Pelvic girdle	8	66.7	2	16.7	2	16.7	12	100
Vertebra columns	7	58.3	3	25	2	16.7	12	100
Different types of Joint	6	50	4	33.3	2	16.7	12	100
Reproduction system	5	41.7	3	25	4	33.3	12	100

Man and Woman						33.3	12	100
Flower structure	5	41.7	3	25	4	16.7	12	100
Parts of a flowering plant	9	75	1	8.3	2			

Source: Researchers' Fieldwork, 2016

Research Question 4: *Is there any difference in the utilization of biology laboratory facilities by private and public schools?*

Results emanating from analysis and interpretation of responses based on research questions 2 and 3 show no significant disparity in the utilization of biology facilities by either public or private school biology teachers. Although, the teachers varied on the use of prepared slides and charts/plastics model, it was still not statistically significant as the outcomes followed similar pattern for equipment and reagents which are pivotal to effective teaching and learning of biology.

Discussion

Findings from this research revealed that majority of sampled schools have less than the required amount (QRD) of laboratory equipments while a few recorded a number more than the required. There was also a noticeable non-availability of plant pots by majority of the sampled public and private school. This finding corroborated the submission of Aromolaran (2003) who noted that the lack of laboratory facilities for teaching and learning was a significant problem in the Nigerian education system.

Similar finding was revealed for laboratory reagents as obtained in table 3. The table revealed a poor degree of availability of laboratory reagents by public schools while an average degree of availability by private schools. Generally, all the sampled schools have less than the required amount (QRD) of laboratory reagents. There was also a noticeable non-availability of all listed reagents by one of the sampled public schools. This finding lends credence to the assertion of Folorunso (2004) who opined that poor achievement trend in biology particularly has linked to the lack of instructional resources in schools. Similar findings were obtained on the availability of charts/plastics models and prepared slides for the teaching and learning of Biology.

It was the aim of the research to investigate the level of use of laboratory facilities in Ilorin metropolis. The findings of this research revealed that the level of use of laboratory materials by both private and public are similar. It is revealed from the finding of this study that majority of the respondents (over 50%) agreed to the use of white board, Boiling tubes, microscopes, beakers, Filter paper, Dissecting kit, Evaporating dish, Hand lens, Specimen bottles, Plant pots, Heating source(Bunsen burner), Clamps(Retort stand), Flask – Vacuum, Glass rod, Conical Flask, Measuring Cylinders, Crucible tongs and Flasks (Round bottom & Flat bottom) 250ml while majority agreed to either the no use or seldom use of Bell jars and watch glasses. This however justifies Bajah's (1984) reasons for using laboratory facilities. Similar trend was obtained on the use of prepared slides, charts/plastics models for the teaching and learning of Biology while table 9 revealed that over 41.7% of the respondents agreed on either the regular use or seldom use of the following reagents: Fehling solution, Millions reagents, Hydrochloric acid, Potassium Iodide. The respondents vary in their agreement on the use of the following reagents: Agar powder, Starch soluble and Xylene while majority of the respondents agreed to not using or seldom use of Zinc sulphate. Variation was obtained on the use of reagents. This finding lends credence to the findings of Ugbaja (2008) who noted that there is a sharp fall in students' performance in Biology due to poor qualities of some laboratories or teachers' avoidance of teaching certain topics in the syllabus

Implications and Recommendations

From the findings of this study, it could be concluded that majority of the secondary schools sampled have inadequate availability of the laboratory facilities for the teaching and learning of Biology. It could also be concluded that the sampled schools reported a regular or seldom use of laboratory facilities where available. However, there was no detectable difference in the availability of laboratory facilities by both public and private schools. This however, lends credence to the suggestion that poor academic performance of students in biology is much affected by lack of laboratory facilities in both public and private schools

Based on the findings of this study, it is recommended that:

1. The government should pay great attention to the availability of laboratory facilities by providing these facilities to schools.
2. State ministry of education and other agencies should priorities the adequate availability of laboratory facilities in the approval or accreditation process of such schools especially for the writing of NECO and WAEC which are the two main examination bodies in Nigeria for the certification of secondary school students.
3. Teachers should be encouraged through in-service /refreshers courses aimed at educating and motivating them on the use of laboratory facilities.
4. School authorities should seek for donations of instructional materials and laboratory facilities from philanthropic individuals and corporate bodies within and outside Nigeria. Rehabilitation of existing and acquisition of new of new materials should be given a priority.

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