**EFFECT OF INSTRUCTIONAL MATERIAL ON ACADEMIC ACHIEVEMENT OF PHYSICS STUDENTS IN SECONDARY SCHOOLS IN UDI LOCAL GOVERNMENT AREA OF ENUGU STATE**

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**U16/EDU/PHY/004**

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**JULY, 2018**

**TITLE PAGE**

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**DEPARTMENT OF SCIENCE AND VOCATIONAL EDUCATION (PHYSICS EDUCATION), FACULTY OF EDUCATION GODFREY OKOYE UNIVERSITY,**

**ENUGU**

**A RESEARCH WORK SUBMITTED TO THE DEPARTMENT OF SCIENCE AND VOCATIONAL EDUCATION, FACULTY OF EDUCATION, GODFREY OKOYE UNIVERSITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR IN SCIENCE EDUCATION (B.SC.B.ED)**

**JULY, 2018**

APPROVAL

This is to certify this research work titled “effect of instructional material on academic achievement of physics student in senior secondary school in Udi Local Government Area of Enugu State” has been read and approved as meeting the requirement of the Department of science and Vocational Education, Faculty of Education Godfrey Okoye University. Ugwuomu Nike Enugu.

By

Prof Eze Aaron

Project supervisor …………........................................ ………………………

 Signature Date

Prof. Agwagah UNV

Head of Dapartment ………………………………… ………………………

 Signature Date

Prof A.E. Eze

Dean of Faculty …………………………………….. ………………………

 Signature Date

External Examiner ………………………………….. ……………………… Signature Date

CERTIFICATION PAGE

I OkpeVenansia.O.a degree student in the department of Science and Vocational Educational with the Registration number. U16/EDU/PHY/004 has satisfaction completed the requirement for the course and the research work for the degree of bachelor in Science Education B.Sc. Ed (Physics). The work contained in this project report is original and has not been submitted in part or full for any diploma or degree of this or any other university.

………………………………..

OkpeVenansia .O.

DEDICATION

I dedicate this work to the almighty God, who has been with me all these years and also to able supervisor (Prof. Aaron Eze). Most especially to my ParentMr. and Mrs. Anthony Okpe who has been my rock.

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Special thanks and gratitude goes to the Almighty God for his kindness, mercy, grace and faithfulness upon me and also for his blessing and provision upon my family. My deep appreciation goes to my parents Mr and Mrs Anthony Okpe and siblings for seeing me through in all stays in school and financial assistance, provision of my needs.

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I will not fail to acknowledge my friend my Sylvester Owotakpa who has been guiding me and supporting me in my work for God with his infinite mercy bless him

Abstract

*The topic of the study is Effect of instructional material on the academic achievement of physics student in senior secondary school student in Udi Local Government Area of Enugu State. The purpose of the study was to determine the effect of instructional material on the academic achievement of physics student. The work was a pre-test, post-test of control and experimental group. The research design is quasi-experimental design. The researcher formulated two research question and two hypotheses that guided the study. The researcher used Physics achievement test as an instrument of data collection the population of the study is 525 and the sample size is 80 in four selected school government secondary schools in Udi Local Government Area of Enugu State. The data collected was analyzed using mean, standard deviation for the research questions and ANCOVA for the hypothesis analysis. The validity is face and content validity. The reliability is tested to be 1.0 using Karl Pearson Correlation The study revealed that the academic achievement of physics student depends on the use of instructional material and teacher’s attitude to arose the interest of the physics student. Result also showed that there is significant different between male and female student taught with instructional material because physics is seen as hard course. The following recommendations were made, government should organize workshop and seminar for teachers on the use of instructional material to arouse the interest of the student and educational planners should implement it in the school curriculum among others.*

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CHAPTER ONE

INTRODUCTION

BACKGROUND OF THE STUDY

Materials are classified according to many different criteria including their physical and chemical characteristics as well as their intended applications whether it is thermal, optical, electrical, magnetic, or combined materials can be anything consisting of pure or impure substance, a singular composite or a complex mix, living or non-living matter, whether natural or man-made, either concrete or abstract ideas. . Ibeneme (2000) defined teaching aids as those materials used for practical and demonstration in the class situation by students and teachers.

Instructional materials are essential and significant tools needed for teaching and learning of school subjects to promote teachers’ efficiency and improve students’ performance. They make learning more interesting, practical, realistic and appealing. They also enable both the teachers and students to participate actively and effectively in lesson sessions. They give room for acquisition of skills and knowledge and development of self- confidence and self- actualization. They are print and non-print items that impact information to students in the educational process. Instructional materials include items such as: kits, textbooks, magazines, newspapers, pictures, recording videos etc. Fadeiye (2005) saw instructional materials as visual and audio-visual aids, concrete or non-concrete, used by teachers to improve the quality of teaching and learning activities in Social Studies. Agina-Obu (2005) submitted that instructional materials of all kinds appeal to the sense organs during teaching and learning. Instructional materials play a very important role in the teaching and learning process. It enhances the memory level of the students. At this time that education has spread wide and entirely, oral teaching cannot be the key to successful pedagogy. Therefore the teacher has to use instructional materials to make teaching and learning process interesting (NIC hulls, 2003; Raw 2006) .The Board is also responsible for the content of all instructional materials used in a classroom, whether adopted and purchased from the state-adopted instructional materials list, adopted and purchased through the District instructional materials program or otherwise purchased or made available in the classroom.

