

**STUDENTS' VARIABLES AS PREDICTORS OF ACADEMIC
ACHIEVEMENT IN BIOLOGY IN SENIOR SECONDARY SCHOOLS,
IMO STATE, NIGERIA**

Ph.D ORAL DEFENCE

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CERTIFICATION

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DEDICATION

This research work is dedicated to the Almighty God who guided and protected me throughout the duration of the project.

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ABSTRACT

The importance of Biology is obvious in all realms of human endeavours. However, Senior School students' academic achievement in Biology has been reported by Chief Examiners for Biology to be unsatisfactory. The unsatisfactory academic achievement has also been attributed to variables that include teachers, students and others. Hence, this study examined students' variables as predictors of students' academic achievement in Biology. The objectives of this study were to determine whether students' (i) motivation, study habits, attitude, interest and absenteeism are predictors of academic achievement in Biology; (ii) motivation is a predictor of academic achievement in Biology; (iii) study habits is a predictor of academic achievement in Biology; (iv) attitude towards Biology is a predictor of academic achievement in Biology; (v) interest is a predictor of academic achievement in Biology; and (vi) absenteeism is a predictor of students' academic achievement in Biology.

The study was a descriptive research of the correlation survey type. The population of the study consisted 386,760 Senior School students in all 296 senior secondary schools, Imo State, Nigeria. A sample size of 900 Biology students drawn from 100 senior secondary schools was selected through simple random sampling techniques. Four adapted research instruments were used to collect data and were tagged; Students' Motivation in Biology Scale (SMBS), Students' Study Habits in Biology Scale (SSHBS), Students' Attitude toward Biology Scale (SATBS) and Students' Interest in Biology Scale (SIBS). They were validated by experts in science education, measurement and evaluation and Biology giving reliability coefficients 0.89, 0.76, 0.74 and 0.83 respectively. Simple and multiple regressions were the statistical tools used for data analysis. The hypotheses were tested 0.05 levels of significant.

The findings of the study were:

- i. motivation, study habits, attitude, interest and absenteeism significantly predicted academic achievement in Biology in senior secondary school ($R^2 = .68$, $F_{(1, 898)}=317.77$, $p<0.05$);
- ii. motivation significantly predicted academic achievement of senior secondary school Biology students ($B=.30$, $t_{(898)}=9.12$, $p<0.05$); ($R^2 = .10$, $F_{(1, 898)}=94.47$, $p<0.05$);
- iii. study habits significantly predicted academic achievement of senior secondary school Biology students ($B=.56$, $t_{(898)}=14.90$, $p<0.05$); ($R^2 = .20$, $F_{(1, 898)}=222.02$, $p<0.05$);
- iv. attitude toward Biology significantly predicted academic achievement of senior school Biology students ($B=.50$, $t_{(898)}=13.74$, $p<0.05$); ($R^2 = .17$, $F_{(1, 898)}=188.68$, $p<0.05$);
- v. interest significantly predicted academic achievement in senior secondary school Biology students ($B=.66$, $t_{(898)}=16.62$, $p<0.05$); ($R^2 = .24$, $F_{(1, 898)}=276.16$, $p<0.05$); and
- vi. absenteeism significantly predicted academic achievement in senior secondary school Biology students ($B=-.77$, $t_{(898)}=-39.39$, $p<0.05$); ($R^2 = .63$, $F_{(1, 898)}=1551.2$, $p<0.05$).

The study concluded that motivation, study habit, attitude toward Biology, interest, and absenteeism enhanced the achievement of Biology students. This implies that if properly implemented, these variables would enable students to improve their academic achievement. The study recommended that intrinsic motivation, good study habits, positive attitude toward Biology, high interest and high rate of class attendance should be enforced on students.

Word Count: 448

CHAPTER ONE

INTRODUCTION

Background to the Problem

Science and technology play critical roles in nations' growth and development. Scientific knowledge is therefore crucial at secondary schools in order to enable students fit into the global competitiveness in science and technology. Secondary school is the second-tier of an educational system which prepares students in various science subjects such as biology, chemistry and physics for such global competitiveness and further studies in tertiary institutions. These subjects when taught very well at this level, forms the bedrock for the study of science courses and technological advancement of any nation. In addition, the teaching and learning of science and technical subjects are extensively becoming an integral part of worlds' culture for the purpose of training out great scientists (Metafilter, 2008)

Science is a body of knowledge acquired through systematic investigation, observation and logical thinking in view of understanding the natural phenomena (Abimbola, 2013). Indeed, every nation requires the teaching of science and technology to her citizens to overcome economic recession, health problems and poor educational status. In addition, Brotherton (2010) opined that science help us to understand ourselves and our functions on earth, the spread of dreaded diseases and how to cure them, how to communicate using radio, television and Mobile phones and how to control our environment.

In Nigeria, much emphasis had been laid on science and technology education for the purpose of scientific and technological development. The goals of science education as stated in National Open University of Nigeria (NOUN) include;

- (a) “ cultivating inquiry knowledge and rational mind for the conduct of good life and democracy,
- (b) producing scientists for national development,
- (c) encouraging studies in science and technology and enhance technological development,
- (d) acquainting the students with certain basic knowledge, skill and attitude (NOUN,2004)

Henceforth, the purpose of the federal government of Nigeria in establishing educational institutions including secondary schools is to achieve the above goals. Biology is one of the science subjects taught in the senior secondary Schools for the purpose. It is the study of living things. The important of biology in the society cannot be over-emphasized. It is the prerequisite for the study of courses like biology education, botany, zoology, medicine and Nursing (Nwagbo & Uzoamaka, 2011). Biology as a subject exposes student to various ways of combating dreaded diseases, family planning techniques, personal hygiene and the use of natural herbs as curative drugs. With adequate knowledge of biology, human beings live longer,

healthier, manage the environment; prevent obesity, hypertension and loss of weight.

However, the successful mastery of biology concepts by students may depend mainly on variables such as motivation, study habits, attitude, interest, Absenteeism (Ajaja, Empero & Onwuegbu, 2007). Among all the student variables, attitude immensely influences academic achievement of students. Attitude is a psychological construct that portrays persons' like and dislike towards an object, item, environment or people (Gul & Arshad, 2012).

According to Mensa (2013) attitude is psychological construct developed as a result of one's experience which influences persons' view of conditions, things or objects and how to respond to them either positively or negatively. Dennis (2016) opined that somebody's attitude is either a lock on or a key to the door of one's success. Positive attitude of science students beget positive thoughts, events and outcome while negative attitude on the other hand paves way for negative outcome. The attitude toward science embraces component factors such as the perception of the science teacher, anxiety toward science, attitudes of peers and friends towards science, the nature of the classroom environment, achievement in science and fear of failure on course (Osborne, Simon, Collins, 2003).

However, fear of failure can be eroded through the development of students' interest in Biology. In the work of Okoro (2012) interest is the force that motivates an individual to do what he/she wants to do when he is given the

chance or privilege. Furthermore, Okoro (2012) opined that interest connote absolute absorption, willingness and effective participation in events and lessons by students. Students' interest in biology is strengthened by the relationships that exist between teachers and students. If the relationship that exists between teacher and student is cordial, the interest in biology will be high and sustained. Furthermore, the researcher is of the view that if teachers motivate students, use related instructional materials, good specimens, functional equipment and different instructional strategies, the classroom environment will become attractive and interesting.

The major determinants of students' academic achievement or failure in biology are the levels of students' interest and study habits in the subject (Mkparo, 2006). Study habit is the articulated manner of comprehending concepts read. Study habit had been defined as the combination of study attitude, study methods and study skills (Grace, 2013). Positive study habits impact tremendously on academic achievement of students in science (biology). Retrogression in academic achievement of students in biology had been attributed to poor study habits by students (Anton, 2018). The researchers further emphasized that if students are able to develop positive study habits, they will remarkably perform excellently well in their academic pursuit. This means application of cognitive, psychomotor and affective domain.

In addition, the possibility of students to appropriately assimilate course content, digest it, reflect on it and be able to articulate the information in written

or oral form, depend on positive study habit (Kelli, 2009). Furthermore, Ashish (2013) stated that for students to ensure academic success throughout the entire year of their study, it is important to avoid bad study habit and adopt good ones. Positive study habits should be an integrate part of students so as to succeed in their academic endeavour in respective of gender.

Gender as opined by Yang (2010) is the social attributes and opportunities concerned with being male or female and the relationships between women and men, girls and boys. Gender can be defined as the classification based on male and female. A lot of studies have shown some academic achievements, interest and attitude of boys and girls toward biology. Ogunleye and Babajide (2012) opined that boys have natural positive attitude towards technical and science subjects while girls show negative attitude. It has also been reported by Khwaileh and Zaza (2011) that males were saddled with complex and difficult tasks inside and outside home while girls' handled relative easy and less demanding tasks at home. The academic achievement is free of gender influence as reported by (Kolawole & Popoola, 2011).

Attendance register is one of the statutory records kept in the secondary schools for the purpose of daily recording of student's attendance. The attendance register has columns where the class teacher mark present or absent for daily school attendance of students. The students that were not in the classroom when the teacher called the names are regarded as being absent. Class absence has been defined as the period students are not in the school (Longman

Dictionary of Contemporary English, 2009). The cumulative percentage of absenteeism is usually computed at the end of the session. The cumulative absenteeism of ten percent (10%) and below is regarded as being chronic (Katelyn, 2013).

Chronic absenteeism is the periods when students are absent in school which includes excused and unexcused absence that amount to 10% or below. Absenteeism is a common phenomenon found among the male and female students. The female absenteeism matters most because of their involvement in domestic activities which keep them out of school. Absenteeism had been identified as the major factor that contribute to decline in learning which leads to poor academic performance among students (Oluremi, 2013). According to Pect (2002) the various behavioural disorder exhibited by students such as rape, armed robbery, school dropout, drug abuse, Examination malpractice, kidnapping and cultism had been linked to retrogression in academic achievement, teaching and learning process in such a way that teachers are helpless and disorganized in their course of teaching.

Ubogu (2004) enumerated the causes of absenteeism as illness, peer group influence, socio economic status of parents and geographic area. Other factors identified were institutional based factors such as bullying by students and teachers, administration of corporal punishment by teachers, poor teaching methods, lack of guidance and counselling in schools and strikes by teachers Zhou et al (2016) in their study found out that students with higher GPAS

attended classes at a higher rate as compared to students who exhibit chronic absenteeism. The rate of absence among underachiever had been discovered to be consistently higher than the moderate and higher achievers groups. The absenteeism could therefore be classified as being chronic, severely, excessively and not at all (Balfanz & Byrness, 2012).

One of the school factors that accounts for students' academic achievement is motivation. Motivation is the force that exerts willingness towards the accomplishment of one's goal (Silvapakian&Nalinilatha, 2017). Motivation is classified into intrinsic and extrinsic motivation. The intrinsic motivation is one's internal force which propels him or her into emitting certain behaviour (Noun, 2009). The extrinsic motivation is powered by rein forcers such as material and verbal rein forcers (Silvapakian & Nalinilatha, 2017).

Ajaja, Emperor and Onwuegbu (2007) opined in their study that motivated students performed significantly better than the unmotivated students. Their study further showed that the motivated students in single sex schools significantly do better than their counterparts in mixed schools. Motivation includes, but not limited to, all the reasons which cause a person to act, including the negative ones like fear and the more positive motives such as money, promotion and recognition (John, 2009). Motivated students set goals which are achieved through hard work and persistence. If motivation and scientific attitudes are jealously combined, the academic achievements of students are assured.

Academic achievement can rightly be defined as the ability of students to fully accomplish the requirements of examinations and pass successfully. Adeyemi (2010) found out that there is a serious decline in students' academic achievement in senior secondary school certificate examinations in Nigeria. Adeyemi's view is further revealed on Table 1 of this study which depicts the trends of enrollment, credit passes and percentage passes at credit level of students in West African Senior School Certificate Examinations (WASSCE) in biology, chemistry and physics from 2010 to 2019. A close examination of the table and line graph below showed relatively progressive increase in enrollment and performances of students in the science subjects from 2010-2019, probably due to free education policy of some states in Nigeria such as Imo state.

The enrolment which dropped slightly in 2016 may be as a result of negative attitude of some students towards education. The decrease can also be attributed to lack of job and economic recession in the country where parents cannot cope with training their children in schools. The increase in enrolment for the nine year could be as a result of students choosing biology as the easiest science subject. According to Ukwewe (2012) students' enrolment in biology is not because of attached interest and academic achievement but whenever they compare biology to chemistry and physics they consider biology easiest. There was also progressive improvement in performance of students in biology for the ten years too. Even though there is improvement in recent time in the academic achievement of students, there is still room for much improvement. The interest

to gain admission into tertiary institutions must have motivated them to study very hard and perform better.

For the ten years period, chemistry and physics had similar improvement in enrolment and academic performances. The interest to gain admission into institutions and obtain good certification could have been the cause of the improvement. One of the bases for gaining admission into the high institution in Nigeria is to pass at credit levels in five relevant subjects which include the science subjects such as biology, chemistry and physics for science courses

Table 1

Showing students' Enrollment and Performances in WASSCE in Biology, Chemistry and Physics

Year	Biology			Chemistry			Physics		
	Total Entry	Credit Passed (A1-C6)	% Pass	Total Entry	Credit Passed (A1-C6)	% Pass	Total Entry	Credit Passed (A1-C6)	% Pass
2010	1,300,418	427,644	32.88	465,644	263,059	50.70	463,755	237,756	51.27
2011	1,505,199	79,432	38.50	565,692	280,280	49.54	563,161	360,096	63.94
2012	1,646,150	587,044	35.66	627,302	270,570	43.13	624,658	429,415	68.74
2013	1,648,363	852,717	51.73	639,296	462,517	72.34	637,023	297,988	46.77
2014	1,365,384	766,971	56.17	636,268	397,649	62.49	635,729	386,270	60.76
2015	1,390,234	798,246	57.42	680,357	412,323	60.60	684,124	410,543	60.01
2016	1,200,367	740,345	61.68	706,873	408,122	57.74	705,125	415,655	58.95
2017	580,449	394,898	68.03	377,970	320,635	84.83	377,851	205,757	54.45
2018	1,087,063	679,299	62.48	728,551	424,231	58.22	728,354	571,687	78.49
2019	1,033,304	775,103	75.01	726,132	566,156	77.96	725,853	565,746	77.94

Source: WAEC Office, Yaba, Lagos State, Nigeria (Statistical Section).

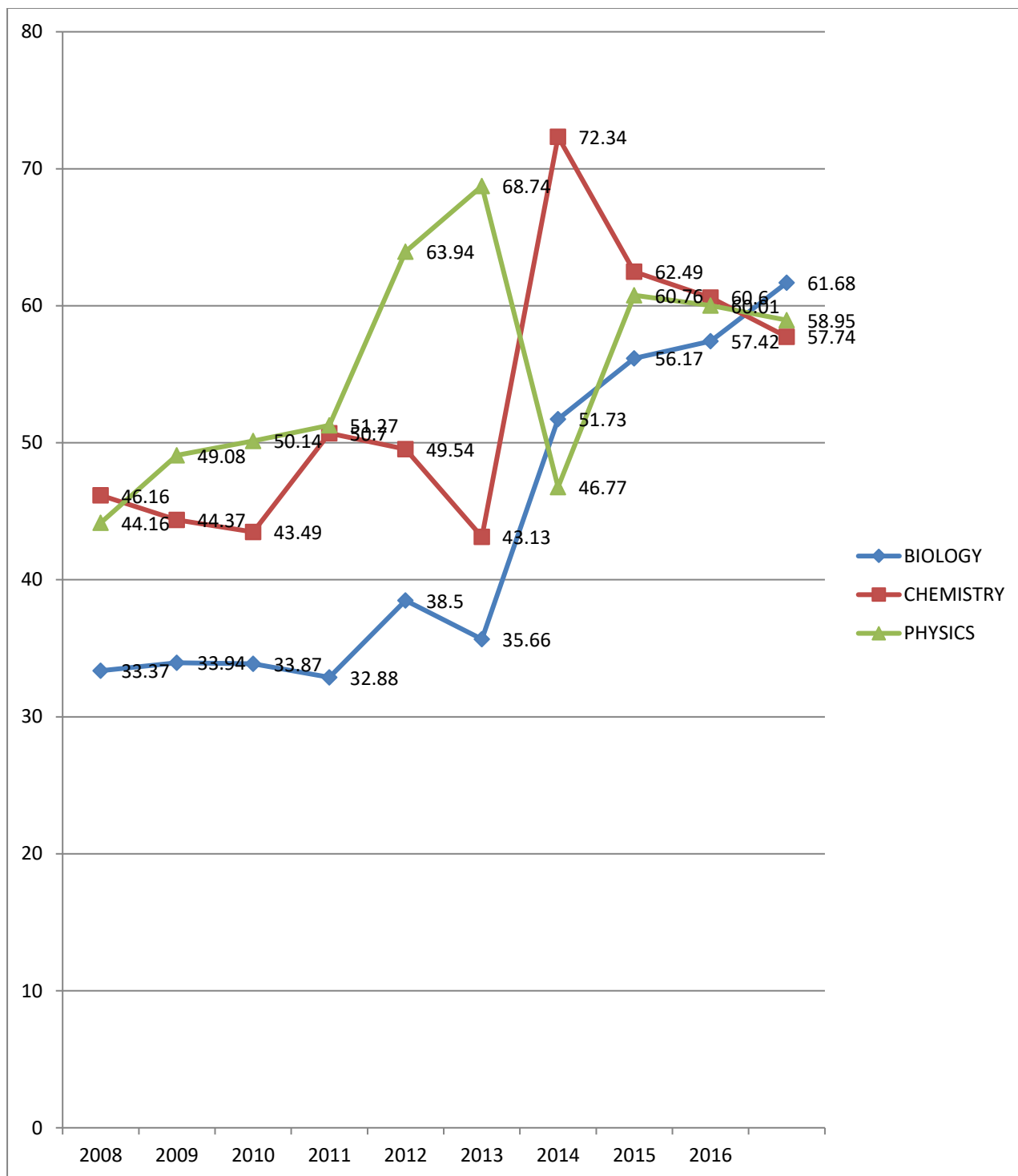


Figure1.