Orji (2000) asserts that teaching aid is “the guidance of learning activities” that “a teacher uses to motivate and arouse student’s desire to learn” From the fore-going statement, it can be agreed that for effective learning to take place, a student need to be properly guided by the teacher by way of employing various method and means through which his teaching could be meaningful.

Instructional materials and resources shall be provided in a variety of formats that are appropriate, timely, and essential to the attainment of specified educational objectives and are free of bias, stereotypes, distortions, and prejudices. These items may be provided in a variety of forms, bound, unbound, kit, or package form and may consist of hard backed or soft backed textbooks, electronic content, consumables, learning laboratories, manipulative, electronic media, and computer courseware or software. Instructional materials, including textbooks, educational media (library media print, nonpoint, and electronic resources), computer software, digital content, videotapes used by teachers to aid explanations and make learning of subject matter understandable to students during teaching learning process. The Board must either (1) adopt instructional materials selected from the state-approved materials according to the state adoption cycles, (2) adopt instructional materials pursuant to a Board instructional materials review program prescribed by this policy, or (3) a combination of both.

Isola (2010) also described instructional materials as objects or devices that assist the teachers to present their lessons logically and sequentially to the learners. Obanya (2004) asserted that several studies carried out in some areas in Nigeria indicated that the results of Senior School Certificate Examinations was completely bad in nearly all subjects offered by the students. He stressed further that only about 10% of candidates ‘meaningfully passed’ the examination. Abdu-Raheem (2011) asserted that non availability and inadequacy of instructional materials are major causes of ineffectiveness of the school system and poor performance of students in schools. Ahmed (2003) confirmed that in most secondary schools in Nigeria, teaching and learning take place under a most un-conducive environment without access to essential materials. Eniayewu (2005) posited that it is very important to use instructional aids for instructional delivery to make students acquire more knowledge and to promote academic standard.

The use of instructional materials can enhance the learning achievement. Cronbach (2009) states the important elements of behaviour that provides the base for learning theory situation which consists of all the objects, persons and symbols in the learning environment. Experience in situation prepares a person to respond to similar situation in future. Use of instructional materials can appeal to the individual attention by creating interest goal that will help the learner achieve direct effort. Teacher’s problem of motivation is essentially one of arranging situation with instructional materials in which the learner will see goals he want to attain. Brown etal (2005) summarized the role of teaching aids as follows:

•It promotes meaningful communication and effective learning.

•They ensure better retention, thus making learning more permanent.

•They help to overcome the limited classroom by making the inaccessible accessible.

•They provide a common experience upon which late learning can be developed. •They stimulate and motivate students to learn.

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•They encourage participation especially if students are allowed to manipulate materials used. Osuala (2010) in his own contribution said it does not only help to motivate and develop interest on the part of the student, but also help to bring about an enhance respect for teachers knowledge of the subject. Instructional materials are also described as concrete or both to the sense organs during teaching (Aginna-Obu 2000).The nature of the learning and the wide range of student’s abilities in the average classroom necessitate a high degree of teachers and experience in the method of presenting the subject matter. This has been truncated with the unavailability of instructional materials in schools. However, a common goal a teacher carries wherever he is, to make lesson presentation vitally fresh, stimulating and testing for their students. This will help the teacher to individualize the learning method as well as the content and also working according to the student’s need. This goal can be reached most effectively through the use of instructional materials. The need to emphasis on the use and importance

of instructional materials in any learning and teaching environment cannot be underestimated. For any learning to take place, the teacher has to make use of these materials that would enable him to teach effectively.

Equipment and other instructional materials to the some extent determine the method the teacher uses in teaching physics. The method adopted could be demonstration, experimental, discussion, inquiry-based method, explanation etc. It is generally agreed by both teachers and school administrators that apart from the most boards and textbooks which are often available for the teacher to use, there are other materials that aid or are capable of complementing the teacher’s effort in teaching/learning process. Those materials are commonly called “instructional materials. One of the reasons why students in our secondary schools sometime find it difficult to comprehend immediately what is being taught by the teacher is the non availability of instructional materials that can easily convey the message of the lesson to the learners. In addition, Ajayi and Ayodele (2001) stressed the importance of availability of instructional materials to achieving effectiveness in educational delivery and supervision in the school system. Ogbondah (2008) alerted on the gross inadequacy and under utilization of instructional materials necessary to compensate for the inadequacies of sense organs and to reinforce the capacity of dominant organs. He noted that school teachers should try their possible best in the provision of locally made materials in substitution for the standard ones to promote their lessons.

Abdu-Raheem (2014) encouraged teachers to improvise teaching aids because they are in great measure enhance learners’ full participation in the lesson, gives room for inquiry, problem-solving, discussion and clarification of issues and ideas among students and the teacher.

He suggested the needs for teachers to find necessary materials for instruction to supplement what textbooks provide in order to broaden concepts and arouse students ‘interests in the subject, attested that effective teaching and learning requires a teacher to teach the students with instructional materials and use practical activities to make learning more vivid, logical, realistic and pragmatic. Esu, Enukoha and Umoren (2004) agreed that instructional materials are indispensable to the effective teaching and learning activities.

Enaigbe (2009) noted that basic materials such as textbooks, most board and essential equipment like computer, projector, television and video are not readily available in many schools. In a town study, Olumorin, Yusuf, Ajidagba and Jekayinfa (2010) observed that instructional materials help teachers to teach conveniently and the learners to learn easily without any problem

**STATEMENT OF THE PROBLEM**

One of the most problems facing Nigeria education today is poor performance in science education. The rate of student poor academic achievement in physics is really disturbing, internal and external examination. The poor academic achievement of students in physics has attributed to many factors which are lack of instructional material and skills needed for effective teaching and inability to provide or improvise material relative to the topic depending on the school type. Unqualified teachers and teacher’s attitude towards effective teaching and learning, lack of student interest in physics as subject. It is observed that most students complain of being taught principles that seem to be abstract in nature because materials such as textbooks, most board and essential equipment like computer, projector, television and video are not readily available in many schools. In Indian axioms that says, what I hear, I may forget but what see, hear and touch I will never forget. This is because physics teachers adopt the verbalistic and theoretical method as a way of teaching and learning of physics thereby making students to loose interest. In Nigeria, for example experience has shown that spoken words alone in the communication of ideas are grossly ineffective and inefficient in producing desired learning outcomes. One of the major problems facing education sector in Nigeria is the low level of the performance of secondary school students in both local and standardized examinations. It has become a great concern for researchers, educators and all education stake-holders over the years. It was observed that students usually fail in examinations owing to improper teaching methods and lack of essential teaching aids for instructional delivery. (Afolabi, 2009). This study therefore deemed it necessary to look specifically into the contributions of instructional materials to academic achievement of secondary school students in physics. The reason for this could be ascribed to the fact that there are topics in Physics that pose serious problem of comprehension to students. These topics cannot be taught effectively without the use of relevant instructional materials to make the learning practical. However, the questions here are: does the use of instructional materials really influence student’s academic performance? Is teaching effectiveness enhanced by the use of instructional materials?  Could students learning be advanced by the use of instructional materials? Finding answers to these questions and more summarizes the entire problem of this study

 **SIGNIFICANCE OF THE STUDY**

The study has both theoretical and practical significances. In the theoretical aspect, it is the use of Jean Piaget on the cognitive development and behavioral learning theory which center on the child development knowledge, intelligence and high level of thinking that allows the child to acquire problem solving skills by inventing or constructing reality out of experience and thus mix their observation with their ideas about how the world works. It also provides individual with a certain behavioural management plan or change based on observation in the classroom. On the practical aspect, the findings of the study will benefit the followings, the students, schools, physics teachers, textbook writers, curriculum planners and government. Constructivist teaching is based on the belief that learning occurs as learners are actively involved in a process of meaningful and knowledge construction as opposed to passively receiving information. Through interaction with the physical situations, or concrete objects, a child’s physical experience accumulates and he is able to conceptualize, think creatively and logically. The child therefore develops skills to abstract problems. According to this theory, learners are the makers of knowledge and meaning Constructivists believe that "learners construct their own reality or at least interpret it based upon their perceptions of experiences, so an individual's knowledge is a function of one's prior experiences, mental structures, and beliefs that are used to interpret objects and events." "What someone knows is grounded in perception of the physical and social experiences which are

Students: the study will change student attitude to learn physics since the use of instructional during teaching and learning made the lesson very interesting by having direct contact with the material by touching, smelling or tasting of the object thereby enhancing their performance in the subject in question. This is because according to Nwadinigwe (2000), learning is a process through which knowledge, skills, habits, facts, ideas and principles are acquired, retained and utilized; and the only means of achieving this is through the use of instructional materials.

School: it help the school have a well equipped laboratory and a good environment on production of improvised and standardize resource material suitable for teaching and learning without waiting for government tom provide it for them. It also helps know the number of student in the classroom and proper monitoring of teachers or student teacher on the use of instructional material.

Textbook writers: inclusion of instructional material needed to teacher the particular topic base on specific objectives.

Physic teachers: The effective use of standardize or improvised material to make the teaching effective and productive base on observation and evaluation. This is in line with assertion of Ekwueme and Igwe (2001) who noted that it is only teachers who will guarantee effective and adequate usage of instructional materials and thereby facilitate success. He further says that instructional materials are of high value in importing information, clarifying difficult and abstract concepts, stimulating thought, sharpening observation, creating interest and satisfying individual difference.

Government: production and provision of resource instructional material to school base on the subject offered. Organizing seminar and workshop on the utilization of instructional material especially in the area of science and technology. And parent teacher their children on how to embrace technology.

Curriculum planner: when developing syllabus and scheme of work, space for the provision of instruction material should be made with related topics and days of supervision of teachers with instructional material.