Line Graph Showing Percentage Pass at Credit Level (A1-C6) For Biology, Chemistry and Physics Students (2007-2016).

The chief examiners report of West African Examination Council (WAEC, 2014) revealed that students who registered for biology as a subject

have cognitive and psychomotor skill problems which had lead to poor achievement in biology in the certificate examinations. The word poor indicate that the students performed short of expectations or below standard of about 50% for some years (2007-2012). A lot of studies had identified many factors that retard the academic achievement in the sciences. Durban University (2008) identified poor retentive memory as one of the causes of poor achievement in the sciences. The poor retentive or working memory is attributed to an unsatisfactory workspace. The workspace is a practical working memory. Some biological concepts such as genetics and ecology are very difficult in nature which demands the overstretching of working memory.

Similarly, factors like poor mastery of subject matter by teachers, poor teacher-student relationship, lack of motivation and educational facilities, the downtrend of socio-economic status of students' family, poor study habit and some cultural taboos are responsible for lack of interest and under-achievement in science (Ali,1998). Boettcher (2013) observed that in some towns, communities and states, fear and cultural heritage prevent the indigenes from touching some biology practical specimen such as toad, shark, millipede, snail, cockroach and frog. The fear and hatred of these specimens contribute colossally to lack of interest and poor academic achievement in biology practical. However, factors such as good environment, location, hard work by students and financial encouragement by parents and guardians favour academic success. If

the relationship between teachers and students is cordial, there is the possibility of greater academic achievement, interest and motivation.

The purpose of this study, therefore, is to investigate students' variables as predictors of academic achievement in biology in senior secondary schools in Imo State, Nigeria. From the related literature reviewed, the previous studies concentrated on the students' variables as determinants of academic achievement in genetics based on gender, attitude, school type, mode of entry, socio-economic status. However, due to the importance of studies on students' variables as predictors of academic achievement in biology in senior secondary schools much are still undone in identifying more students' variables so as to proffer solution to poor academic achievement in biology. In addition, the study had been considered worthy because the related studies were done in foreign countries and other regions of the country but not in South East of Nigeria. The variables of this study are more than the previous studies whereas the previous researchers had one or two independent variables and one dependent variable.

Statement of the Problem

For many decades, people had been clamouring for establishment of school as social environment for learning. However, some findings from research studies on students' academic achievement in these institutions had been reported to be poor (WAEC, 2016; Manalanga &Awelani, 2014).

The trend of results from table 1 of this study had shown that for over one million May/June WAEC students per year, that sat for biology, only

33.37%,33.94%,33.87%,32.88%,38.50%,35.66%,51.73%,56.17%,57.42% and 61.68% passed at A-C6 for 2007,2008,2009,2010,2011,2012,2013,2014,2015 and 2016 respectively. The researcher as a biology examiner in WASSCE had also observed that some biology examiners jubilate when they mark their scripts and found out that they collected “zero centers”. Zero centers means that majority of the candidates scored zero. Common observations in these schools had also shown that some variables seem to have inhibited the students’ academic achievement in biology. In view of this, students’ variables such as students’ attitude towards science and self-efficacy in secondary school biology subject by Anne (2008) and students’ study habits in senior secondary school students’ academic performance in federal capital Territory, Abuja by Ebele and Olofu (2017) had been investigated and yielded some results, but these studies were not comprehensive enough to cover all students’ variables such as motivation, study habit, attitude, interest and absenteeism this present study had covered.

Some of these studies were conducted in college of education and university but not in secondary school this study took place. The present study was conducted in the South East of Nigeria while the previous studies were conducted in other regions. This raises doubt about the relevance of the previous research efforts to the region (South East) where this study took place.

It was therefore hypothesized that the results of this study might provide a unified view of the students’ status of academic achievement in biology in south

east, Nigeria. The problem of this study therefore stated in question forms were: Are student's variables such as motivation, study habits, attitude, interest and absenteeism responsible for poor academic achievement in biology? Or what are students' variables that predict students' poor academic achievement in biology?

Purpose of the Study

The general purpose of the study was to determine students' variables that served as predictors of academic achievement in biology in senior secondary schools, Imo State, Nigeria.

Specifically, the study determined:

- (i) Students' motivation, study habits, attitude, interest and absenteeism as predictors of academic achievement in biology;
- (ii) Students' motivation as a predictor of academic achievement in biology;
- (iii) Students' study habits as a predictor of academic achievement in Biology;
- (iv) Students' attitude towards Biology as a predictor of academic achievement in Biology;
- (v) Students' interest as a predictor of academic achievement in Biology; and
- (vi) absenteeism as a predictor of students' academic achievement in Biology.

Research Questions

The following research questions were formulated to guide the study;

1. What is the biology achievement score of students' motivation, study habits, attitude, interest and absenteeism as predictors of academic achievement in Biology?
2. What is the biology achievement score of students' motivation as a predictor of academic achievement in Biology?
3. What is the biology achievement score of students' study habits as a predictor of academic achievement in Biology?
4. What is the biology achievement score of students' attitudes as a predictor of academic achievement in Biology?
5. What is the biology achievement score of students' interests as a predictor of academic achievement in Biology?
6. What is the biology achievement score of students' absenteeism as a predictor of academic achievement in Biology?

Research Hypotheses

The following research hypotheses were formulated and tested at 0.05 levels of significance

H₀₁: There is no significant relationship between students' motivation, study-habits, attitude, interest, absenteeism and their academic achievement in senior secondary schools' biology.

H0₂: There is no significant relationship between students' motivation and their academic achievement in senior secondary schools' biology.

H0₃: There is no significant relationship between students' study habits and their academic achievement in senior secondary schools' biology.

H0₄: There is no significant relationship between students' attitude and their academic achievement in senior secondary schools' biology.

H0₅: There is no significant relationship between students' interest and their academic achievement in senior secondary schools' biology.

H0₆: There is no significant relationship between students' absenteeism and their academic achievement in senior secondary schools' biology.

Scope of the Study

The study was restricted to motivation, study habits, attitude towards biology, interest and absenteeism as predictors of student's academic achievements in biology in senior secondary schools, Imo State, Nigeria. There was total number of 386,760 students in 296 secondary schools in six education zones of Imo state. The sample size for the study was 900 SSII students. There are four instruments designed to elicit information from the respondents and pro-forma designed to collect promotion examination scores and annual percentage average of absenteeism of sampled SSII students.

Significance of the Study

The importance of research in the area of science education cannot be over- emphasized. Researches in area of science education are crucial for

nations' growth, development and greater academic progress. It is therefore anticipated that the finding of this study could be of immense benefit to the following stakeholders; Teachers, Students, Education administrators, curriculum planners and developers, policymakers, Guidance and counselors in education and examination bodies.

Teachers' efficiency and effectiveness in teaching biology depend on his/her ability to motivate, develop students' attitude toward biology, improve their interest and close gender gap in science education in term of academic achievement. Teachers might therefore benefit from the findings by improving their motivational skills, teaching methods and attitude toward teaching biology so as train out students who will obtain good certificates and develop interest in biology. The finding might ginger teachers to attend conferences and in-service training to upgrade and update their academic status for the purposes of developing students' interest in biology through good teaching and motivation. The finding might also help teachers to understand the causes of lack of interest and poor academic achievements of students in biology.

Equally the finding might boost students' interest and greater academic achievement, through the benefit of efficient teaching, respect and good attitude by the biology teachers. If students develop good study habits by studying very hard, develop interest in biology and participate actively in biology lesson, they will perform excellently in both internal and external examination which might

qualify him or her to study biology or biology related courses in higher institutions.

The finding of this study might also boost the morale of education administrators to send the serving biology teachers to conferences, workshops and seminars so as to acquire the skills of motivation in order to train out students who will uplift the image of their schools and ministry of education too. Such sponsorship will help the administrators to have sufficient qualified and experience teaching staff in their domain of administration which might boost the interest and academic achievement of biology students.

The curriculum planners and developers might also benefit from the finding by developing curriculum that has relevant topics, appropriate instructional materials and activities that are within the qualification and experience of the biology teachers. Well planned curriculum will help teachers to teach very well so as to attract the interest and greater academic achievement of students in biology. Biology activities such as insect capture and dissection of some specimens and good teaching methods such as field trip and excursions contribute colossally to development of students' interest, positive attitude and academic achievement in biology.

The finding of this study might encourage the policy makers in education to come up with educational policies such as sponsorship for conference, in-service training, and scholarship for teachers and students as well as free education which will enhance better teaching and academic achievements. These

policies, if well implemented might help to produce great teachers and scientists who will contribute to the growth and development of science and technology in the country.

Examination bodies such as WAEC, NECO, NABTEB, and JAMB might find the results of this study worthy by setting biology questions within academic level of secondary school students. WAEC chief examiners had consistently reported that interest and academic achievement of students in biology are poor (WAEC, 2014). To boost the interest and academic achievement of students in biology, their questions should be standardized to reflect the topics and activities in the syllabus.

Guidance and counselling unit of secondary school is a very important administrative arm of education. Consequently, the findings of the study might enable the school counsellors to identify the area of difficulties and interest for proper counselling. The finding might also help counsellors to counsel students on right choice of career and study habits.

Lastly, the finding might help parents to buy relevant biology text book and biology equipment such as dissecting kit, microscope and hand- lens to motivate and arouse the interest and academic achievement of their wards in biology. When students are well sponsored they will develop greater interest in biology.

Clarification of Major Terms and Variables

For the purpose of this study, the following terms and variables have been operationally defined.

Absenteeism: refers to students that were not in class during the class roll call by teacher. Attendance register is used to check students' present and absent

Academic achievement: Refers to students' performance in both external and internal examination in biology.

Attitude: Refers to the manner of approach of students and biology teachers toward biology as subject of study.

Biology: Biology is the aspect of science that deals with study of Living things. Living things consist of plants and animals. Biology Education henceforth involved the teaching of scientific knowledge in the area of botany and zoology.

Class absence: This refers to total number of time students didn't go to school in a week, month or a year.

Interest: Is the key force or factor that motivates students to choose and study biology as a subject in senior secondary school.

Motivation: This refers to driving force that lead to achieving set objectives

Pro-forma: It is a blueprint used for collection of promotion examination scores of SS11 Students in Biology.

Science: science is the study of nature and natural phenomena therein. Nature refers to living and non-living things. The natural phenomena refer to occurrence

of eclipses, rainbow, Earth tremor, volcanic eruption, Day and Night, the seasons of the year and Earthquake.

Students: The term student refers to people admitted to study various subjects such as biology in senior secondary school.

Study Habits: This term refers to individual's method(s) of learning biology by senior secondary school students.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The review of related literature for this study had been organized and presented under the following sub-headings.

Theoretical Frame Work of the Study

- ✓ The Objectives and Contents of Senior Secondary school Biology Curriculum
- ✓ The importance of Biology for National Development
- ✓ The Influence of Motivation on Academic Achievement of Students in Biology
- ✓ The influence of study habits on Academic Achievement of Students in Biology
- ✓ The influence of Interest on Academic Achievement of Students in Biology
- ✓ The influence of Absenteeism on Academic Achievement of Students in Biology
- ✓ Reviewed Empirical Studies
 - Empirical Studies on Students' Motivation and Academic Achievement in Biology in senior Secondary School.
 - Empirical Studies on Students' Study habit and Academic Achievement in Biology
 - Empirical Studies on Students' Attitude towards Biology and Academic Achievement in Biology
 - Empirical Studies on Students' interest and Academic Achievement in Biology
 - Empirical Studies on Students' absenteeism and Academic Achievement in Biology
 - Empirical Studies on Students Academic Achievement in Biology
- ✓ Appraisal of the Reviewed Literature

Theoretical Framework for the Study

The theories that support the study on students' variables as predictors of academic achievement in biology in senior secondary school are as discussed below. Such educational theories are: Maslow's theory

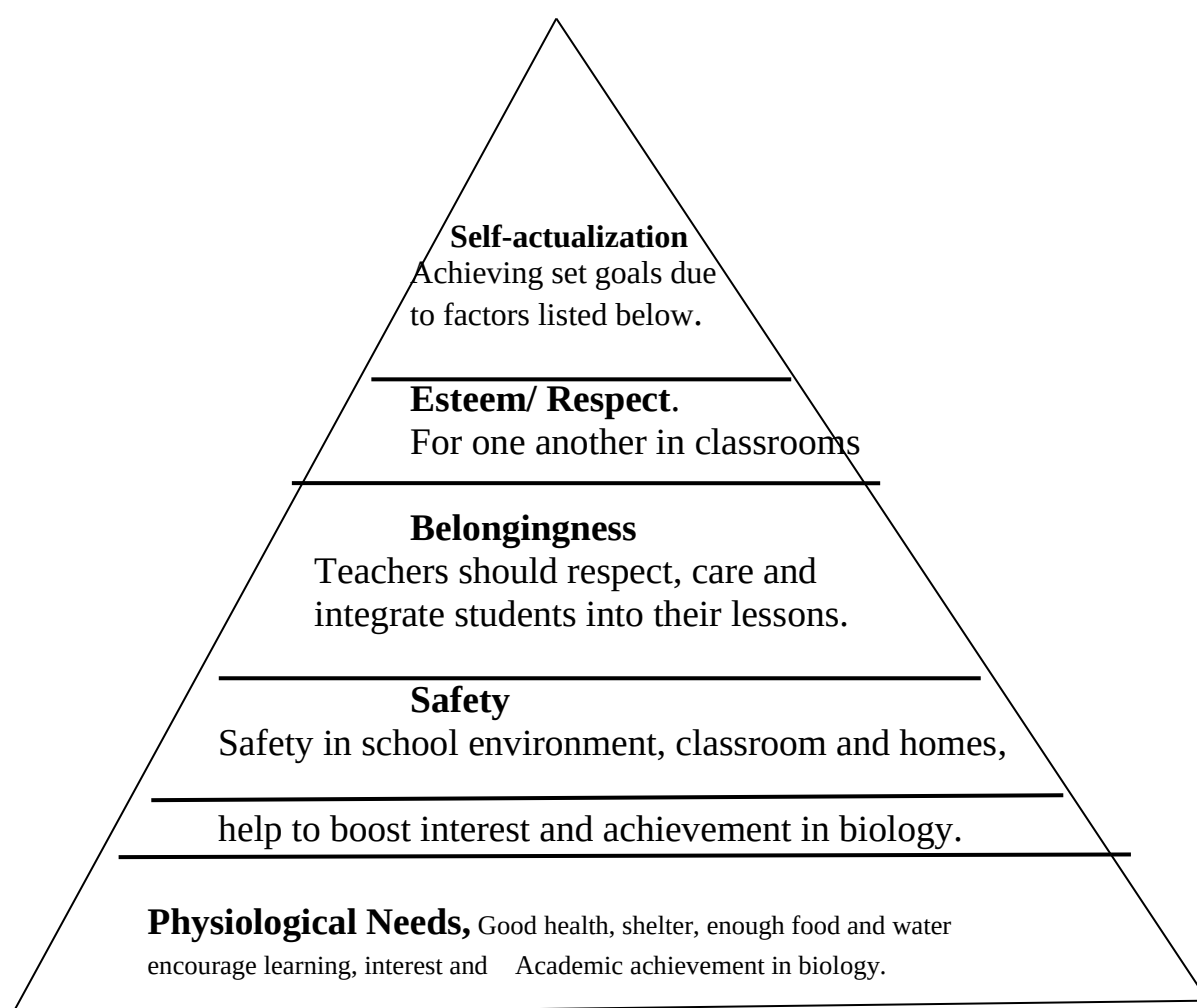


Figure 2: The Adapted Structure of Maslow's Hierarchy of Needs

Maslow's Motivational Theory

The Maslow's theory postulate that the prominent basic needs of students are motivation, belongingness, love, caring, safety, needs for respect, self actualization/fulfilment and the physiological needs (McLeod, 2016). In addition, Maslow (1962) postulated that the basic characteristic of hierarchy of

needs is the establishment of intimate relationship with students and freedom to contribute during educational discussion/teaching. In this view, teachers should discard the attitude of imposing power and academic knowledge which deprives students of democratic conditions in the classrooms. Maslow (1962) further emphasized that there is no perfect human being and that the underachievers cannot progress unless they are given good knowledge by qualified and experience teachers, motivated, cared for, respected and assisted through proper interaction. Furthermore, Maslow (1962) opined that students require unconditional safety, freedom, respect and recognition in the classroom so as to attain their academic peak. They should be made to understand that they are respected, cared for and supported in the classroom. These factors help to build strong and reliable teacher-student relationships, interest, motivation and academic achievement in the school environment.