**SCOPE OF THE STUDY**

This study is focused on investigating the effect of instructional material in academic performance of physics student in secondary school in Udi Local Government Area of Enugu State. It was carried in senior secondary school two (SSII) class public schools in Udi Local Government due to they have covered some topics in SS1 and are heading to exam class. but was restricted to five government sec limited to Udi Local Government Area of Enugu state. Which are

1. Community Scecondary Amozalla Girls
2. Community secondary school Amoku Affa
3. Community Secondary School Ogoh-Affa
4. Community Secondary school Akpakume Nze

The topics are

1. Electromagnetic induction
2. Waves
3. Electricity

**PURPOSE OF THE STUDY**

The main aim of the study is to critically analyze the impact of instructional materials in teaching and learning of physics in secondary schools in Enugu with particular reference to Udi as a case study. The study tends to find out the following:

1. The mean achievement scores of physics students taught with instructional materials and those taught without instructional materials.
2. Determine if such effect depends on gender (sex) of students.

**Research Questions**

In the field of physics, it has been observed that the use of instructional materials play a major role to the teaching and learning of physics. Based on the above observation, the researcher generated the following questions to guide the study:

1. What is the mean achievement scores of physics students taught with instructional materials and those taught without instructional materials?
2. What are the mean achievement scores of male and female students taught with instructional materials?

**RESEARCH HYPOTHESES**

The following hypotheses were generated for the study:

1. The achievement mean scores of students will not be significantly different in the experimental and control groups.
2. The achievement mean scores of students in Physics will be significantly different based on gender.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter treats the review of the related literature under the following headings. Conceptual framework, theoretical framework, empirical studies and summary of literature review

**Conceptual frame work**

* Teaching
* Instructional material
* Concept of physics
* Gender
* Teaching method
* Physics achievement

**Theoretical frame work**

* Jean Piaget cognitive development and behavioral theory
* Constructive theory

**Empirical studies**

* Impact of Instructional Materials on Academic Achievement In Mathematics
* Impact of instructional materials in teaching and learning of physics
* Effects of Instructional Materials on Secondary Schools Students’ Academic Achievement
* Effect of instructional material on the achievement and retention of biology
* Studies on Gender and students’ academic achievement in physics.

**Summary of literature review**

**Conceptual frame work**

Teaching is art of helping and science of helping others to grow in their knowledge and understanding, demonstrating the real difficulties presented in some situations and solving them which involve development of personal persistence, honest with students and be inquisitive to find more answers/solution to their problem. Therefore teaching at any level requires that students be exposed to some form of simulation. Ikerionwu, (2000), refers to instructional materials as objects or devises that help the teacher to make learning meaningful to the learners. Instructional materials, which are educational inputs, are of vital importance to the teaching of any subject in the school curriculum. Wales (2000), opined that the use of instructional materials would make discovered facts glued firmly to the memory of students. A teacher who makes use of appropriate instructional materials to supplement his teaching will help enhance students innovative and creative thinking as well as help them become enthusiastic, (Ekwueme and Igwe 2001).

Instructional materials are teaching aids or materials used to illustrate the teaching process and makes instruction more comprehensive to the learner. Instructional aids are devices or pieces of equipment, graphics or sound representation or illustration that helps pupils to learn. Instructional materials refer to objects or devices which help the teacher to make learning meaningful to the learners, (Ikenionwu, 2000). Ezegbe, (2000), classified them into two; visual materials made up of reading and non reading materials, and audio visual materials comprising electrically operated and none electrically operated materials. Yero (2000) mentioned 3types of instructional aids, these are:

1. **Visual Aids: -** These include chalk board, posters, bulletin board, displayed models, motion pictures, slides, projected transparences, flip chart and flannel boards. In fact they represent all the materials the eyes can focus and is used by the teacher or instructor in delivering the lesson to the pupils, it makes visual impression.

2. **Auditory Aids**: - These include record players, tape recorders and language laboratory and all that appeals to the sense of hearing.

3. **Audio-visual Aids: -** These include aids that make use of both sight and hearing such as sound motion, pictures, slide on sound and television. Instructional materials have great value in education. In this era of science and technology, the government of Nigeria is advocating the use and easy access for computer instruction (Minister of Education 2014). The ITC training i.e. instructional technology communication between teachers and students is for better development in science and technology. The modern and latest instructional aid in this 21st century is the use of instructional technology media such as making use of computer, television etc, which give access to other work and easy development The use of computer in modern teaching makes it faster because facts and contents are stored and recalled; it generates lots of advantages such as self confidence in the part of students and also improves teaching and learning. According to Aduwa (2005), these materials and resources includes, audio tapes recorders, video tape recorders, slide projectors, still pictures, programmed instructional film strips, maps, chart, graphs and many more; offer a variety of learning experience individually or in combination to meet different teaching and learning experiences. Instructional strategies need to be identified where the use of manipulative are often suggested as some of the effective approaches to improve student physics achievement (Gurbuz, 2010; Sherman &Bisanz, 2009). Physics manipulative-based instructional techniques are approaches that include opportunities for students to physically interact with the objects to learn target information. The use of manipulative in physics instruction has been cited as a strategy to allow students draw on their practical knowledge (Burns, 2000). Concrete objects that resemble everyday items should assist students in making connections between abstract concepts and the real world (Brown, Neil, &Glernberg, 2009).