Theory of Reasoned Action that Support the Attitude of Students toward Biology

The Theory Reason Action (TRA) is targeted at establishing the relationship between attitude and behaviours involving students' action towards studying. Theory of reasoned action originates from researched work in social psychology, persuasion models, and attitude theories. The theory was propounded by Fishbein & Ajzen, 1975 to predict how individuals behave based on the already existing attitude and behavioural intentions such as positive and negative attitude towards biology. The theory went further to suggest that

stronger determinations are accomplished by increased effort to perform learning activities which equally increases the likelihood for greater academic achievement in biology (Fishbein & Ajzen, 1975). Students' attitude towards biology can either be positive, negative or neutral (Fishbein, 1967). The theory also emphasized that there is direct correlation between students' attitude and outcome towards the subject biology. If the outcome emanating from biology assessments is favourable, the attitude towards biology will be positive, while the unfavourable results beget negative attitude.

Peoples' attitude for studies in terms of the study consequences had been attributed to behavioural belief (Ajzen & Fishbein, 2012). There are believes by persons that when they study and fail examinations, then studying for longer time will make them pass the examination. The behavioural belief here is that engaging in study for long time makes students achieve success in examination whereas in the other hand, not studying at all leads to failure (Ajzen & Albarracin, 2007).

Cognitive Learning Theory that Support Study Habits of Students in Biology

Bruner (1957) propounded the concept of cognitive development. He strongly emphasized that the result of cognitive development of students is his thinking ability. Bruner further stressed that for the intelligent minds to be created from environment, experience and qualified teachers must be involved (Bruner, 1957). In addition, he opined that learning should not only stop on

concepts, categories and problem-solving already in existence but should extend to discovery of new knowledge by the students. Cognitive growth or development should involve interaction between the experienced teachers and instructional facilities that serve as amplifier of the interaction. The purpose of educating a student is to create independent students but not dependent students. Bruner (1966) proposed three representative education modes which include enactive, iconic and symbolic representation. Enactive representation which starts from (0-1) years is the ability to understand action-based information and sustain the information. In biology, hands-on activities such as practical reflection-based information. The iconic (1-6) years are the representation of information in form of image or biology diagrams. Symbolic representation (7 years and above) is the storing of information in form of words such as Osmosis, Photosynthesis and Diffusion. Bruner further stressed that students are active learners who are capable to construct their own knowledge. He further emphasized that students are capable of understanding complex information if properly guided by experienced and qualified teachers. Brunner (1960) explained this through the idea of spiral curriculum where the teaching starts from simple to complex levels. In order to appreciate the spiral curriculum, teacher should allow students to construct his own knowledge through the concept of discovery learning.

Equally, Brunner and Vygotsky emphasized the importance of scaffolding. Scaffolding is the manner in which experienced teachers help to

fashion the knowledge of students through assisting the students to solve complex problems.

The Objectives and Contents of Senior Secondary School Biology Curriculum

Curriculum is instructional material that guides teachers in teaching and other activities to perform during instructional processes. Curriculum is prepared for various subjects by Nigeria Educational Research and Development Council (NERDC). The contents of the curriculum are spiral in nature. The term curriculum had been precisely defined as set of plans, intentions, activities or outcomes that are delivered in a variety of ways and in different settings (John & Joseph, 2011).

Biology curriculum had been identified as the crucial working tool at senior secondary schools in Nigeria. The curriculum was planned and developed as a document by the Nigerian Educational Research and Development Council (NERDC) for the use at all levels of the secondary school in Nigeria. The curriculum is an articulated instructional guide that helps teachers to teach theory and perform hands-on activities in schools. Due to federal government reform in education, NERDC was mandated to renew and include National Economic Empowerment and Development Strategies (NEEDS) and the Millennium development goals (MDGs) in the senior secondary school curriculum in the year 2005 by the National Council in Education (FRN, 2013).

The senior secondary school curriculum now contains science, mathematics, humanities, business and technology (NERDC, 2009).

The curriculum consists of themes, topics and activities performed by teachers and students of the senior secondary school (SS1-3). The themes and topics are as shown below

Table 2

Shows the four (4) themes, contents and topics of Senior Secondary two (SS11) biology curriculum

Themes	Contents	Topics
1	Organization of life.	(i) Classification of plants.
2	The organism at work.	(i) Digestive system. (ii) Transport system. (iii) Respiratory system. (iv) Excretory system
3	The organism and its' environment.	(i) Nutrient cycling in nature (ii) Ecological Management, Association, Tolerance, Adaptation, Pollution. (iii) Conservation of Natural Resources. (iv) Pest and Diseases of Crops.
4	Continuity of life	(i) Reproductive systems in vertebrates. (ii) Reproductive systems in plants. (iii) Pollination in plants.

Furthermore, the new content of the senior secondary school curriculum includes value orientation, peace and dialogue, human right education, family life, HIV and AIDS education and entrepreneurial skills. The purpose of educational curriculum is to transform individuals (students) and satisfying societal aspiration based on effective teaching of the contents of the curriculum

(Adegoke, 2005). Basically, the unifying objectives of the biology curriculum as extracted from the National Policy on Education (FRN, 2013) include:

- (a) Adequate laboratory and field skills in biology; Meaningful and relevant knowledge in biology;
- (b) Ability to apply scientific knowledge to everyday life in matters of personal, community health and agriculture;
- (c) Reasonable and functional scientific attitude. (FME,2009)

In order to justify the objectives of the curriculum above, the contents of the developed biology curriculum stressed the important of field-trips, Project-Based Learning (PBL), guided discovery, scientific processes, scientific attitude etc. The themes of the curriculum include:

- (a) Organization of life;
- (b) Organism at work;
- (c) The organisms and its environment;
- (d) Continuity of life” Federal Ministry of Education (FME,2013)

The new curriculum is spiral in nature, indicating that topics taught in SS1 can be repeated in SS11 and SS111 in more complex order. As regard the sections, the curriculum had been arranged into six sections thus:

- (a) Topic;
- (b) Performance objectives;
- (c) Content;
- (d) Activities which embraced teacher and students;
- (e) Teaching and learning materials;

(f) Evaluation (FME, 2013).

The major benefit of any curriculum is hinged solely on the pedagogical output/implementation. According to Okebukola (2014), many teachers of science extract particularly biology has very poor content knowledge (CK) of the subjects they teach in their respective schools. He further opined that factors such as inadequate funding, ill equipped laboratories, classroom, and workshops are the causes of poor performances in biology education in Nigeria.

Salau (2012) who opined that factors such as pedagogical patterns of science teacher, students insensitivity to serious studies, poor instructional and ICT facilities, poor training background of teachers, poor teacher-student relationships and government insensitivity to proper funding of education at all levels contribute to poor implementation of science curriculum and academic achievement in biology

The Importance of Biology for National Development

Science is defined as the study of the nature and all the natural phenomena therein. It plays a significant role in the technological growth of any nation (Ozioko, 2013). Biology being a branch of natural science contributes colossally to the development of the nation particularly in the area of medicine. Biology is defined as the study of living things (plant and animal). It is the prerequisite subject for the study of courses like biology education, botany, zoology, medicine, forestry, agriculture, biotechnology, and nursing (Nwagbo & Uzoamaka, 2011).

The greatest benefit senior secondary student can get is to choose and study biology in school. Biology as a course exposes student to various ways of combating the dreaded diseases, family planning techniques, personal hygiene and the use of natural herbs as curative drugs. Biology educations help to teach scientific literacy and unveil the structure and functions of animals and plants parts. It equally educates students on how to live successfully in our environment. Because of the technological advancement in this field, biologists and pharmacists are able to extract liquids from herbs to produce drugs for the treatment of many diseases.

With adequate knowledge of biology, human beings live longer, healthier and adapt favorably to environment. Adequate knowledge of biology helps us to prevent obesity, hypertension and loss of weight. The medical field is one of the largest fields that use biology to the greatest advantage, because they produce vaccines for treating sickness like chicken pox and polio as well as cure for other diseases (Tomasovic,2014).

In the past, disease like cholera, smallpox and measles had been claiming lives in thousands because better drugs and vaccines were scanty. The study of some content of biology course directs us on how to interact with non-living component of our environment such as processes of osmosis and diffusion. The study of branch of biology such as parasitology (study of parasite), pathology (study of diseases), and virology (study of viral diseases) have equipped human beings on production of vaccines for treatment of disease that cause havoc since

10,000 B.C (Tomasovic, 2014). Oncology is the study that deals with cancerous processes. The people that study oncology called oncologist have for some years develop treatments for patient suffering from cancer and the sickness is in decline (Tomasovic, 2014).

Another importance field of biology is the genetics which is concern with the study of genes which is a hereditary traits or character. These aspects of biology help us understand why people have cancer, grow red hair and how two people are identical. Biology had given credible answers to what happen in our environment such as rainfall, evaporation, assimilation of water by plants through root and the process of feeding in lower animals like Amoeba (diffusion). The study of ecosystem which is the aspect of biology helps us to understand the interaction of living and non-living things in our environment (Bioexplore, 2016).

The research in biology has helped to equip people on the sustainability of life such as production of food, production of medicine through the available herbs, the study of human body, treatment of dreaded diseases and the need for regular and adequate exercise. The knowledge of biology also helps us to know the changes that occur in our bodies such as the development of hair in the armpit, deepening of voice by boys, production of semen, enlargement of pelvic girdles and rapid growth in youths (Bioexplore, 2016). The study of different kinds of diseases properly called pathology had equipped Doctors to diagnose and treat many diseases. Many students opt for biology in senior secondary

schools because it serves as the basic science subject for the study of courses such as immunology, pharmacy, medicine, parasitology, botany, zoology and virology. The beauty therapists study some elements of biology because it deals with the skin, fingers, hairs and nails which are significant component of the body.

The knowledge acquired from biology had significantly impacted on solving world food crisis, attack of some dangerous pests such as locusts and treatment of diseases that cause havoc in the society. In the researcher's view, the forestation policy embarks up by many countries of the world originates from biology and had continued to solve world ecological problems such as ozone layer depletion, erosion and scarcity of timber for building. Trees also provide shelter for the arboreal and terrestrial animals like snake and lizard. In addition, the study of biology provides us with the basic concepts of adaptation in our environment such as production of meat to sustain life, planting of trees and rearing of animals for food and money, the eating and sleeping time and type of drugs to take for treatment of a particular sickness.

Furthermore, the body of knowledge acquired through the study of biology help us to provide an answer to the evolution of organisms (plants and animals). The hands-on activities (practical works) pave way for the discovery of many things in our environment (Tomasovic, 2014). Investigations into the environment help researchers to discover the importance of photosynthesis and respiration in our lives. The biologists conduct several experiments for the

betterment of human beings. The fertility and poor soil structure are discovered due to experiment to determine the soil structure and component by biologists.

According to Tomasovic (2014), when sportsmen and women are actively participating in sports, we should reflect biology influence in action, large portion of energy is spent during serious exercise. Such energy spent is replaced by eating balance diet. The meal we eat as breakfast, lunch and dinner originate from the influence of biology through the process of photosynthesis. The synthesis of various foods we eat is through the process of photosynthesis which is a biological process. Other applications of biotechnology are in the area of invitro - fertilization (IVF) or Test-tube babies and Genetic cloning. In fact, the contributions of biology and science in general are overwhelming and are too numerous to get exhausted

Studies on Influence of Motivation on Academic Achievement of Students in Biology

Many factors contribute to students' academic achievement in secondary school. Among the factors identified are students' motivations by their teacher, individual characteristics, socio-economic status, family and peer influence on students. Among the school related students' factors, students' motivation matter most (Research clue.com, 2018). Students' motivation is the driving force which is targeted toward achieving greatness both in academic and social life. Motivation therefore is the driving force that account for initiation, persistence, direction and vigour for goal-directed behaviour (Colman, 2003). Both intrinsic

and extrinsic motivation plays a crucial role in students' academic achievement in biology. The intrinsic traits such as study habit, curiosity and persistence help to achieve set objectives. The intrinsic motivation can further be defined as the internal force within the individual which propels him or her into emitting certain behaviour (Noun, 2009). The extrinsic motivation is the verbal and material rewards that help to boost interest and greater achievement among students.

Ajaja, Emperor and Onwegbu (2007) opined that the motivated science students performed significantly better than the unmotivated science students. He further stated that the motivated students in single sex schools performed significantly better than their mates in mixed schools. Motivation and school type were found to influence students' achievement in science. Joan (2010) stated that motivation is what people need to perform better and can only work if the right person with right skill has been placed in charge of the task at hand. Motivation therefore consists of needs (deficiencies) which set up drives (motives) which help in acquiring the incentive (goals).

Motivation of students in teaching processes can stimulate positive behaviour towards achievement of individuals' goals. Motivation like other attitudinal behaviour encompasses many aspects and such aspect is motivational orientation act. Motivational orientation act as a driving force that encourages a person to engage in a task (Steward, Bachman & Johnson, 2010). It consists of

several constructs and among these are intrinsic motivation, extrinsic motivation, personal relevance, self-efficacy, and self-determination and assessment anxiety.

According to Cavalla, Rozman, Blinkersaft and Walker (2003), intrinsically motivated individuals' possess the following traits; they remain highly focused throughout their activities with clearly defined goals; they are self-critical, they are self-reflected on their own actions realistically and they are usually relaxed and not afraid to fail during learning. This aspect of students' variable contributes colossally to greater achievement in biology.

Studies on Influence of Students' Study Habits on Academic Achievement of Students in Biology

On tackling various academic challenges students usually adopted difference types of study habits. These study habits vary among students. Hussain (2000) stated that study habits is broad and embrace study attitude, methods and skills. Study habit is manner of approach towards acquiring scientific knowledge. The positive habits of study can be enhanced by factors such as teachers' and parents' motivation, appropriate counseling, adequate library facilities and individual traits too. Absence of these factors retards the academic achievement in biology and other subjects too.

Furthermore, Mark and Howard (2009) opined that among the challenges in students' academic achievement is lack of effective study habit. In addition, they emphasized that if students can adhere to good study, they will achieve

greatly in both internal and external examinations. Grace (2013) stated that students get frustrated in their academic endeavour due to bad study habits. According to Kelli (2009), students are regarded as being successful in their studies if they are able to comprehend course content, remember them and write them or present it in oral form during examinations.

Aish (2013) stated that for students to maintain academic success throughout their duration in the institution, they should avoid bad study habits such as listening to music while studying, discussing non-academic issues while studying and watching movies. In his view, Adeyemi (2011) stated that positive study habits encourage independent study at home and perseverance for higher educational career. Positive study habits create path-way for excellent achievement in both internal and external examinations such as West African Examination Council (WAEC), National Examination Council (NECO), Joint Admission Matriculation Board (JAMB) and National Business and Technical Education Board (NABTEB).

Agba (2013) further opined that unserious students do study anyhow without specified techniques. Such students can be classified as non-vibrant students whose performance is usually poor.

There are fourteen (14) positive study habit identified by Katelyn, (2013). They include:

- (i) Studying with ICT resources materials.

- (ii) Self-test by listing questions and answering them.
- (iii) Correcting mistakes in ones note.
- (iv) Attending lessons regularly.
- (v) Studying daily
- (vi) Studying topics ahead of lessons and time scheduled for them.
- (vii) Attending conferences with experts.
- (viii) Attending extra-mural lessons.
- (ix) Always asking questions in the class.
- (x) Avoid rote learning
- (xi) Studying old papers and biology marking schemes.
- (xii) Sleeping at least 8 hours before examinations.
- (xiii) Studying under bright light.
- (xiv) Avoid consumption of stimulants such as coffee, kola and cocaine

These approaches towards study enhance greater academic achievement in science and other subjects. Nikkei (2013) also identified bad study habits as procrastination, listening to music, watching football matches and studying, cramming, truancy, sitting in bad seats and playing phone games and watching pornographic films while studying. These factors mislead students from achieving excellence.

Studies on Students' Interest and Academic Achievement in Biology

Interest is the force that propels the academic achievement of students in biology. It can be established by individuals' zeal to achieve greatness and

teachers' level of relationships with the students. Interest is the force that empowers an individual to achieve a set goal. Interest is the level of curiosity about achieving a task (Okoyo, Okongwu & Nweke, 2015)

Similarly, Anyagh and Okwu (2010) identified factors that cause low interest as the activities of examination bodies such as WAEC and NECO. Teachers' factors such as teaching qualification and Experience, lack of mutual relationships with students, environmental factors such as poor classroom environment, teaching strategies, type of specimen used for practical, the language structure and legibility of biology textbooks. Furthermore, low interest in biology can be ascribed to the anxiety and fear of teachers' harsh attitude, school environment and practical specimen. Interest is the key that unlock the academic misfortune. Although some students inherit high intelligence quotient (IQ) and physical capability of learning, they may not learn until they are motivated. Students' interest is based on the teacher's emotional stability, training and personal relationships with the students. Once there are mutual relationships between teacher and students, they will be sensitive to academic activities. Love and respect are the proper diagnostic instruments to unveil interest in the classroom situation. However, students' interest can be improved through the use of proper and relevant instructional materials, adequately trained teachers, conducive classroom environment and positive teacher-student relationships.

The issue of academic achievement of students in sciences, particularly biology in recent times has generated serious researches and academic debates among the stakeholders in education sectors in Nigeria. The chief examiners reports, opinion papers and research studies have consistently reported serious decline in the students' academic achievement in biology and science in general. Academic achievement is the performance output that demonstrates the extent to which students have accomplished set target that were the focus of activities in instructional environment (Wikipedia, 2017). It is multifaceted and involves all the domains of learning.