The above reviewed works have a relationship with the present study as they all focused on some aspects of instructional materials as an essential and significant tools needed for teaching and learning of school subjects to promote teachers’ efficiency and improve students’ performance. They make learning more interesting, practical, realistic and appealing. They also enable both the teachers and students to participate actively and effectively in lesson sessions. They give room for acquisition of skills and knowledge and development of self- confidence and self- actualization. They are print and non-print items that impact information to students in the educational process. Instructional materials include items such as: kits, textbooks, magazines, newspapers, pictures, recording videos etc. Fadeiye (2005) saw instructional materials as visual and audio-visual aids, concrete or non-concrete, used by teachers to improve the quality of teaching and learning activities in Social Studies. Agina-Obu (2005) submitted that instructional materials of all kinds appeal to the sense organs during teaching and learning. Instructional materials play a very important role in the teaching and learning process. It enhances the memory level of the students. At this time that education has spread wide and entirely, oral teaching cannot be the key to successful pedagogy. According to Akude and Ofoefuma (1990) learners should embrace the use of resources to maximize learning.. The use of teaching aids give way to different methods of teaching and learning such as project method, self-learning, discovery learning and others yet to be known. Teachers should therefore make use of teaching materials for impacting knowledge. Teaching without teaching materials would look like a dancer without listening to musical instrument. Okpala (2010) reported that government indicated that efforts would be made, in providing some educational services such as counseling and educational resource centre amongst others and also maintained that teaching should be practical, exploratory and experimental in nature. Murphy (2012) expressed that assessing education means that teachers have to use ICT resources to appeal to the interest of younger learners and attract their interest. The quality of education is determined by the quality of teachers and the societal needs and the future which requires creativity and problem solving skills (Okwo 2012). It becomes imperative that teachers need to be innovative and develop inquiry skills as well as apply modern and innovative strategies to meet not only the demands of future society but according to Eya (2006) it serves as a key challenge for the development of the future of education in Nigeria through ICT emergence. Instructional materials are wide varieties of equipment and materials used for teaching and learning by teachers to stimulate self-activity on the part of the students. The teaching of physics without instructional materials certainly resulted to poor academic achievement. Poor academic achievement in physics could also be attributed to so many other factors such as, low interest of students in physics, inadequate motivation from teachers, poor incentives to physics teachers, lack of adequate supply of instructional material, lack of qualified teachers, use of teacher centered instructional strategies, inadequate use of instructional materials and use of abstract standardized materials (Nwagbo 2006). Among these factors, teachers use of improvised instructional strategy is considered as an important factor in this study. This implies that the mastery of physics concepts was not fully achieved without the use of instructional resources that the students are abreast with. The teaching of physics without instructional materials certainly resulted in poor academic achievement of students in the subject. Folorunso (2009) observed that there is lack of adequate and appropriate instructional resources for effective teaching of physics in schools. For Ibitoye and Fape (2007), the poor academic achievement in physics was traced to poor usage of instructional resources for physics teaching and learning, poor state of infrastructural facilities, large class size, poor teaching, use of faulty assessment practice, and inadequacy of quality teachers. According to Okebukola (2004), the poor state of laboratory facilities and inadequate use of instructional materials has constituted a cog in the wheel of students’ achievement in the Senior Secondary School Examination. The verbal exposition does not promote skill acquisition, objectivity, and critical thinking abilities that will enable the child to function effectively in the society. This according to the researcher leads to poor achievement of students. Okebukola and Jegede (1986) stressed that a professionally qualified teacher no matter how well trained, would be unable to put his ideas into practice if the school setting lacks the equipment and material resources necessary for him or her to translate his competence into reality.

**Concept of physics.**

The word physics comes from a Greek word meaning “knowledge of Nature”.

Physics is the natural science that involves the study of matter and its motion through space and time, along with related concepts such as energy and force. More broadly, it is generally the analysis of nature, conducted in order to understand how the universe behaves. Physics is the study of the physical properties of matter in relation to energy. Physics, which is one of the sciences, is highly needed for our nation’s technological breakthrough. Physics attempts to describe the fundamental nature of the universe and how it works. This is because physics plays a great role in the entire world. Physics according to (Ajayi 2000) is an experimental science. The acceptance of any physical theory depends on its success in predicting and explaining reproducible observations. According to encyclopedia Americana (2002), Physics is defined as the “science of change in nature”. The change referred to above concerns matter and energy. Physics however is a human enterprise involving mental operations, manipulating and computational skills and strategies that man uses to discover those laws that govern the universe. Physics education requires adequate and appropriate instructional materials. Physics learning experiment become more memorable through the proper use of supplementary teaching aids. Agomuoh and Nzewi (2003) asserted that a look is worth a thousand words. He conducted audio-visuals and other materials, and the result of his study showed that lack of supportive aids constituted great limitation on the quality and amount of instruction transmitted to students. According to Babajide (2010) a dull and un-stimulating environment

without adequate instructional resources offer little learning experiences as opposed carefully selected instructional resources exists. Where instructional materials are lacking in a subject like physics education, the idea becomes more abstract and the students resort to rote learning which is not ideal for physics subject. Physics education unlike other academic subjects involves practical demonstrations of various skills. This implies that materials will be needed to accomplish indispensable in physics education administration. Physics as one of the science subjects has remained one of the most difficult subjects .