Furthermore, academic achievement connotes the level of success merited by students in a test or examination (Onwukwe, 2010). Academic achievement is often quantified in terms of scores. The biology test scores therefore become crucial academic parameter to determine the success of students in biology.

The students' scoring levels is usually classified as high (70-100%), Medium/Average (50-69%) and low (0-49%). The level of academic achievement of students depends to some extent on the efficiency and effectiveness of the teachers and students.

Ravitsh (2000) vehemently argued that the academic achievement of students had been pulled down because teachers had reduced the academic demand of school curriculum in order to boost the students' self-esteem, culture, religion and interest too. This might be the reason why some biology topics such as family planning and cloning are not given much attention. In similar manner

the reduction in academic rigour involved in teaching and learning (short-cut) equally retard the academic achievement of students in the schools (Ravitsh, 2000).

Furthermore, Aina (2006) reported that the consistence poor academic achievement of students had been in existence for the past ten years in our schools. He mentioned teachers' inexperience and poor interactive pattern as the key factors. Instructional materials which are in short fall also counts as major hindrance for poor academic achievement in science. Onwukwe and Okereke (2009) opined that poorly structured and Implementation of curricular contents is major causes of students' underachievement in junior secondary school Basic science and Technology. The authors also remarked that lack of improvisation and innovative attitudes by teachers affects the academic achievement of students.

In addition, biology is one of the science subject in senior secondary school which is activity oriented. It requires that students should be involved in activities such as practical and project works but not being passive as observed in conventional teaching methods. Edeth (2007) observed that conventional teaching method used by teachers in teaching biology is inappropriate and counts for poor academic achievement. Conventional teaching method requires the application of cognitive domain only leaving the affective and psychomotor domains (Eze, 2005). Consequently, constructivism is an instructional approach which has been found to be suitable for teaching of biology (Eze, 2005).

Constructivism is a teaching strategy that allows students to originate their ideas through the application of previous knowledge. The aforementioned methods and innovative strategies henceforth become the path-way for enhancing high standard and academic achievement in biology.

The individual differences in academic achievement among students have been linked to differences in intelligence and personality traits (Wikipedia, 2007). Some students inherit higher mental ability as determined by intelligent quotient (IQ) test and those who are higher in conscientiousness (achievement motivation and effort). Furthermore, the researcher is of the opinion that occupational stress intertwined with excess workload affects the performance of teachers and students' academic achievement too. On the side of students, the long period of extra lessons wears away the attention span of students. The socio-economic status of parents equally contributes significantly to the downward trend of students' academic achievement. Families whose economy is not buoyant can't afford to pay school fees on time, buy dissecting kits for biology practical and relevant textbook. Students from divorced parents equally suffer moral, social and academic depreciation due to lack of care, love and good relationship.

Another global cause of underachievement in science is the over patronage of social networks by students (Kellecher, 2009). Hemalatta, Palamappan and Remanigopal (2009) opined that the term social networking is the grouping of people into urban, semi-urban and rural communities for social

interactions. This mode of internet services prevents students from actively participating in lectures, lessons and doing their assignments in schools. The playing of games and watching of pornographic films prevent the students from active involvement in academic work. In addition, Tse (2014) opined that the negative involvement of students in social networking leads to time wastage, poor academic achievement and decline in moral life of students. The social networking cut across gender and ages

The issue of gender disparity has become a global concern especially to educators and researchers. In this context, the emphasis is on the imbalance between the masculine and feminine in school enrollment, academic achievement and interest in biology. Hansman, Tyson and Zahidi (2009) opined that “no nation in the world has presently achieved gender equality in sensitive issues such as leadership, education, military and economic participation”. This problem has made many great researchers devote precious time conducting logical researches in comparing the academic achievement of male and female students in science. Some of the studies were more holistic while some were sparsely addressed.

Ariyo (2006) found that most of the studies on the academic achievement of male and female students in science were consistently in favour of male students. They believe is that science and mathematics are ascribed to masculine while home economics, arts and secretarial studies are branded feminine subjects. Amedu(2015) and Onwukwe(2011), on their separate study tagged

trend in student's academic achievement in chemistry, found out that "male student performs significantly better in chemistry than their female students". In comparing the performance of male and female teachers in social studies, Fasiku (2011) found out that those social studies male teachers perform better than the female counterparts. The study attributes the gender imbalance to versatility in the knowledge of environmental education and current affairs of male teachers than the female social studies teachers. In a study conducted by Amedu (2015), using jigsaw method in teaching biology found out that boys achieved significantly higher than girls in sciences.

In contrast, Kolawole and Popoola (2011) in their study affirm that gender has no influence in academic achievement of students. The study differs from others as concern the literature reviewed. In addition, Lynn and Irwin (2004), attributed the gender imbalance in science as a result of inherited superior intelligent quotient (IQ) level. He further noted that the superiority of male students IQ starts from the age of 15years throughout life time. This imbalance in IQ is natural and may be attributed to transfer of gene. Apart from the influence of IQ, another inhibiting factors that greatly influence students academic imbalance include attitude of students and teachers toward learning and teaching, study habit, teacher's qualification, teaching methods , school environment, government policy such as poor funding , urban-rural dichotomy, family type and status(Asikhia, 2010; Akomolufe & Olorumfemi-Olabisi,2011).

According to Alade (2012) opined that the disparity is attributed to socially and culturally related issues. For instance, the researcher observed in some communities' cultural practices and fear prevent female students from using some practical specimen such as cockroach, snails, millipede and crabs. Such culture and fear help to retard the academic achievement of such female students.

White (2010) noted that for more than ten (10) years, the academic achievements of students from non-metropolitan (rural) schools in the United States of America have consistently remained stagnant. This stagnation has remained irrespective of increase in enrollment of students in schools. In addition, he further stated that there is a continuous gap between the metropolitan and non-metropolitan in academic achievement levels in the United States of America. The reason given for better academic achievement of the urban students in science is the improvement and utilization of technology in educational involvement (white, 2010). The truth remains that as long as teachers rejects posting to rural areas and disparity exist in terms of instructional materials such as ICT facilities, the imbalance in academic achievement of students in urban and rural areas must continue to exist in Nigeria.

Studies on Influence of Absenteeism on Academic achievement of senior secondary school

Attendance register is one of the statutory records kept in the secondary schools for the purpose of students' attendance. Attendance register has columns

where the class teacher mark present or absent for students. The students that were not in classroom when the teacher calls names were regarded as being absent. Absent has been defined as the period a student is not in school (Dictionary of contemporary English, 2009). The cumulative percentage of absenteeism is usually computed at the end of school session. The cumulative absenteeism of ten percent (10 -20%) is regarded as being chronic absenteeism (Kate, 2013). Chronic absenteeism is the period where students were absent in school which include excused and unexcused absences. Absenteeism is a common phenomenon among the male and female students. The female absenteeism matters most because of their involvement in domestic activities which keep them out of school. Absenteeism had been identified as the major factor that contribute to decline in learning which leads to poor academic performance among students (Oluremi, 2013).

According to Pect (2002) the various behavioural disorders exhibited by students such as rape, armed robbery, school dropout, drug abuse, examination malpractices, kidnapping and cultism had been linked to retrogression in academic achievement teaching and learning process in such a way that teachers are helpless and disorganized in their course of teaching.

Ubogu (2004) enumerated the causes of absenteeism as illness, peer group influences, socio-economic status of parents, geographical area and age. Robert& John (2014) further outlined the causes of absenteeism as stated below: scholastic requirements which include (fees, craft show, uniforms and

books), others are levies, household work, lack of interest for schooling, hunger at school, illness or diseases, loss of parent/guardians, peer group influences, sexual harassment at school, long distance and harsh punishment at school. Other factors identified were institutional based factors such as bullying by students and teachers, administration of corporal punishment by teachers, poor teaching methods, lack of guidance and counselors in schools and incessant strikes by teachers. Zhbuet al (2016) in their study found out that students with higher GPA attended classes at a higher rate as compared to students who exhibit chronic absenteeism. The rate of absence among underachiever had been discovered to be consistently higher than the moderate and higher achiever group (kassarning, Bjerre-Nielsen, Mones, Lethmann, Lassen & Andrade, 2017). The absenteeism can therefore be classified as being chronic (1-20%), severely (21-40%), excessively (41-100%) and not all (0%) (Balfanz & Byrnes, 2012). The chronic or excessive absenteeism is associated with very poor achievement while the severely and not all leads to good and excellent academic achievement in schools.

Reviewed Empirical Studies

Empirical Studies on Students' Motivation and Academic Achievement in Biology

Orluwene (2011) conducted a study on the relationship between student's motivation and human capital acquisition. The researcher adopted a correlation survey research design. Two research questions and two null hypotheses were

formulated to guide the study. The sample for the study was 224 fourth year students selected through non-proportionate stratified random sampling technique across the seven (7) faculties. The instruments for the study were students' motivation for attending university scale (SMAUS) and human capital acquisition scale (HCAS). The internal consistency of the instrument was computed using Crobach Alpha and the reliability coefficient index of 0.71 and 0.63 respectively for the two instruments. Data generated was analyzed with correlation technique. The results showed positive significant relationship between (PIDM, CMM, HUM and HCA) motivational types. There was negative relationship between DFM and HCA. There was no relationship between EXDM and HCA. The result of the study shows that students' motivation plays a significant role in predicting their levels of human capital acquisition.

Adedeji (2007) conducted study on the impact of motivation on students' academic achievement and learning outcomes in mathematics among secondary school students in Nigeria. The design of the study was ex-post facto type of survey research type. The sample size for the study was 450 SSII students which was selected through simple random technique. The instrument for data collection was motivation for academic performance questionnaire (MAPQ). The data collected were analyzed using t-test and analysis of variance. The results revealed that gender difference were significant when impact of motivation on academic achievement was compared in male and female

students. The result also showed significant difference when extent of motivation was taken as variables of interest on academic achievement in mathematics based on the degree of the motivation.

Chow and Bob (2013) conducted their study on secondary school students' motivation and achievement in combined sciences in Brunei Darussalam. The sample for the study was 324, consisted of 141 boys and 183 girls of average of 16.4 years. The research was survey design. The researchers adapted the questionnaire from Gylynn, Taasoobshirazi and Brickman (2009). There were 24 items. The statistical tools were descriptive and inferential statistics, mean, t-test, and Pearson product moment correlation. The data was analyzed using statistical package for the social sciences (SPSS) window version 11.0. The results showed that students showed a moderate level of intrinsic motivation, personnel, relevance, self-determination and self-efficacy and a high level of extrinsic motivation and assessment anxiety in learning combined science. Results further showed significance difference in motivational orientation towards learning combined science between boys and girls and between high ability and low ability students. The correlation analysis showed that there was significant positive relationship between students' motivational orientation and science achievement.

Empirical Studies on Study Habits of Students in Biology in Senior

Secondary School

Ebele and Olofu (2017) investigated the impact of study habits on secondary school students' academic performance in federal capital territory Abuja. The researchers adopted a descriptive survey design. The sample for the study was 1050 senior secondary school students drawn through simple random sampling technique from the federal capital territory, Abuja. The data was collected using questionnaire. The researcher formulated one null hypothesis which was tested at 0.05 levels of significance. The data was computed using chi-square. The finding revealed that there was significant relationship between study habits and students' academic performance

Empirical Studies on Influence of Students' Attitude toward Biology in

Senior Secondary School

In a similar study, Anne (2008) investigated the evaluation of students' attitude towards science and self-efficacy in college biology course. Survey design was adopted for the study. The sample for the study was 128 students. The instrument for data collection was questionnaire. Data collected was analyzed using Pearson's(r) as its correlation coefficient. The result of the study showed that students have a more positive attitude towards science, less confident feelings of self-efficacy after interaction than they did prior to enrolling in and attending courses, other findings revealed that self-efficacy and attitudes correlated with small but significant correlation of .23.

Owoeye and Agbaje (2016) equally conducted study on students' attitude and gender as correlate of students' academic performance in biology in senior secondary school. The sample for the study was one hundred and eighty (180) SSI biology students who were randomly selected from six (6) secondary schools in Ikere Local Government Area of Ekiti State. Descriptive survey design was adopted for the study; questionnaire and terminal continuous assessment results were the source of data. The two null hypotheses formulated for the study were analyzed using Pearson product moment correlation as statistical tool. The result showed that there is significant relationship in students' attitude towards biology and students' academic performance in biology. The result also revealed that there is significant relationship in the students' interest in biology and students' academic performance in biology.

Adekunle and Femi-Adeyoye (2016) conducted study on students' attitude and interest as correlates of students' academic performance in Biology in senior secondary school in Ekiti State, Nigeria. The sample size for the study was 200 SSII Biology students randomly selected from five secondary schools in Ado Local Government Area of Ekiti, State. The researchers adopted descriptive survey research. The instrument for data collection was questionnaire and past continuous assessment results of the students. The data were analyzed with Pearson-product moment correlation (r) statistical analysis. The finding showed that there is significant relationship in the students' attitude to biology and students academic performance. The findings also showed that there is

significant relationship in the students' interest in Biology and students' academic performance in Biology.

Odagboyi (2015) conducted a study on the effect of gender on the academic achievement of students in biology using the Jigsaw method. The study was quasi-experimental study. The sample for the study was 88 SSI secondary school students. They utilized intact classes. The biology achievement test (BAT) was constructed from past questions. The class was taught. The data was computed using T-test at 0.05 levels of significance. The findings revealed that males' students gained more from the Jigsaw method compared to females.

Empirical Studies on Students' Interest in Biology in Senior Secondary School

Okoye, Okongwu and Nweke (2015) conducted a co relational survey research on the relationship between students' interest and achievement in chemistry. The sample size was 200 SS III chemistry students which were randomly selected. A 20-items questionnaire chemistry interest scale (CIIS) was used to collect data from students. The data collected were analyzed using Mean, Standard Deviation and Spearman rank order correlation coefficient. The findings revealed that students with high interest achieved higher in chemistry. The findings equally revealed that male students achieved higher than female students in chemistry.

A study conducted by Evangelina, Helen, Margarita, Irene and Maria (2012) was on Greek secondary school students' views about biology. The

researchers adopted survey design. The sample for the study was 368 students. Data were generated through questionnaire and analyzed. The result revealed they are slightly positive about biology's usefulness in their lives, perceived as it is rather easy, but 26.4% find no interest in it. Gender did not seem to affect students' overall achievement in biology

Empirical Studies on student's Absenteeism in Senior Secondary School in Imo State

Oluremi (2013) investigated the relationship between physical environment of school and absenteeism among students in secondary schools in South-western, Nigeria. The study adopted stratified random sampling technique to select 360 students as sample from 4 secondary schools in 4 out of six (6) states in South-Western Nigeria. The three instruments used were; Academic records of school, Attendance register and school environmental questionnaire (SEQ). Four hypotheses formulated were tested using chi-square and t-test analysis. The result indicated that there was a significant relationship between truancy and academic achievement of students.

Fabgenle and Elegbeluye (2014) studied the attendance dilemma and its effects on the academic performance of secondary school students in Osun State, Nigeria. The study was a survey. The instruments for data collection were attendance register and examination scores report. The population of the study was 3,050 students from 61 out of 208 state owned secondary schools. Two hypotheses were formulated and tested while descriptive and inferential

statistical tools were used for data analysis. The result showed that the average attendance scores across the ten (10) constituencies in the state were proportionate to their examination scores.

Furthermore, Komakech and Osuu (2014) investigated the major cause of students' absenteeism and the possible solution to the vices in universal secondary Education schools in Uganda. The study adopted a descriptive cross-sectional research design. They used both qualitative and quantitative methods of data generation. Data for the study was generated using both secondary and primary sources. Secondary sources were publication, reports and relevant literature on absenteeism whereas primary data were generated using questionnaire and interview. A sample of 278 students out of 1000 students was used for the study. The findings revealed that the under listed factors were the causes of absenteeism in schools, Poor interest in schooling, lack of scholastic requirements, sexual harassment, hunger at school, illness or outbreak of diseases, household or domestic work, trekking long distance, loss of parents/guardians, peer influence, and harsh weather and punishment at school.

Empirical Studies on Student's Joint Variables as predictor of Academic Achievement in Biology in Senior Secondary School

In addition, Agbaje and Alake (2014) carried-out a study on student's variables as predictor of secondary school students' academic achievement in science subjects in Ikere-Ekiti, Ekiti State Nigeria. The researcher adopted a survey research design of ex-post facto type. The study was carried out using a

sample of 125 SSI science students from five (5) secondary schools in Ikere local government Area of Ekiti State. The researchers used one instrument (questionnaire) and past academic performance in biology, chemistry and Physics. The finding revealed that student's variable such as study habit, attitude towards science and interest of students in science subjects predict academic achievement in biology. The students' gender has no influence on student's Academic performance.

Appraisal of the Related Literature

In education, a lot of effort had been put into researches in view of finding solutions to educational problems. In attempt to find solutions to ever increasing educational problems, researchers have been embarking on various studies. Such study was conducted by Chow and Bob (2013) on secondary school students' motivation and academic achievement in combined sciences (biology, chemistry and physics). The study was survey design. The researchers used sample of 324 students and science motivation questionnaire as data collecting instrument. The data was analyzed using SPSS window version 11.0. Furthermore, mean, t-test and Pearson product moment correlation were the statistical tools used. Their study differs from the present study in terms of design, samples and statistical tool. The present study is correlation survey design, the sample was 900 students and the statistical tools were t-test, simple regression and multiple regression. However, both studies adopted questionnaire as data collecting instrument.

In a similar vein, Orluwere (2011) conducted study on relationship between students' motivation for schooling and human capital acquisition. Orluwere's study differs from the present study in terms of location, sample size and sampling technique. The previous study was done in Ekiti State; he used sample size of 224 students selected through non-proportionate stratified random sampling technique. The present study took place in South- East, precisely Imo State, Nigeria with sample size of 900 students drawn through simple random sampling technique. In addition, the two studies adopted co relational survey design and questionnaires as data collecting instrument.

In similar study, Anne (2008) investigated the students' attitude towards science and self-efficacy in Non-major college biology course in Texas Christian University, U.S.A. The study was survey design that had sample size of 128 students. The previous and present study differs in terms of location and sample size. The previous study was carried out in Texas U.S.A (foreign county) while the present study was conducted in South-East Nigeria with more students variables, sample size of 900 students and used multi-stage sampling techniques. Both studies adopted questionnaire as data collecting instrument. The study by Anne used Pearson correlation coefficient as statistical tool while the present study used t-test, simple regression and multiple regressions as statistical tools.

Another correlation study was conducted by Owoeye and Agbaje (2016) on students' attitude and gender as correlate of students' academic performance in biology in senior secondary school, Ikere L.G.A. Ekiti State. The sample size

was 180 students and questionnaire was used as data collecting instrument. The data collected was analyzed using Pearson's Product Moment correlation coefficient. The previous and present studies adopted correlational survey design and Questionnaire. The previous study used Pearson Product Moment Correlation coefficient as statistical tool while the present study used t-test, simple regression and multiple regressions as statistical tools. The result of the previous study indicated that there is significant relationship in the student's attitude and interest in biology and academic achievement in Biology.

Ekong, Akpan, Anongo and Okrikata (2005) conducted study on the influence of selected variables on students' academic performance in genetics and their implications for effective application of STEM Education. The study was ex-post facto with sample size of 100 students drawn through simple random sampling technique. The instrument for data collection was questionnaire. The statistical tools were t-test and SPSS version 17.0. The results showed general positive attitude of students towards genetics. The t-test analysis showed a significant difference ($p=0.05$) for type of school attended and non-significant difference for students' gender and mode of entry into the university. This study differs from the present study in terms of sample (100) students, design (Ex-post factor) and statistical tool (SPSS version 17.0. and independent t-test). The present study selected 900 students as sample size and computed data using t-test, simple regression and multiple regressions as statistical tools. Both studies adopted questionnaire as instrument for data collection.

In (2012), Evangelia, Helen, Marganita, Irene and Maria conducted study on Greek Secondary School Students' motivation and interest in biology. The researchers adopted survey design with sample of 368 students. The data was generated through questionnaire and analyzed using SPSS version 16.1. The result revealed no interest in biology. The present study had sample size of 900 and used questionnaire too. T-test, simple regression and multiple regression were the statically tools used.

Odagboyi (2015) also investigated the effect of gender on academic achievement of students in biology using the jigsaw method. The study was quasi-experimental research with sample size of 88 SSI secondary school students. The researcher used biology achievement test (BAT) and data was analyzed with t-test at 0.05 levels of significance. The two studies differ in terms of design. The previous study was quasi-experimental design hence the present study is co relational survey design, with sample size of 900 SSII students drawn through simple random sampling techniques. The previous study had sample size of 88 students. The present study used t-test, simple regression and multiple regressions while the previous study used t-test for data analysis.

Equally, Ebele and Olofu (2017) investigated the impact of study habits on secondary students' academic performance in federal capital territory, Abuja. The researchers adopted descriptive survey design and sample size of 1050 senior secondary school students drawn through simple random sampling technique. The instrument used was questionnaire and analyzed with Chi-square.

The study revealed significant relationship between study habit and students' academic performance. The two studies differed in terms of sample size, designed, instruments, statistical tool and location.

Nabwire, Toili, Onguaya and Sougok (2014), Abigun, Onibunwa, Irunokhhai, Sada & Adesina (2015), Alufobai & Ibhafidon (2011) and Odagboyi (2015) conducted research on the influence of gender on the students' interest and academic achievement on subjects such as biology, integrated science, Mathematics and computer. The results of their own study revealed that there were no significance differences in the interest and academic achievement of male and female students in the subjects. The previous studies were conducted in foreign countries, south-south, North-central and south-West, Nigeria while the present study is being conducted in south-East Nigeria. Some of the previous studies and the present study adopted survey as design, random sampling technique, frequency count, percentages, and mean and regression analysis while others adopted Pearson Correlation Coefficient, chi-square, t-test and ANOVA as statistical tools.

Having reviewed studies on students' variables and found out that no single study comprehensively examined students' variables such as motivation, attitude, interest, gender, study habits and location in Nigeria and elsewhere. This study on these students' variables therefore filled the gap. The present study was conducted in south-East (Imo state) hence no known such study had been conducted in senior secondary schools in the South East, Nigeria.

CHAPTER THREE

RESEARCH METHOD

This chapter dealt with the general methods of the research work. The chapter has the following sub-headings. Research Type, Population, Sample and Sampling Techniques, Research Instrument, Validation of Research Instrument, Procedure for Data Collection and Data Analysis Techniques.

Research Type

The study is a correlation survey type. The correlation survey is conceived as the design that establishes a relationship between independent and dependent variables (Nworgu, 2014). Correlation design is considered appropriate in this study because it establishes the relationship between students' variables and academic achievement in biology. The independent variables are students' variables such as motivation, attitude, study habits, gender, interest and absenteeism while the dependent variable is academic achievement.

Population, Sample and Sampling Techniques

The target population for the study was all the senior secondary schools' students (SS II) in Imo State, Nigeria. There are 296 Secondary schools in six education zones, found in the 27 Local Government Areas of Imo State. There were 386,760 students in six education zones of Imo state. The total number of SS II students in all the zones was 129,092 students.

The sample size for the study was 900 SS II students offering Biology. The researcher adopted multistage sampling techniques so as to account for

sampling from various variables such as students, schools, education zones, locations and gender. For instance, 8 co-education schools, 4 each of single sex (boys and girls schools) were selected through simple random sampling techniques by balloting in Okigwe Education zone I. Furthermore, simple random sampling technique was adopted to select 72 students from the co-education schools, 36 students each from single sex (boys and girls) were equally selected giving a total of 144 students from Okigwe education zone I. In addition, half of the 144 students selected from the zone came from Urban and Rural schools of the zone. The same selecting techniques were replicated in all the remaining five zones of the state to obtain the 100 schools and 900 students used for the study.

Finally, nine students were selected through simple random sampling technique by balloting from the co-education, single sex (boys and girls) schools giving a total of 900 students from the 100 schools selected for the study. The details are depicted on the sample table in appendix vii

Research Instrument

There are four research instruments for the study which include students' Motivation in biology scale (SMBS), Students' Study Habits in Biology scale (SSHBS), Students' Attitude toward Biology Scale (SATBS) and Students' Interest in Biology Scale (SIBS). The instrument contains section "A" and "B". Section "A" has names of schools and personal information. Section "B" has four instruments which include Students' Motivation in biology scale (SMBS),

Students' Study Habits in Biology scale (SSHBS), Students' Attitude toward Biology Scale (SATBS) and Students' Interest in Biology Scale (SIBS).

The instruments have been designed to elicit information on the students' variables as predictors of students' academic achievement in biology in senior secondary school, Imo state, Nigeria. The instruments have four points rating scale of highly interested, moderately interested, marginally interested, and not interested. The same range applies to other instruments with different captions. The respondents (students) were instructed to tick only one good (✓) against the responses that appealed to them. The instruments have eighty (80) items. Each of the questionnaires has twenty (20) items. The researcher also developed a Pro-forma for collection of the SSII promotion Examination scores as achievement score in biology and class absenteeism from attendance register. The pro-forma has spaces for teachers to write their zones, name of school, and name of students, annual mean scores grade and annual percentage of absenteeism. The pro-forma(s) were given to teachers a week before the administration of the questionnaires for them to put the promotion examination scores and percentage of absenteeism of each student selected for the study. The total number of questionnaires issued to respondents was 910 but 900 were completely filled by students and returned. The number returned represents 98.90% of the total questionnaires issued.

Validation of Research Instrument

The instruments were subjected to face and content validity to three validates; one copy each was given to biology teacher, science educator in the department of science education, University of Ilorin and expert in Measurement and Evaluation, University of Ilorin. They were requested to validate the research instruments base on the appropriateness, Ambiguity, clarity, usability, relatedness to research questions and hypotheses. Consequently, the pieces of advice from the experts led to modification of the instruments such as increasing the questionnaire items, eliminating the unsuitable items, changing the questionnaires that started with “Does” because they lead to “Yes or “No” answers and changing the original title of study. Furthermore, the instruments were submitted to my supervisor for consideration and approval.

For the reliability test, copies of the questionnaires were administered twice to the students with interval of two weeks. The copies of the questionnaires were administered to twenty (20) students of non- selected schools but having similar characteristics. The reliability coefficients of the instruments were determined using Cronbach Alpha and found to be 0.89, 0.76, 0.74and 0.83 respectively.

Procedure for Data Collection

The procedure for data collection is a crucial sub-title of research method. At this stage, the researcher sought the permission to conduct the study in the

participating schools by obtaining an introductory letter from the HOD, Department of science Education, University of Ilorin, Kwara State which were issued to the host principals and teachers of the selected schools for consideration of involving their students for the study. The consent forms were equally issued to the respondents (SS11 Students) for filling and endorsement respectively.

The researcher assured the participating students that their efforts, safety and promotion exam scores on biology and their responses will be treated confidentially and used for the purpose of the study only. Students were also informed that participation is voluntary and no risk is involved because it involved filling of questionnaires only. The students were assured that they will not be victimized for not participating on the filling of the questionnaires. The researcher used the services of biology teachers of the selected schools as the research assistants. The researcher with the help of the research assistants administered the research instrument face-to-face. The instruments were retrieved from the respondents at the end of their responses. The data from the respondents were carefully packaged in an envelope for the purpose of data analysis. The reason is to reduce or completely avoid lost. The ethical issues were completely observed.

Data Analysis Techniques

The analyses of data collected from the respondents were answered using descriptive and inferential statistics. The research questions 1 to 6 were answered using simple correlations, while corresponding research hypotheses 1

were tested using multiple regressions at 0.05 significance level. SPSS version 25 was used for the analysis.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

This chapter presents the results of data analyses for this study using descriptive and inferential statistics. Specifically, research question 1 to 6 were answered with linear and multiple correlation, while the corresponding hypotheses 1 to 6 were tested with linear and multiple regression at 0.05 level of significance. SPSS version 25 was used for the analysis.

Research Question One: What is the biology achievement score of students' motivation, study habits, attitude, interest and absenteeism as predictors of academic achievement in Biology?

Based on the result of multiple regressions as shown in Table 3, there was a strong positive correlation among the predictors' variables (Motivation, Study-habits, Attitude, Interest & Absenteeism) and students' academic achievement in senior secondary schools' biology with 0.83 R value. Similarly, the R^2 value of 0.68 (68%) explains the variance in students' academic achievement in biology as explained by the model containing all the predictor variables (Motivation, Study-habits, Attitude, Interest & Absenteeism).

Table 3

<i>Model Summary of Motivation, Study-habit, Attitude, Interest and Absenteeism</i>				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.83 ^a	.68	.68	7.56

Predictors: (Constant) Motivation, Study-habit, Attitude, Interest & Absenteeism.

Ho₁: There is no significant relationship between students' motivation, study-habits, attitude, interest, absenteeism and their academic achievement in senior secondary schools' biology.

ANOVA table in Table 4 shows that there was a significance difference in the model ($F_{(1,898)}=317.77$; $p<0.05$), hence, the null hypothesis which states that there is no significant relationship between students' predictor' variables (students' Motivation, Study-habit, Attitude, Interest & Absenteeism) and their criterion variable (academic achievement in biology) is rejected. This implies that students' Motivation, Study-habit, Attitude, Interest and Absenteeism can collectively predict their achievement in senior secondary school biology. Also, Table 5 shows that students' absenteeism had most influence in their achievement, while motivation had least influence on the achievement. Furthermore, interest ($.014<0.05$), absenteeism ($.039<0.05$), attitude ($.000<0.05$) and study-habit ($.000<0.05$) significantly contributed to the model as their p-values were less than 0.05 significant level ($B=.66$; $p<0.05$), while motivation ($.840>0.05$) could not predict their achievement in senior secondary school biology as their p-values was greater than 0.05. The multiple regression equation is shown below:

Students Achievement in Biology = 64.303 + .005*Motivation + .090* Study Habit + .071* Attitude + .194* Interest - .625* Absenteeism

Table 4

ANOVA^a Results for Motivation, Study-habit, Attitude, Interest and Absenteeism

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	109095.387	6	18182.564	317.765	.000 ^b
	Residual	51097.613	893	57.220		
	Total	160193.000	899			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Motivation, Study-habit, Attitude, Interest& Absenteeism

Table 5

Coefficients of Achievement for Motivation, Study-habit, Attitude, Interest and Absenteeism

Model		Un -standardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	64.303	2.451		26.233	.000
	Motivation	-.005	.023	-.005	-.202	.840
	Study-habits	.090	.037	.071	2.450	.014
	Attitude	.071	.034	.059	2.062	.039
	Interest	.194	.038	.143	5.077	.000
	Absenteeism	-.625	.019	-.699	-33.527	.000

a. Dependent Variable: Achievement

Research Question Two: What is the biology achievement score of students' motivation as predictor of academic achievement in Biology?

Table 6 shows the model summary of simple regression analysis which involves students' motivation on their academic achievement in biology in senior secondary schools, 0.31 R value indicates that the two variables: motivation and academic achievement of students in biology correlate positively. Similarly, The R^2 value was 0.10, that is, 10% of the variations in

students' academic achievement in biology can be explained by the model containing only motivation.

Table 6

<i>Model Summary of Students' Motivation</i>				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.31 ^a	.10	.09	12.71

a. Predictor: (Constant), Motivation

HO₂: There is no significant relationship between students' motivation and their academic achievement in senior secondary schools' biology.

Table 7 shows that there was a significance difference in the model as ANOVA table revealed ($F_{(1,898)}=94.47$; $p<0.05$). This result rejects the null hypothesis which states that there is no significance relationship between students' motivation and students' academic achievement in biology in senior secondary schools. Hence, students' motivation can predict their achievement in senior secondary school biology. Also, Table 8 on coefficient of prediction to the whole model indicates that motivation contributed significantly to the model with p-value of .000 which is less than 0.05 significant level ($B=.30$; $p<0.05$).

The final simple regression equation is:

➡ **Students Achievement in Biology = 33.885 + 0.301* Motivation**

Table 7

ANOVA^a Results for Students' Motivation

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15247.684	1	15247.684	94.466	.000 ^b
	Residual	144945.316	898	161.409		
	Total	160193.000	899			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Motivation

Table 8

Coefficient^a of Students' Motivation

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	33.885	1.875		18.076	.000
	Motivation	.301	.031	.309	9.719	.000

a. Dependent Variable: Achievement

Research Question Three: What is the biology achievement score of students' study-habit as predictor of academic achievement in Biology?

Table 9 shows the result of simple regression analysis which involves students' study-habit on their academic achievement in biology in senior secondary schools, 0.45 R value indicates that the two variables: study habit and academic achievement of students in biology correlate positively. Similarly, The R^2 value was 0.198, that is, 19.8% of the variations in students' academic achievement in biology can be explained by the model containing only study habit.

Table 9

Model Summary for Students' Study-habit

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.445 ^a	.198	.197	11.959

a. Predictors: (Constant), Study-habit

HO₃: There is no significant relationship between students' study-habit and their academic achievement in senior secondary schools biology.

Table 10 shows that there was a significance difference in the model ($F_{(1,898)}=222.02$; $p<0.05$) as displayed in ANOVA table. This result rejects the null hypothesis which states that there is no significance relationship between students' study-habit and academic achievement in biology in senior secondary schools. Thus, students' study-habit can predict their achievement in senior secondary school biology. Also, Table 11 on coefficient of prediction (Independent Variable) to the whole model indicates that study habit contributed significantly to the model with p-value of .000 which is less than 0.05 significant level ($B=.56$; $p<0.05$).

The final simple regression equation is:

➡ Students Achievement in Biology = 21.739 + 0.560* Study habit

Table 10

ANOVA^aResults for Students' Study-habit

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31755.682	1	31755.682	222.027	.000 ^b
	Residual	128437.318	898	143.026		
	Total	160193.000	899			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Study-habit

Table 11

Coefficient^a for Students' Study-habit

Model	Un-standardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1	(Constant)	21.739		10.628	.000
	Study-habit	.560	.445	14.901	.000

a. Dependent Variable: Achievement

Research Question Four: What is the biology achievement score of students' attitudes as predictor of academic achievement in Biology?

The result of simple regression was shown in table 12 which indicates a relationship between students' attitudes towards biology and their academic achievement in senior secondary schools, 0.42 R-value indicates that there was a positive relationship between students' attitudes towards biology and their academic achievement. Similarly, The R^2 value was 0.174, that is, 17.4% of the variation in students' academic achievement in biology can be explained by the model containing only their attitude.