The difficulty of physics as a subject is revealed in the school curriculum NERDC (2005). A study by Owolabi (2004) revealed that the performance of Nigerian students in ordinary level physics was generally poor. According to Etukudo 2000; Eze and Agbomma (2008), & Wasagu (2011) factors responsible for students’ general poor performance in science, technology and mathematics include laboratory facilities, inability of the physics teacher to put across ideas clearly to the students and inadequate number of learning facilities in schools as against consistent increase in the number of students. And besides students do not have interest in science especially physics because of the mathematical nature of physics, but fail to know that physics cannot be studied separately without the knowledge of mathematics. Historically, the development of mathematics in the Nile region by the early man helped them to explain the principle of floatation and mechanical concept of lever. All part of physics discovered, comprehended due to the application of mathematics. The study of physics cannot therefore be isolated from the study of mathematics. It is in realization of this that the universities and other institutions of higher learning stress that students must obtain at least a

**Overview of Students’ Achievement in Physics**

Achievement is an important educational variable that expresses the success or failure of a teaching and learning process. Academic achievement is the outcome of a teaching and learning process. The extent to which a student, teacher or institution has achievement depends on their educational goals’. Similarly Adeyemi and Olaleye (2010) described academic achievement as the scholastic standing of a student at a given moment which states individual’s intellectual abilities; which can be measured by grades obtained from examinations or continuous assessments (tests or quiz). In Nigeria, the level of students’ academic achievement in the senior secondary school is determined by grades obtained from

external examination Senior School Certificate Examination conducted by external

examination bodies WAEC and NECO respectively. Hence, academic achievement refers to the accomplishment of academic goals, the educational outcomes of students or rather the extent to which a student, a teacher or an instructor has achieved the stated educational objectives. In the educational system, a poor or an under achiever is someone whose performance is consistently below average. Bassey (2006) defined academic achievement as the performance of the students in the subjects they study in the school. Academic achievement determines the students’ status in the class. It gives children an opportunity to develop their talents, improve their grades and prepare for the future academic challenges. Students with high academic achievement are considered to achieve their identity in the society, get good career opportunity, get acceptance from peers, parents and teachers, and enhance their self confidence and self-efficacy. In today’s competitive world, academic A child with high academic achievement is likely to be rated as capable of excelling in his/her career, where as academic failure leads to frustration, stress, inferiority complex, rejection by loved ones and corruption. achievement is considered as one of the criteria to judge one’s total potentialities and capabilities. Academic achievement in this study is the outcome of education through the use of students’ improvised and standard instructional materials. The WAEC chief examiners report of 2010-2012 showed that there is persistent poor academic achievement of students in physics. This poor academic achievement of students in physics was attributed to so many factors such as lack of students’ interest in physics, poor classroom management, teachers’ attitude to teaching and lack of adequate supply of instructional materials for teaching physics.

credit-pass in mathematics before they will be admitted to study physics (Owolabi

2003). The degree of relationship between mathematics and physics has been the concern of many researchers. In a bid to find this relationship, Fajola (2002), and Onah (2011) found out that scores of students in mathematics and physics have high linear correlation. From these findings, it follows that poor knowledge of mathematics, will affect students sound understanding of physics. According to Igwe (2003) failure to understand mathematics discourages girls in the study of physics. Fajola (2002) in a research on “causes of apathy towards physics in Nigerian Senior Secondary Schools and Universities found among other things that students fear mathematics and this fear is transferred to physics. Stressing further on the importance of mathematics in the study of physics, Foster (2011) stated that a basic requirement for the study of mathematics is a good foundation in elementary mathematics. The knowledge of mathematics formulae is an advantage in the understanding of physics, but more important skill is the understanding of these formulae or else the knowledge of mathematical formulae alone will simply be an exercise in futility. One can understand from the above discussion that lack of knowledge of mathematics is a great problem facing students in studying physics. Students need to be guided in whatever they are doing in school or even outside school. The guiding should be accompanied with motivation. Once students are not motivated in their studies they will be carried away by external factors in their environments. Some parents are not concerned about what their ward do. Physics as practical oriented science is what students cannot do without motivation from the government, guidance and parents. With all these it is obvious that lack of motivation of the students from their parents and government, hinder the study of physics in senior secondary schools. Lack of proper understanding of basic concept of physics is another source of difficulty in the understanding of physics. It follows that those areas of physics containing more of such concepts will be more prone to difficulties. To understand these basic concepts, proper explanation will be needed. Students who do not understand what physics is all about at first instance, usually find the study of physics so difficult. With this, it is quite open that when students lack the concept of physics, will be affected in their later studies of physics. Physics is one of the science subjects that cannot be studied outside the laboratory. Physics as a science subject is activity oriented and the suggested method for teaching it which is guided discovery method, is material based; National Teacher Institute NTI (2007). This suggests that the mastery of Physics concepts cannot be fully achieved without the use of instructional materials. The teaching of physics without learning materials will certainly result to poor performance in the course. Awolabi (2003), Ali (2005) and Ajagun (2006) stressed that, a professionally qualified physics teacher, no matter how well trained would be unable to put his ideas into practice if the school setting lacks the equipment and materials necessary for him or her to translate his competence into reality. Experimentation in science is however dependent on the availability of science equipment for proper understanding, development and application Ugwu (2008). Physics is a science of observation of the world around us (Gibbs 2002). It is a towering achievement of the human intellect in its quest to understand our world and ourselves (Young and Freedman, 2008). The Nigeria Federal Ministry of Education (FME, 2008) regards Physics as a crucial subject for effective living in the modern age of science and technology. This means that it is necessary that every student is given an opportunity to acquire some physics concepts, theory, principles and skills. These concepts, theory, principles and skills are clearly explained in the objectives of physics education enshrined in the new Senior Secondary School Physics Curriculum (2008: ii).According tothe National Policy on Education (Federal Government of Nigeria 2013), the Objectives of Physics education are to: provide basic literacy in physics for functional living in the society; acquire basic concepts and principles of physics There will be no groomed scientists if effective laboratory work were not practiced at the secondary school level where foundation of science is laid. According to Ikoku cited in Olinya (2009) it is in the secondary school that the foundation of science and technology should be laid if the right types of scientists, technologists and technicians that will build up the continent are to be produced. Such foundations involve exposing the students to the method of scientific observation, systematic experimentation and development of an enquiry mind, the ability to improve and the urge to be creative. Laboratory is said to be the workshop of a scientist where practical are carried out. That is why science is considered more than body of knowledge to be learned. In this regard, science belongs in the school laboratory as naturally as, cooking belongs in the kitchen and gardening to a garden. In view of this, it can be seen that laboratory work brings students beyond knowledge and comprehension to the distinctive character of science education through manual work. AlsoAdo (1997) stated that laboratory creates excitement in students and improves their attitude through science. Attitude of students to physics cannot be divorced from among the factors that are responsible for physics suffering from consistent low enrolment and poor achievement by students. Considering the fact that attitude is highly related to how well people do things, including learning school subjects, any meaningful effort towards transforming science education programme, should take cognizance of the need to improving students attitude to learning science subjects including physics. Attitude according to Okebukola (2002) refers to one’s favourable or unfavourable disposition towards something. It is one’s mental state torespond to doing something Aiken (2006). Thus, attitude is a way of feeling and actiontowards doing something. In practice, attitude can be acquired or learnt through experience or social transmission. Thus formation of stable positive attitude towards the study of sciences including physics is a challenge to science education practices. On studies relating to attitude, German (1994) Bassey (2002) and Akubilo & Joshua (2004) revealed students’ attitude towards a significant predictor of performance. But Reddish, Saul & Steinbery

**Physics achivement**

The report of West African Examination Council (WAEC) on the Senior Secondary School Certificate Examination SSCE (2013) on student enrolment and performance in Nigeria by subject, grade, and sex revealed low enrolment of girls for science subjects as well as low academic achievement in physics and other science subjects and the persistent poor achievement of students in physics at senior school certificate examination (WAEC Chief Examiner’s report 2010-2013). This leaves one in doubt about the effectiveness of instructional materials and teaching methods used by the physics teachers for the teaching and learning. On this note, instructional materials are seen as materials which help the teachers in teaching, for example, chalkboard, laboratory equipment, charts etc. In the classroom situation, instructional materials are devices which are used to facilitate teaching and learning. National Teachers Institute (2010) reported that materials in the classroom can be classified into two broad categories, those that appeal to the sense of sight which are classified as visual resources and those which appeal to the sense of hearing, classified as audio materials. There are also those which combine both features and are classified as audiovisual (A-V) materials. Isola (2010) referred to instructional materials as objects or devices, which help the teachers to make a lesson much clearer to the learner. Instructional materials are also described as concrete or physical objects which provide sound, visual or both to the sense organs during teaching (Agina-obu, 2010).The teaching of physics cannot be effectively done without interaction between the teacher, students and the learning materials. The physics curriculum is planned to enable the teacher use activity oriented, methods to teach (Ezeife, 1996). However, evidence from research has shown that instructional materials and equipment for science, especially physics are either in short supply or are completely lacking in schools to the extent that most teachers end up with verbal exposition of scientific principles, facts and concepts. frame of reference on which students can key their attention during classroom activities and the opportunity of becoming familiar with resources in their environment. The poor academic achievement in physics as indicated by various empirical studies such as Wasagu (2000), Ogunleye 2002, Onasanya and Omosewo (2010); & WAEC Chief Examiner’s reports, (2010-2013) respectively, have attracted the concern of all stakeholders including the researcher. Subsequently many factors have been identified and regarded as being responsible for the dwindling trend in the performance of students. These factors include school- teacher- related characteristics, poor instructional approaches and the use of abstract instructional materials (Duit & Treagust, 2003, Wasagu, 2011). The afore listed factors have been taken into consideration and students excelled more in physics. There is an outcry on students’ poor performance in SSCE physics (Lee, 2000; Lin, 2007). So many efforts have been made to improve the academic achievement of students and these have yielded appreciative results. Physics has remained one of the most difficult subjects in the school curriculum (Nigerian Educational Research and Development Council, NERDC 2009). The study by Owolabi (2004) revealed that the academic achievement of Nigerian students in ordinary level physics was generally poor. Based on the increased poor academic achievement of students in physics, this study have found out the effect of instructional materials on senior secondary school students’ academic achievement in physics. Also another variable of interest to this study which was gender and its influence on students’ academic achievement in physics has been determined.