Table 12

Model Summary for Students' Attitudes

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.417 ^a	.174	.173	12.141

a. Predictors: (Constant), Attitude

HO₄: There is no significant relationship between students' attitude and their academic achievement in senior secondary schools' biology.

Table 13 shows that there was a significance difference in the model ($F_{(1,898)}=188.68$; $p<0.05$) as displayed in ANOVA table. This result rejects the null hypothesis which states that there is no significance relationship between students' attitude towards biology and students' academic achievement in senior secondary schools. Thus, students' attitude can predict their achievement in senior secondary school biology. Also, Table 14 which coefficient of prediction (Independent Variable) to the whole model indicates that students' attitude contributed significantly to the model with p-value of .000 which is less than 0.05 significant level ($B=.50$; $p<0.05$). the simple regression is shown below:

$$\text{Students Achievement in Biology} = 26.435 + 0.501 * \text{Attitude}$$

Table 13

ANOVA^a Results for Students' Attitude

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27814.570	1	27814.570	188.682	.000 ^b
	Residual	132378.430	898	147.415		
	Total	160193.000	899			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Attitude

Table 14

Coefficient^a for Students' Attitude

Model		Un-standardized Coefficients	Standardized Coefficients		
		B	Std. Error	Beta	t
1	(Constant)	26.435	1.879		14.072
	Attitude	.501	.037	.417	13.736

a. Dependent Variable: Achievement

Research Question Five: What is the biology achievement score of students' interests as predictor of academic achievement in Biology?

Based on simple regression shown in Table 15, there was a positive relationship between students' interest in biology and their academic achievement in senior secondary schools' biology with 0.49 R value. Similarly, The R^2 value of 0.235, that is, 23.5% explains the variance in students' academic achievement in biology as explained by the model containing only their interest.

Table 15

Model Summary of Students' Interest

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.485 ^a	.235	.234	11.680

a. Predictors: (Constant), Interest

HO₅: There is no significant relationship between students' interest and their academic achievement in senior secondary schools' biology.

ANOVA analysis showed in Table 16 that there was a significance difference in the model ($F_{(1,898)}=276.156$; $p<0.05$), hence, the null hypothesis which states that there is no significance relationship between students' interest in biology and their academic achievement in senior secondary schools biology. This implies that students' interest can predict their achievement in senior secondary school biology. Also, Table 17 indicates that coefficient of prediction (Independent Variable) to the whole model significantly contributed to the

model as p-value of .000 which is less than 0.05 significant level ($B=.66$; $p<0.05$). The simple regression is shown below:

$$\text{Students Achievement in Biology} = 15.758 + 0.660 * \text{Interest}$$

Table 16

ANOVA^a Results for Students' Interest

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	37676.628	1	37676.628	276.156	.000 ^b
	Residual	122516.372	898	136.432		
	Total	160193.000	899			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Interest

Table 17

Coefficient^a of Students' Interest

Model		Un-standardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	15.758	2.194		7.184	.000
	Interest	.660	.040	.485	16.618	.000

a. Dependent Variable: Achievement

Research Question Six: What is the biology achievement score of students' absenteeism as predictor of academic achievement in Biology?

The result of simple regression in Table 18 revealed that there was a positive correlation between students' absenteeism and their academic achievement in senior secondary schools' biology with 0.80 R value, also, R^2 value of 0.633(63.3%) was the variance in students' academic achievement in biology explained by the model containing only absenteeism.

Table 18

Model Summary for Absenteeism

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.80 ^a	.633	.633	8.087

a. Predictors: (Constant), Absenteeism

HO₆: There is no significant relationship between students' absenteeism and their academic achievement in senior secondary schools' biology.

Table 19 shows ANOVA result which indicates that there was a significance difference in the model ($F_{(1,898)}=1551.20$; $p<0.05$). The null hypothesis was rejected as the p-value .000 was less than 0.05 significant level; hence, students' absenteeism can predict their achievement in senior secondary school biology. Also, Table 20 shows that the un-standardized B coefficient (-.71) has a negative relationship in predicting whole model, thus, absenteeism contributed significantly to the model with p-value of .000 which is less than 0.05 significant level ($B=-.71$; $p<0.05$).

Table 19

ANOVA^a Results for Students' Absenteeism

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	101458.244	1	101458.244	1551.203	.000 ^b
	Residual	58734.756	898	65.406		
	Total	160193.000	899			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Absenteeism

Table 20

Coefficients^a for Students' Absenteeism

Model	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	87.578		92.030	.000
	Absenteeism	-.711	-.796	-39.385	.000

a. Dependent Variable: Achievement

Summary of the Findings

The following represents the summary of the findings:

1. motivation, study habits, attitude, interest and absenteeism significantly predicted academic achievement in Biology in senior secondary school ($R^2 = .68$, $F_{(1, 898)}=317.77$, $p<0.05$);
2. motivation significantly predicted academic achievement of senior secondary school Biology students ($B=.30$, $t_{(898)}=9.12$, $p<0.05$); ($R^2 = .10$, $F_{(1, 898)}=94.47$, $p<0.05$);
3. study habits significantly predicted academic achievement of senior secondary school Biology students ($B=.56$, $t_{(898)}=14.90$, $p<0.05$); ($R^2 = .20$, $F_{(1, 898)}=222.02$, $p<0.05$);
4. attitude toward Biology significantly predicted academic achievement of senior school Biology students ($B=.50$, $t_{(898)}=13.74$, $p<0.05$); ($R^2 = .17$, $F_{(1, 898)}=188.68$, $p<0.05$);
5. interest significantly predicted academic achievement in senior secondary school Biology students ($B=.66$, $t_{(898)}=16.62$, $p<0.05$); ($R^2 = .24$, $F_{(1, 898)}=276.16$, $p<0.05$); and

6. absenteeism significantly predicted academic achievement in senior secondary school Biology students ($B=-.77$, $t_{(898)}=-39.39$, $p<0.05$); ($R^2=.63$, $F_{(1, 898)}=1551.2$, $p<0.05$).

CHAPTER FIVE

DICUSSION, CONCLUSION AND RECOMMENDATIONS

The focus of this study was to investigate the influence of students' variables as determinants of academic achievement in biology in senior secondary schools in Imo State, Nigeria. Therefore, this chapter presents the discussion and conclusion of the findings. Also, recommendations and suggestions were made based on the findings.

Discussion

The finding showed that motivation can significantly predict students' academic achievement in senior secondary school biology. This is because, motivation usually lead to being appreciated and bring about self-confidence, hence, students who are well motivated either by their teachers or parents are always put in their best, and this will reflect in their overall academic achievement. The finding agrees with the finding of the study conducted by chow and bob (2013) who found out that student showed moderate level of intrinsic motivation, self-determination and self-efficacy and high level of extrinsic motivation in combined science. Furthermore, Cavalla, Rozman, Blinkeraft and Walker (2003) found out that intrinsically motivated individuals possess the following traits; they remain highly focused throughout their activities with clearly defined goals, are self-critical, self-reflected on their own action, realistic, relax and are not afraid to fail during learning. Ajaja, emperor

and Onwegbe (2007) found out motivated science students performed significantly better than the unmotivated science students.

The finding also revealed that study habits can predict students' academic achievement in senior secondary school biology. A good study habit will mostly likely bring about improved academic achievement in student, for instance, students who pay attention to lesson presentation and ask questions when lesson is not clear, also, revise every lesson after school will no doubt perform better than those that have lackadaisical attitude towards learning. Thus, having a good study habit will go a long way in bringing the best out of students in biology. This finding is in agreement with Ebele and Olofu (2017) who found out that study habits of students was significant with their academic performance in biology. Also, it agrees with that of Agbaje and Alake (2014) who found out that study habits predicted academic achievement in biology.

The finding further showed that students' attitude can predict significantly their academic achievement in senior secondary school biology. This is because learning requires certain attitude which must be developed for learning process to take place. That is why, students with positive attitude to learning will always want to prosper irrespective of their condition, while those with negative attitude learning may easily lose focus at the slightest provocation, hence positive attitude brings about improvement of performance in students' achievement in biology. The finding was in agreement with Owoeye and Agbaje (2016) who found out that there is significant relationship between students' attitude towards

biology and their academic performance in biology. In addition, the finding of Agbaje and Alake (2014) finding revealed that students' attitude towards science is better in predicting their academic achievement in science subjects.

It was further revealed from the findings that students' interest in biology was significantly predicting their academic achievement in senior secondary school biology. This is because, interest is the first positive step in achieving any goal, particularly in education (formal/informal), this will lay a proper foundation for learning to take place, thus, it will increase their mental awareness which will pave way for actually learning to take place. This finding had similar results with Agbaje and Alake (2014) which showed that students' interest in science subjects was a better predictor of students' performance among the variables considered. In the same vein, God-power and Ihenko (2017) found out that gender has significant influence on students' interest in integrated science. Contrary to other findings, Ugorji (2001) found out that there was a gender gap concerning students' interest in science.

Furthermore, the findings showed that students' gender cannot predict their academic performance in senior secondary school biology. This is necessary as adopting a particular learning style is no gender bias, hence, students exhibit learning style as it suits them and not necessarily being determined by their gender type. Though, several studies may have divergent views about students' learning style based on gender, but limiting it to a particular gender type is out of it as revealed by this study. Thus, this finding

agrees with Abubakar and Oguguo (2011), and Uduosoro (2011) found out that there was no significant difference between the performance of males and females in integrated science. In addition, the finding of Odagboyi (2015) agreed with this study by reporting that there was no significant difference between the mean scores of males and females. In contrary the finding, Temitope (2011) found out that due to African culture and tradition, males are more inclined towards science whereas females develop more interest in arts.

Conclusion

Based on the findings of this study, it was concluded that senior secondary school biology students exhibit different approaches to learning which may either make or mar their learning outcome, particularly, in biology. Therefore, this study concludes that student' motivation, study habits, attitude, interest and absenteeism can positively predict their academic performance in secondary school biology, while their gender type cannot predict their performance.

Recommendations

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

1. Teachers should encourage students to develop intrinsic motivation through the enhancement of extrinsic motivation such as verbal reward, showing respect to students, care, love, teaching students with appropriate instructional materials and methods.

2. Teachers should also develop the sense of empathy to arouse students' interest by integrating practical activities and field-trips to in order to make biology interesting.
3. Teachers should also encourage students to develop study habits by placing students in `peer group assignment, discussion group and projects activities group, this will make teachers to identify bad study habit and as well correct it. Also, government at all levels should collaborate and embark on free education policy, award of scholarships and sponsorship to all students both poor and handy on sciences to motivate and encourage them to develop interest and study habits on biology;
4. Parents and teachers should collaborate in reducing addictive used of social media sites and application as this will distract their intrinsic motivation, good study habits and interest in biology, thus leading to abuse of these facilities to play music, watch pornographic films and play games while teaching is going on in the classroom;
5. The curriculum planners and developers should develop curriculum that are spiral in nature (starting from simple to complex topics) and integrate affective, cognitive and psychomotor domains. Such curricula will encourage better teaching of biology topics and encourage students to develop interest in biology;

6. The examination bodies such as WAEC, NECO and NABTEB should supervise both examinations and marking of answer scripts thoroughly so as to produce outstanding results in sciences; and
7. Parents, government at all levels and non-governmental organizations should as a matter of urgency provide necessary financial resources to discourage students from developing absenteeism attitude. Also, educational demands such as payment of school fees and levies, buying of relevant textbooks and other required items to should be available for each student in order to study harder.

Suggestions for Further Studies

Further studies could be conducted using more students' variables as determinants of academic achievement in other subjects like physics and chemistry.

1. The study could be replicated using larger population and other regions of the country such as south-south, North- Central, North- west and Western part of the country.
2. The study could also be conducted in Junior secondary school using the same variables as determinants academic achievement in Basic science (JSS11)

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UNIVERSITY OF ILORIN, ILORIN, NIGERIA

DEPARTMENT OF SCIENCE EDUCATION

CONSENT FORM FOR SCHOOL PRINCIPALS

I, Ozioko Sylvester Ugwu, a postgraduate student of department of science education, University of Ilorin, Ilorin, Kwara State, Nigeria, is currently embarking on a Ph.D research study on the topic titled: Students' variables predictors of Academic Achievement in biology in Senior Secondary School in Imo State, Nigeria. The study is meant to ascertain the extent of Students' variables as predictors of Academic Achievement in biology in Senior Secondary School, Imo State, Nigeria, which has been considered crucial for better teaching, learning, effective administration and coordination by the school management. Consequently, the purpose of this form is to seek your consent for the involvement of your students and biology teachers in filling questionnaires for the study, which will be conducted in your school premises during the school hours. The researcher will treat any information obtained during the research work with utmost confidentiality. This is no risk involved; hence the study is concern with the administration of questionnaire to the students only. The study is voluntary and no student will be victimized. The data generated will be used for the research purposes only. Thanks for anticipated co-operation.

.....

Principal	Signature	Date
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APPENDIX II

UNIVERSITY OF ILORIN, ILORIN, NIGERIA

DEPARTMENT OF SCIENCE EDUCATION

CONSENT FORM FOR PARTICIPATING STUDENTS.

Dear student.

I humbly wish to inform you that you are selected to participate on the study titled: students' variables as predictors of Academic Achievement in Biology Senior Secondary School in Imo State, Nigeria. The purpose of seeking your consent is for you to participate in the study. I wish to appeal for evidence of volunteering to participate in the study.

Purpose of the study: The purpose of the study is to ascertain the extent, students' variables predicts Academic Achievement in Biology in senior secondary school, Imo State, Nigeria.

Procedure: Students offering biology will be required to respond to the research instruments which are designed to elicit information on the research topic.

Confidentiality: I wish to affirm that all information provided on the course of this study will be treated with utmost confidentiality and the information will be restricted to the research purpose only.

Risk: The questionnaire will be administered face-to-face with the help of research assistant/s in the school environment; hence no risk is evolved during the encounter.

Benefits: The expected benefits of the research work include, gains of enjoying good teaching and establishing good relationships between teachers and students, absolute motivation and freedom of speech and interaction with the classroom environment, adopting appropriate teaching methods, caring and empathy by teachers on the course of teaching and learning. These will pave way for better Interest and academic achievement in biology in external examinations such as NECO and WASSCE.

Rights of volunteers: Your participation in the study is optional. If you have any doubt, ambiguous issues, you may contact the Department of Science Education, University of Ilorin, Kwara State, Nigeria or you can call mobile phone number-08068531760.

Students' Response Agreement: The researcher having issued enough information about the research work, I hereby volunteer to participate in the research. Secondly, I have been informed that I can ask questions and there is no risk about the research work and also I can contact the Department of Science Education, University of Ilorin, kwara state, Nigeria. Or call Phone number; **08068531760**

.....
Participating Students

Signature

Date

.....
Parents/Guardian

Signature

Date

.....
Researcher

Signature

Date

APPENDIX III

UNIVERSITY OF ILORIN, ILORIN, KWARA STATE-NIGERIA

DEPARTMENT OF SCIENCE EDUCATION,

CONSENT FORM FOR RESEARCH ASSISTANT

Dear Sir/Madam,

With due respect, I wish to inform you that you have been selected as the research assistant for the study on students' variables as predictors of Academic Achievement in senior Secondary School in Imo State, Nigeria. Below is the detail information about research work and you are expected to endorse the consent form if you have volunteer to participate in the study after reading about the research.

Purpose of the Research: Generally, the purpose of the study is to ascertain the extent of students' variables serve as predictor of Academic Achievement in Imo State, Nigeria.

Procedure; There is no special training because the study involved the administration of questionnaire to teachers and students.

Benefits; The benefits of the study include better teaching and learning of biology concepts.

Confidentiality; The information provided by you during the research study will be treated with utmost confidentiality and used for the purpose of the research.

Rights of Volunteers: As a research assistant, your participation in the study is voluntary. You have the option of participating and not to participate. If you have any question about the research, you are free to contact Department of Science Education, University of Ilorin, Kwara state, Nigeria or call the researcher on the phone number **08068531760**

Research Assistant Respondent Agreement: I, as a research assistant voluntarily consent to participate in the research. I have been assured to ask questions and to contact Department of Science Education, University of Ilorin, Ilorin, Nigeria, or call mobile Phone number **08068531760**

.....

Research Assistant

Signature

Date

APPENDIX IV

GUIDE FOR VALIDATION OF THE RESEARCHINSTRUMENTS

PLEASE KINDLY,

1. Examine each item of the instruments and indicate its suitability for the content and behaviour it purports to measure.
2. Judge the suitability of language and indicate any correction/s.
3. Review the statements and indicate their correctness.
4. Make Suggestions for modifications of the instruments
5. Many items were generated so that the unsuitable ones can easily be replaced.

VALIDATION OF RESEARCH INSTRUMENT

Department of Science Education
University of Ilorin,
Kwara State, Nigeria

Dear Sir / Madam,

I am to carry out a research, which requires the assessment of how students' variables predictor of academic achievement of senior secondary school in Imo state, Nigeria.

I, therefore, request that you kindly help me with the validation of the questionnaire items. I enclose herewith copies of the instruments.

Your contribution will be highly appreciated.

Yours Faithfully,
Ozioko Sylvester.

QUESTIONNAIRES ON STUDENTS' VARIABLES AS PREDICTORS OF ACADEMIC ACHIEVEMENT IN BIOLOGY IN SENIOR SECONDARY SCHOOL, IMO STATE, NIGERIA

SECTION A; PERSONAL DATA

Dear Respondents.

The questionnaires below are designed to elicit information on students' variables as predictor of senior secondary school academic achievements. This is not examinations. Just be sincere as much as possible, hence there are no correct or wrong responses. They are for research purposes only.

Please (✓) against the column as appeal to you.

Name of Student.....

School: -----

Class.....

Type of School: Single-sex ☐ Co-educational ☐

Gender: Male ☐ Female ☐

SECTION B:

QUESTIONNAIRES ON STUDENTS' VARIABLES AS PREDICTORS OF ACADEMIC ACHIEVEMENTS IN BIOLOGY IN IMO STATE, NIGERIA

Institutions: Read each statement carefully, there are columns on the right hand side of the paper bearing: Highly Motivated(HM)4, Moderately Motivated(MOM)3, Marginally Motivated(MAM)2, Not Motivated(NM)1; Strongly Agree (SA) 4, Agree (A) 3, Disagree (D) 2, and Strongly Disagree (SD) 1; Highly Interested (HI) 4, Moderately Interested (MOI) 3, Marginally Interested (MAI) 2, Not Interested (NI) 1; Always(4), Often (3), Rarely (2), Never.(1); Excessively Chronic Absenteeism(ECA)4, Severely Chronic Absenteeism(SCA)3, Chronic Absenteeism(CA)2, Not at all(NA)1; Tick (✓) against the column that appeals to you, Remember that only one tick(✓) per column is allowed:

STUDENT'S MOTIVATION IN BIOLOGY, SCALE (SMBS)

S/N	(SMBS), ITEMS	HM	MM	MAM	NM
1	Achieving better than others in biology				
2	Viewing specimen under microscope during Biology practical				
3	Obtaining excellent result in Biology for further studies in high institution				
4	Obtaining excellent result Biology in order to find a high-paying job later				
5	Acquiring enough knowledge in biology to take care of myself health-wise				
6	Adopting field-trip and demonstration methods in teaching biology.				
7	Studying very hard to become Medical Doctor.				
8	Studying hard to attract government's scholarship				
9	I studying biology with ICT facilities				
10	Writing biology text books.				
11	Studying very hard to represent my school in Biology quiz				
12	Studying very hard to become a famous scientist like Charles Darwin				
13	Drawing biology diagrams during Biology lessons				
14	Doing biology assignment with computer.				
15	Studying very hard to become a professor				
16	Studying very hard to acquire the knowledge of rearing animals				
17	Studying very hard to obtain good grade in biology				
18	Dissecting specimen in the laboratory during practical				
19	Throwing quadrants during insect capture				
20	Labelling of specimen				

Source: Adopted from Britt, K, S.U. & Gorill, H. (2016). The academic motivation scale.

STUDENTS' STUDY HABITS IN BIOLOGY, SCALE (SSHBS)

S/N	(SSHBS), ITEMS	SA	A	D	SD
1	I study less than two hours a day in biology				
2	I stick to the schedule on my time table while studying Biology				
3	I write down important points while studying Biology				
4	I listen to radio while studying Biology				
5	I take short rest during a long study session in Biology				
6	I prefer studying Biology at mid-night				
7	I study Biology in quiet and lighted environment				
8	I only study when I have examinations				
9	I only study one concept in biology per day				
10	I always use biology Dictionary while studying				
11	I always consult my teacher if I don't understand what I am studying in Biology				
12	I always do self-test by asking and answering questions while studying Biology				
13	I always study more than two hours every day				
14	I don't stay where I am distracted while studying				
15	I always pray before studying				
16	I only study few weeks to the examination in Biology				
17	I always study in Biology laboratory				
18	I don't study at all because biology is boring				
19	I practice drawing and labelling biology diagrams while studying.				
20	I shut my door while studying Biology				

Source: Chiemeka, C. E. (2011). Study Behaviour Inventory.

STUDENTS' ATTITUDE TOWARD BIOLOGY, SCALE

S/N	(SATBS), ITEMS	Always	Often	Rarely	Never
1	I attend biology lesson in my school				
2	I do assignments in biology				
3	I am frightened when I think of genetics				
4	I attend conferences with experts to update my knowledge in biology				
5	I practice dissecting of specimens in biology				
6	I study with ICT facilities to make me understand Biology better.				
7	I participate in group discussion				
8	I use acronym while studying biology				
9	I answer revision questions in my biology textbooks				
10	I participate actively during practical lessons in Biology				
11	Biology is valueless to me so I don't study it				
12	I study ahead of time with my Biology books				
13	I ask questions during Biology lessons				
14	I attend to aquatic organisms in aquarium				
15	I don't attend lessons on genetics				
16	I attend biology lesson without writing materials.				
17	I feel burden sourcing for biology specimens.				
18	I find meaning of difficult concepts in biology dictionary				
19	I summarize lesson notes in biology				
20	I consult my teacher for difficult concepts in Biology				

Source: Adopted from, <https://www.jstor.org/stable/4452-29>

STUDENTS' INTEREST IN BIOLOGY, SCALE (SIBS)

S/N	(SIBS), ITEMS	HI	MOI	MAI	NI
1	Observing specimen on microscope				
2	Studying biology as a subject				
3	Doing assignment on biology before others				
4	Organizing group discussion in biology.				
5	Studying biology related course in university.				
6	Attending biology lessons taught with power point.				
7	Participating in field-trips in Biology				
8	Dissecting animals during practical lessons				
9	Reciting botanical names of animals and plants.				
10	Calculating population density of organism in ecology				
11	Listening to Biology quiz and programmes on radio.				
12	Drawing and labeling diagrams of plants and animals				
13	Viewing Biology practical and lessons on television				
14	Identifying ,drawing and labeling of animal bones				
15	Demonstrating osmosis using Irish potatoes				
16	Throwing quadrant to determine population density of organisms				
17	Demonstrating respiration using potted plants				
18	Using ICT facilities for studies in biology				
19	Identifying reproductive organs of plants				
20	Classifying living things into plants and animals.				

Source:Chiemeka,C. E. (2011). Study Behaviour Inventory

APPENDIXV

FACULTY OF EDUCATION, DEPARTMENT OF SCIENCE EDUCATION,

UNIVERSITY OF ILORIN, ILORIN, KWARA STATE, NIGERIA

PRO-FOMA FOR COLLECTION OF SSII STUDENT'S PROMOTION EXAMINATION

SCORES AND PERCENTAGE OF ABSENTEEISM IN BIOLOGY

NAME OF SCHOOL-----

CLASS-----

GENDER:

MALE

☐

FEMALE

☐

S/N	NAME OF STUDENTS	SCORES	GRADE
1			
2			
3			
4			
5			
6			
7			
9			
10			
11			
12			
13			
14			
15			
16			
17			
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28			
29			
30			

APPENDIX VI

2015/2016 REPORT ON STAFF/STUDENTS DISTRIBUTION

OKIGWE ZONES 1

2015/2016 REPORT ON TEACHERS/STUDENTS' DISTRIBUTION					
S/N	NAME OF SCHOOLS	URBAN/RURAL SCHOOLS	NO OF TEACHERS	NO OF STUDENTS	NO,BIOLOGY TEACHERS
	OKIGWE ZONE 1				
	Isiala Mbano LGA				
1	Amaraku Comm. Sec. Sch.	U	15	598	2
2	Amanuziri Comp. Sec. Sch.	R	8	535	1
3	Amara Com. Sec. Sch.	U	16	739	2
4	Comm.. Sec. Sch. Osuachara	R	11	266	1
5	Comp. Sec. Sch. Mbeke-Osu	R	21	500	3
6	Eziama Sec. School Osuama	R	13	725	1
7	Ezihe Com. Sec. Sch.	U	12	413	1
8	Obollo Sec. Tech. Sch.	U	12	574	1
9	Ogbor-Ugiri Com. Sec. Sch.	R	14	580	1
10	Okohia Sec. Sch.	R	12	399	1
11	Okohia-Osu Tech. College	R	23	853	2
12	Umudurd-Osu Com. Sec. Sch.	R	11	408	1
13	Umuneke-Ugiri Sec. Sch.	U	6	320	1
14	UmunkwoGilrs Sec. Sch. Ugiri	R	17	521	2
15	Umunozo Sec. Sch. Ugiri	R	7	297	1
		5U/10R	198	15728	21
	Okigwe LGA				
1	Agbobucomm.. sec sch.	U	6	508	1
2	Akucomm.. sec. sch.	U	5	401	1
3	Comm..sec. sch okigwe.	U	26	1017	2
4	Ezinachicomm.. sec. sch.	R	7	546	1
5	Girls sec.schihube.	U	12	669	1
6	Umulolo boys sec. sch.	U	7	195	1
7	Umulolo high sch.	U	12	177	1
8	Umuowa-Ibu sec. Tech. sch.	R	4	205	1
9	Urban sec. sch. Ubaha-okigwe.	U	20	1098	2
10	WomenEedu. Centre.okigwe.	U	2	-	1
		8U/2R	101	11818	12
	Onuimo LGA				
1	Comm.. sec. sch. Okwe	R	11	311	1
2	Okigwe national Grammar school.	U	7	422	1
3	Okwelle sec. sch. Okwelle	U	8	390	1
4	Umunehekeokwecompr. Sec. sch.	R	9	513	1
5	UmuduruEgbeaguru sec. sch.	R	5	337	1
		2U/3R	40	6973	5

2015/2016 REPORT ON TEACHERS/STUDENTS DISTRIBUTION					
S/N	NAME OF SCHOOLS	URBAN/RURAL SCHOOLS	NO OF TEACHERS	NO OF STUDENTS	BIOLOGY TEACHERS
	OKIGWE ZONE II				
	Ehime Mbanu LGA				
1	AgbaharaNsu comm. Sec. sch	R	24	403	2
2	Agbaja sec. Tech sch.	R	8	728	1
3	Model sec. sch umualumaku/umuihim	U	26	513	2
4	Comm. Sec. sch. Umunumo	U	21	554	2
5	Compr. Sec sch.umunakanu	R	17	402	1
6	DiokpaNzeremcomm.sec sch	R	5	444	1
7	Ezeoke high sec. Nsu	R	13	349	2
8	Ibeaforsec.schumunumo	R	15	558	1
9	Nsucompr.High sch. Umuannunu	U	22	555	2
10	Umuduru-Nsu Boys sec. sch	U	18	429	1
11	Umuleke/umueze sec commercial sch.	U	29	784	2
12	Umueze 1 sec. Tech. sch.	R	16	341	1
13	Umezell sec. sch	U	21	447	1
14	Umuezeala Ama sec. sch	R	13	162	1
15	Umuakabia sec. sch	R	7	449	1
16	Union compr.Sec. sch. Nzerem	R	7	412	1
17	Umuezealaogwara sec. sch	R	14	291	2
		6U/11R	276	16871	24
	IhiteUboma LGA				
1	Abuakacommm.. sec. sch	R	15	569	1
2	Amainyi high sch.	U	21	520	3
3	Amainyintacommm.. high sch.	U	9	301	1
4	Amakohia sec. sch.	U	22	388	2
5	Boys high sch. Amazu-ihitte.	U	11	215	1
6	Comm.. sec sch. Umuawuchi	R	4	56	1
7	Madonna sec. sch Etit	U	18	632	2
8	NwaeruruMbakwecompr. Sec.sch.umuihi	R	9	290	1
9	Okaracompr. Sec. sch.	U	11	547	1
10	Uboma sec. sch.Ikperejere	U	15	330	1
11	Umuezegwusec.Tech. sch.	R	12	492	1
12	Women Edu. Centre	R	7		1
		7U/5R	154	9340	16
	Obowo LGA				
1	Achara sec. commercial sch.	U	8	494	1
2	Amanzecompr.sec sch.	R	16	504	2
3	Avutu sec. Tech sch	U	15	588	1
4	Ehunachicompr. Sec. sch.	R	18	711	2
5	Okenalogho sec. Tech. sch.	U	24	855	2
6	Okwuohiacomm.. sec. sch.	R	9	307	1
7	Umuariam sec. Tech. sch.	U	19	540	1
8	Compr. Sec. sch. Amuzi	U	8	620	1
		5U/3R	177	10619	11

2015/2016 REPORT ON TEACHERS/STUDENTS DISTRIBUTION ORLU ZONES 1

S/N	NAMES OF SCHOOLS	URBAN/ RURAL SCHOOLS	NO OF BIOLOGY TEACHERS	NO OF STUDENTS	BIOLOGY TEACHERS
	ORLU ZONE 1				
	Ideato North LGA				
1	Akokwa high school	U	14	785	1
2	Akokwa sec. tech sch.	U	15	737	1
3	Akpulu sec. sch	R	8	384	1
4	Commercial sec. sch osina	R	15	537	2
5	Compr. Sec. sch. AnicheObinetiti.	R	3	450	1
6	Compr. Sec sch. Uruala.	U	14	618	1
7	Iheme Mem. S.S. Arondizuogu.	R	10	362	1
8	National high sch. Arondizuogu.	U	6	434	1
9	Obodoukwu sec. Tech sch.	R	8	532	1
		4U/5R	93	9839	10
	Ideato South LGA				
1	Amanator comm. sec. sch. Ogboza	U	8	825	1
2	Isiekenenesi high sch.	R	5	927	1
3	National sec. sch. Ntueke	U	13	744	2
4	Sec. Tech. sch. Dikenafai.	R	9	338	1
5	Ugbelecomm.. sec sch.	R	15	460	1
6	Umueshi sec. sch.	U	10	277	2
7	UmumaIsiaku comp. sec. sch.	R	9	304	1
8	Umuobomcomm.. sec. sch.	R	12	397	1
		3U/5R	81	9272	10
	Isu LGA				
1	Compr. Sec. sch. AmurieOmanze.	U	13	1013	1
2	EbenatorEkwe sec. sch.	R	10	444	2
3	Ekwe sec. sch.	R	10	1052	1
4	Isunjabacompr. Sec. sch.	R	9	819	1
5	Isunjaba high sch.	U	10	575	1
6	Sec. Tech sch. Amandugba.	U	10	966	1
		3U/3R	62	9869	7
	Njaba LGA				
1	Amucha sec. Tech sch.	U	14	357	1
2	Comp. sec. Tech sch. Nkume-Isu.	R	16	393	2
3	Girls sec. Tech sch. Umuaka	R	19	1116	1
4	Sec. compr. Sch. Atta	U	10	769	1
5	Sec. Tech sch. Okwudo	R	19	751	2
		2U/3R	79	7516	7
	Nkwere LGA				
1	Comm.. sec. sch. Amaokpara	R	8	349	1
2	Compr. Sec sch. EziamasObaire	R	14	376	1
3	Owerri-Nkwoji sec. sch.	U	12	145	1
4	Nkwere high sch.	R	12	545	2
5	Girls Model EziamasObaire	U	6	610	1
		2U/3R	52	5025	6

ORLU ZONE I

S/N	NAMES OF SCHOOLS	URBAN/ RURAL SCHOOLS	NO OF BIOLOGY TEACHERS	NO OF STUDENTS	BIOLOGY TEACHERS
	ORLU ZONE 1				
	Nwangele LGA				
1	Comm.. sec sch. Abba	U	8	533	1
2	Comm.. sec. sch. Agbja	R	10	527	1
3	Dick Tiger Mem sec.sch. Amaigbo	U	10	472	1
4	Isu Girls sec. sch	R	6	192	1
5	Isu high sch.	U	11	462	2
6	King Jaja High sch. Amaigbo	R	10	620	2
		3U/3R	55	5807	8
	Orlu LGA				
1	Comm.. sec. sch. Umuna	U	21	572	2
2	Comm.. sec sch. Mgbee	R	13	243	1
3	Comm.. sec sch. Obinugwu	R	9	302	1
4	Compr. Sec sch. Umuzuike	R	12	393	1
5	Ezinachi sec. sch. Orlu	U	21	919	2
6	Girls sec. sch.	U	23	1038	2
7	Green Uzorcompr. Coll Ihionia	U	8	341	1
8	IhiteOwerrecomm.. sec. sch.	U	13	493	1
9	Ogberuru sec. sch.	U	12	554	1
10	Ojike Memorial sec. sch.	U	17	645	1
11	Okporo sec. sch.	U	27	2228	2
12	Owerri-Ebeiricomm.. sec. sch.	U	25	1065	2
13	Sec Tech sch. Umuowa	U	16	1234	1
14	Township compr. Sec.schAmaifeke	U	32	1956	3
15	Umuezecomm.. sec. sch. Amaike.	R	12	206	1
16	Umuntanzecomm.. sec. sch.	R	13	1101	1
17	Special Edu. Centre Orlu.	R	15	97	2
		11U/6R	289	19290	25
	Orsu LGA				
1	Amanachi Commercial	U	19	1074	2
2	Comm.. sec. sch Awo-Idemili	U	20	1206	2
3	Eziamacompr. Sec. sch.	R	4	241	1
4	Girls sec. sch. Awo-Idemili	U	13	643	1
5	Ihittenassa sec. sch.	U	14	978	1
6	Orsu-Ihitteukwa sec. sch.	R	14	865	1
7	UmuhuOkabia sec. sch.	R	13	479	2
8	Sec Tech sch. Amaebu-Ebenato	R	7	94	1
		4U/4R	104	9580	11

ORLU ZONE II

S/N	NAMES OF SCHOOLS	URBAN/ RURAL SCHOOLS	NO OF BIOLOGY TEACHERS	NO OF STUDENTS	BIOLOGY TEACHERS
	ORLU ZONE II				
	Oguta LGA				
1	Agwa sec. sch.	U	9	1455	1
2	Comm. Sec. sch. Awa	R	9	339	1
3	Egbuoma sec. sch.	U	10	825	2
4	Ejemekwuru/Akabor sec. sch.	R	9	776	1
5	Ezeorsu sec. sch.	R	4	394	1
6	Izombe sec. commercial sch.	U	10	735	2
7	Priscillia Mem sec. sch.	U	9	1075	1
8	St Micheals sec. sch. Orsuobodo	R	7	375	1
9	Trinity High sch.	R	5	442	1
10	Umunwama Girls sec. sch.	R	8	336	1
		4U/6R	80	13752	12
	Ohaji/Egbema LGA				
1	Abechekecompr. Sec sch. Egbema	R	3	392	1
2	Comm.. sec. sch. Awara	R	8	419	1
3	Commercial sec. sch. Assa	R	6	635	1
4	Mmahu sec. sch. Egbema	U	5	865	1
5	Obosima sec. Tech school.	R	10	732	2
6	Ohuobacompr. Sec. sch.	R	14	614	2
7	Umuapu sec. sch. Ohaji	U	24	830	2
8	Umudikecompr. Sec. sch.	R	10	734	1
9	Umuokannecompr. Sec. sch.	U	17	719	1
10	Egbema sec. sch.	R	8	510	1
11	Umunwaku sec. sch.	U	20	805	2
		4U/7R	125	14255	15
	Oru East LGA				
1	Akatta sec. sch. Oru east	U	15	1218	1
2	Akuma sec. sch.	R	17	810	2
3	Amiri sec. sch.	R	8	951	1
4	Amiri Girls sec. sch.	R	11	540	1
5	Compr. Sec. sch. Awo-Omamma	R	16	616	2
6	Omuma sec. Tech sch.	U	14	660	1
7	Sec. Tech sch. Awo-omamma	R	7	657	1
8	Ubogwu sec. comm.. sch. Awo-omamma	U	10	758	1
		3U/5R	98	12710	10
	Oru West LGA				
1	Comp. sec. sch. Ozara	R	9	532	1
2	Comp. sec sch. Ubulu	U	7	819	1
3	Compr. Sec. sch. Ibiasegbe	R	12	687	1
4	Mgbidi sec. sch.	U	15	702	2
5	Nempi sec. sch.	U	10	778	2
6	Ohakpu sec. compr. School	R	8	416	1
7	Otulu sec. comm.. sch.	R	9	273	1
8	Umuorji Girls sec. sch. Mgbidi	U	21	1255	2
		4U/4R	91	9962	11

OWERRI ZONES 1

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S/N	NAME OF SCHOOLS	URBAN/RURAL SCHOOLS	NO OF TEACHERS	NO OF STUDENTS	BIOLOGY TEACHERS
	OWERRI ZONE 1				
	Ikeduru LGA				
1	Amaimocomm..Girlssec.sch.	R	19	678	2
2	Amattacomm.. sec. sch.	U	27	797	3
3	Atta Boys sec. sch.	U	29	880	3
4	Comm.. sec sch. Ugirike	R	9	280	1
5	Comm.. sec. sch. Inyishi	R	10	316	1
6	Compr. Sec. sch Avuvu	R	10	404	1
7	Iho-DimezeCompr. Sec. sch.	U	23	1221	2
8	Ngugocompr. Sec. sch. Ikeduru	R	16	641	2
9	Owu-Amakohia sec. sch.	R	12	436	1
10	Sec. commercial sch. Eziamia	R	16	576	2
11	Umudim sec. sch.	R	17	478	2
12	Umuoziri sec. Tech sch.	R	19	423	2
13	Uzoagba sec. sch.	R	19	1097	2
		3U/10R	226	14230	24
	Mbaitoli LGA				
1	Afara sec. sch.	R	14	592	1
2	Comm.. sec. sch. EziamiaObiato	R	22	615	1
3	Comm. .sec. sch. Mbieri	R	28	662	2
4	Comm.. sec. sch. Umuonyeali	R	56	501	3
5	Compr. Sec. sch. Ogwa	R	15	107	2
6	Compr. Sec. sch. Ubomiri	U	39	637	3
7	Girls sec. sch. Ifalaka	U	21	207	2
8	Girls sec. sch. Ubomiri	U	52	662	3
9	Ifalakacomm.. sec. sch.	U	22	433	2
10	IMS Deaf and Dumb Orodo	R	19	675	1
11	Mbieri sec. Tech sch.	R	16	744	1
12	Obazu Girls sec. sch.	R	48	302	2
13	OgbakuCompr. Sec. sch.	U	27	417	2
14	Orodo sec. Tech sch.	R	35	1405	3
15	UmuezeOgwa sec. sch. Ogwa	R	16	1478	1
16	Umunoha High sch.	R	16	1025	1
17	Umunoha sec. sch.	R	16	447	1
18	Umunobomcomm.. sec. sch. Mbieri	R	13	392	2
19	Compr. Sec. sch. Obi-Mbieri	U	4	298	1
20	Compr. Sec. sch. OfekataOrodo	U	8	501	1
		7U/13R	487	19100	35

2015/2016 REPORT ON TEACHERS/STUDENTS DISTRIBUTION					
S/N	NAME OF SCHOOLS	URBAN/RURAL SCHOOLS	NO OF TEACHERS	NO OF STUDENTS	BIOLOGY TEACHERS
	OWERRI ZONE 1				
	OWERRI Municipal				
1	Boys sec. sch. New owerri	U	96	1318	3
2	City college owerri	U	71	3222	3
3	Comp. Dev. Sec. sch. Douglas Rd. owerri	U	91	3538	3
4	Emmanuel college owerri	U	59	2118	3
5	Govt. sec. sch. Owerri	U	120	3492	4
6	Govt. Technical college Owerri	U	89	3097	3
7	Ikenegbu girls sec. sch. Owerri	U	114	4548	3
8	Imo Girls sec. sch. Owerri	U	42	1124	2
9	Urban Dev. Sec. sch.	U	87	2244	2
10	Young scientists college owerri	U	27	398	2
11	Women education centreowerri	U	6	293	1
12	Continuing Edu centreowerri	U	17	560	1
		12U	819	45000	30
	Owerri North LGA				
1	Agbala sec. sch.	R	28	833	2
2	Akwakuma Girls sec. sch.	U	84	2320	3
3	Cassita Maria sec. sch. Emekuku	R	47	960	2
4	Comm., sec. sch. Obibiezana	R	20	678	2
5	Comm., sec. sch. Emekuku	U	28	687	2
6	Compr. Sec. sch. Amakohia-Uratta	U	57	2102	3
7	Compr. Sec. sch. Emekuku	U	42	668	2
8	Compr. Sec. sch. Orji	U	66	1448	3
9	Development sec. sch. MbaomaEmii	R	21	558	2
10	Egbu comp. sec. sch.	U	36	1276	2
11	Emekuku high school	U	33	641	2
12	Emii sec. Tech sch.	U	15	492	1
13	Naze sec. sch.	U	49	1153	2
14	Obubecompr. Sec. sch. Egbelu	R	15	954	1
15	Ogbekeobibi sec. sch.	R	11	298	1
16	Uratta sec. sch.	U	50	859	2
		10U/6R	602	26427	32
	Owerri West LGA				
1	AmakohiaUbi sec. sch.	R	19	467	1
2	Amokahia sec. sch.	R	48	1176	2
3	Army Day sec. sch. Obinze	U	38	1754	3
4	Comp.sec. sch. Emeabian	R	10	739	1
5	Compr. Sec. sch. Avu	R	34	708	3
6	Compr. Sec. sch. Nekede	U	12	77	1
7	Eziobodo sec. Tech sch.	R	13	404	1
8	Ihiagwa sec. sch.	R	17	747	1
9	Ndegwu sec. sch.	R	24	1663	2
10	Nekede sec. sch.	U	46	1509	2
11	Oforolacomm., sec. sch.	R	14	353	1
12	Orogwecomm., sec. sch.	R	64	1964	3
13	Sec. Tech sch. Irete	U	33	460	2
		4U/9R	372	19021	21

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S/N	NAMES OF SCHOOLS	URBAN/ RURAL SCHOOLS	NO OF BIOLOGY TEACHERS	NO OF STUDENTS	BIOLOGY TEACHERS
	OWERRI ZONE II				
	AbohMbaise LGA				
1	AbohMbaise LGA	R	11	724	1
2	Compr. Sec. sch. Lagwa	R	10	389	1
3	Orji compr. Sec. sch.	R	16	659	2
4	Mbaise sec. sch.	U	35	1201	3
5	Mbutu sec. sch.	U	20	1323	2
6	Nguru sec. commercial school	U	29	1173	2
7	Nguru sec. Tech sch.	U	18	1121	1
8	Oke-Ovoro sec. sch.	U	23	1202	2
9	Okwuato sec. sch.	U	21	1246	2
10	Uzunorjicomm.. sec. school	R	9	790	1
11	Enyiogugu sec. school	R	11	519	1
		6U/5R	203	18347	18
	AhiazuMbaise LGA				
1	Ahiara Technical college	U	44	1544	3
2	Ahiza sec. sch. Afor-Oru	R	30	688	2
3	Comm.. sec. sch. ObodoAhiara	U	21	1042	2
4	Comm.. sec. sch. Amuzi	R	21	905	1
5	Ihenworie sec. sch.	R	21	530	2
6	Okirikanwekecompr. Sec. sch.	U	19	653	1
7	Oparanadim comp. sec. sch.	R	12	792	1
8	Sec. comm.. sch. OtuluAhiara	R	20	732	2
9	Sec. Tech sch. Obohia	R	23	968	2
10	Umuokirika sec. Tech sch.	U	20	680	2
		4U/6R	231	15534	18
	Ezinihite LGA				
1	Chokoneze sec. Tech sch.	R	16	749	1
2	Comm.. sec. sch. Itu	R	11	440	1
3	Comm.. sec. sch. Obizi	R	9	298	1
4	Eziagbogu sec. sch.	U	9	505	1
5	Eziudo Girls High school	U	14	432	2
6	Eziudo sec. Tech sch.	U	10	210	1
7	IhitteEzinihitte sec. sch.	U	12	512	1
8	Ime-Onitsha compr. Sec. sch.	U	11	552	1
9	Obizi High sch.	R	21	745	2
10	Oboama High sch.	R	17	565	2
11	Okpefe High sch.	U	17	796	2
12	Onicha sec. sch.	U	6	517	1
13	Udo sec. Tech sch.	R	6	197	1
		7U/6R	159	13518	17

2015/2016 REPORT ON TEACHER/STUDENT DISTRIBUTION

S/N	NAMES OF SCHOOLS	URBAN/ RURAL SCHOOLS	NO OF BIOLOGY TEACHERS	NO OF STUDENTS	BIOLOGY TEACHERS
	OWERRI ZONE II				
	Ngor-Okpala LGA				
1	Amala-Ntu sec. sch.	U	11	844	2
2	Comm.. sec. sch. Mbato	R	8	563	1
3	Comm..compr. Sec. sch. Umuowa	R	6	130	1
4	Compr. Sec. sch. Umuokwune	U	3	560	1
5	Imerienwe Girls sec. sch. NgorOkpala	U	10	923	1
6	Logara sec. sch.	R	13	1303	1
7	Ngor-Okpala High school	R	21	1263	2
8	Nguru-Umaro sec. sch.	R	12	620	1
9	Nnorie sec. Tech sch. Ngor-Okpala	U	5	75	1
10	Obiangwu sec. commercial sch.	U	16	817	2
11	Orshieze comm. sec.sch. Orishieze	R	6	356	1
12	Owerri Grammar sch. Imerienwe	R	13	669	1
13	Umuhucompr. Sec. sch.	R	28	808	2
14	Umuohiagu sec. sch.	R	17	827	1
		5U/9R	169	17760	18

2015/2016 REPORT ON TEACHERS/STUDENTS DISTRIBUTION IN IMO STATE,NIGERIA					
S/N	ZONES	URBAN/RURAL SCHOOLS	NO OF TEACHER	NO OF STUDENTS	BIOLOGY TEACHERS
	OKIGWE ZONE 1				
1	Isiala Mbano LGA	5U/10R	198	15728	21
2	Okigwe LGA	8U/2R	101	11818	12
3	Onuimo LGA	2U/3R	40	6973	5
	Total(3)	15U/15R(30)	339	34517	38
	OKIGWE ZONE II				
1	Ehime Mbano LGA	6U/11R	276	16871	24
2	IhitteUboma LGA	7U/5R	154	9340	16
3	Obowo LGA	8R	117	10619	11
	Total (3)	13U/24R(37)	547	36830	51
	ORLU ZONE I				
1	Ideato North LGA	4U/5R	93	9839	10
2	Ideato South LGA	3U/5R	81	9272	10
3	Isu LGA	3U/3R	62	9869	7
4	Njaba LGA	2U/3R	79	7516	7
5	Nkwere LGA	2U/3R	52	5025	6
6	Nwangele LGA	3U/3R	55	5807	8
7	Orlu LGA	11U/6R	289	19290	25
8	Orsu LGA	4U/4R	104	9580	11
	Total(8)	32U/32R(70)	815	76198	84
	ORLU ZONE II				
1	Oguta LGA	4U/6R	80	13752	12
2	Ohaji/Egbema LGA	4U/7R	125	14255	15
3	Oru East LGA	3U/5R	98	12710	10
4	Oru west LGA	4U/4R	91	9962	11
	Total(4)	15U/22R(37)	394	50679	48
	OWERRI ZONE I				
1	Ikeduru LGA	3U/10R	226	14230	24
2	Mbaitolu LGA	7U/13R	487	19100	35
3	Owerri municipal	12U	819	4500	30
4	Owerri north LGA	10U/6R	602	26427	32
5	Owerri west LGA	4U/9R	372	19021	21
	Total(5)	36U/38R(74)	2506	123377	144
	OWERRI ZONE II				
1	AbohMbaise LGA	6U/5R	303	18347	18
2	AhiazuMbaise LGA	4U/6R	231	15534	18
3	Ezinihitte LGA	7U/6R	159	13518	17
4	Ngor-Okpala LGA	5U/9R	169	17760	18
	Total(4)	22U/26R(48)	762	65159	71
	GRAND TOTAL(27)	135U /161R (296)		(386,760)	

SUMMARY ON TEACHER/STUDENT DISTRIBUTION IN SCHOOLS IN IMO STATE ,NIGERIA				
ZONES	URBAN RURAL SCHOOLS	NO OF TEACHERS	NO OF STUDENTS	BIOLOGY TEACHERS
OKIGWEZONE I	15U15R(30)	339	34517	38
OKIGWEZONE II	13U 24R(37)	547	36,830	51
ORLU ZONE I	32U 32R(70)	815	76198	85
ORLU ZONE II	15U22R(37)	394	50679	48
OWERRIZONE I	36U 38R(74)	2,506	123377	144
OWERRI ZONE II	22U 26R(48)	762	65159	71
TOTAL	135U 161R (296)	5,363	386,760	437

APPENDIX VII

SUMMARY OF POPULATION, SAMPLE AND SAMPLING TECHNIQUE

SIX (6) EDUCATION ZONES IN IMO, STATE	URBAN SCHOOLS	RURAL SCHOOLS	NO OF CO- EDUCATION SCHOOLS IN EACH ZONE	NO OF SINGLE SEX BOYS SCHOOLS PER ZONE	NO OF SINGLE SEX GIRLS SCHOOLS PER ZONE	CO- EDUCATION SCHOOL SELECTED PER ZONE	SINGLE SEX BOYS SELECTED PER ZONE	SINGLE SEX GIRLS SELECTED PER ZONE	NO OF CO- EDUCATION STUDENTS SELECTED PER ZONE	NO OF SINGLE SEX (BOYS) SELECTED PER ZONE	NO OF SINGLE SEX (GIRLS) SELECTED PER ZONE	NO OF STUDENTS PER ZONE
OKIGWE EDUCATION ZONE I	15	15	20	5	5	8	4	4	72 (36boys,3 6girls)	36	36	144
OKIGWE EDUCATION ZONE II	18	19	21	10	6	8	4	4	72 (36boys, 36girls)	36	36	144
ORLU ZONE I	32	38	41	13	16	9		5	81 (41boys,4 0girls)	36	45	162
ORLU ZONE II	15	22	20	8	9	8	4	4	72 (36boys,3 6girls)	36	36	144
OWERRI ZONE I	36	38	44	16	14	9	5	4	81 (41boys,4 0girls)	45	36	162
OWERRI ZONE II	22	26	26	13	9	8	4	4	72 (36boys,3 6girls)	36	36	144
TOTAL	138 SCHOOLS	158 SCHOOLS	172 SCHOOLS	65 SCHOOLS	59 SCHOOLS	50 SCHOOLS	25 SCHOOLS	25 SCHOOLS	450 STUDENTS	225 STUDENTS	225 STUDENTS	900 STUDENTS
296 SCHOOLS			296 SCHOOLS			100 SCHOOLS			900 STUDENTS			

NO SELECTED PER SCHOOL WAS 9 STUDENTS