**Gender**

Gender is a social term that is set to differentiate males and females in terms of their different roles and responsibilities. Gender appears more often in recent science education researches. This may be in attempt to find ways of closing the gap between the participation rates of the two sexes in science education. Akinsola and Igwe as cited by Eze (2008) are of the opinion that gender issue is a pertinent factor in educational setting in Nigeria and could be a factor that leads to low achievement of learners in physics as a science subject. It has also been observed that there is a narrow participation of females in physical science and technology courses as well as the number holding professional career in science and technology. The girls themselves feel discouraged by the attitudes of teachers and parents and often suffer from self esteem. Research findings have shown that female students have less positive attitude to mathematics than the male and also demonstrated less superiority at secondary school level. This probably ought to be the result of stereo typing of task that takes place with more attention given to the training and education of males in science area (Ogwuazor 1992).

**School Type:** This factor examines single sex school type versus coeducational type. It is argued that the type of school females attended directly influence their interest and performance in science subjects. This argument initially tilted in favour of girls in single sex schools as being more advantaged in science than females in co-educational schools. Saeker as cited by Eze, (2008), claims that the praise showered on single sex schools for their education of females is not particularly related to the fact that they are single sex school, which abi-nitio exposed them to better learning conditions should also be considered. In Nigeria for instance, most unity schools are federal government schools which attracts females from upper class background (children from rich parents) and may be the student’s characteristic of good home background that is responsible for their fostered enrolment and performance in science in single sex schools and not because they are single sex. Nkpa as cited by Eze (2008) therefore concluded that the issue of single sex school fostering enrolment and performance of girls is being challenged.

**Teaching Methods**

**Discussion Method**

The method is teacher/learner centered. It involves the teacher and learner interacting thereby discovering new ideas and facts by inquiry. The teacher becomes a resource rather than an authority. Discussion could be on individual bases i.e. student to student or class/group discussion also referred to as tutorial.

**Inquiry Method**

Inquiry method is also referred to as problem solving method. Man is faced with everyday problem and in attempt to find solution to the problems inquiry approach is applied based on the situation. Bichi (1989) mention three types of inquiry as: -

i. Guided inquiry

ii. Modified free inquiry

iii. Inquiry role approach

In guided inquiry the teacher poses a problem for the pupils to answer. The guidelines could be given as to solving the problem while the students make use of their initiative to tackle the problem.

Modified free inquiry involves the teacher formulating the problem while the students decide on the way and procedure to find solution to the problem. This method is very suitable for secondary school students and is applicable in biology and most science classes. It is learners centered, the teacher/instructor is both

**Demonstration method of teaching:**

Demonstration is an essential objective method of teaching in which the teacher conducts the operation, while explaining what he/she is doing before the students.

In an ideal situation, the teaching approach would affect the students’ achievement and motivation to learn Physics. In practical situations the students’ achievement and motivation to learn Physics will be influenced by various factors which include, experimentation, demonstration.This is because the concepts involved are considered too abstract to understand and the content too difficult. The concepts, principles and skills involved in the topic are essential in the study of other topics such as electromagnetic induction, magnetism, electricity, cathode rays and cathode ray oscilloscope, current electricity, x-rays and electronicsbecause they highly examine in WAEC.

**The use of Indoor Laboratory in the Teaching of physics**

A Laboratory is a room or a forum where science teachers and their students interact. The laboratory varies in dimension and equipment as a result of the funds available. As a science subject, physics tends to solve human problems and answer some results, records and investigation with the use of apparatus. A well planned laboratory should be located away from the classroom, busy roads, hostels, dining rooms, game field and lucrative or relaxation centre. This is because the materials and equipment placed could be hazardous to health. Some laboratory activities require maximum concentration and as such need a quiet environment such as preparation of chemicals and testing of foods. In designing a physics laboratory the number of students that should be accommodated, the fund and materials required are put into consideration to avoid shortage and non-availability of resource. Physics is a science subject that involves physical, electrical, magnetical geographical, physio-medical material. It is obvious that some of the concepts could be taught, bringing distant habitat nearer to the learners by displaying some apparatus and equipment in the laboratory e.g potentiometer, magnetic coils, ammeter, voltmeter. It is obvious that with the emphasis on science, technology and mathematics (STM) more laboratories would be in existence.

Teachers would teach with instructional materials, Students would be familiar with the concept using material and creativity. Laboratory technologists would be assigned to care of the equipment and assist the physics teacher. Dewey has pointed out that the laboratory method has the advantage over the classroom teaching in as much as the achievements of an experiment entirely diverts the attention of the student from the thought that he/she is studying. In a classroom the teacher presents a statement from a textbook according to his conception and then efforts are made by the students to reproduce the statement in their own way. In the laboratory the students encounter the facts directly without the intermediate steps of the teacher. The latter is concerned in assisting the thorough exploration of facts. Laboratory method is doubtfully of value in the cultivation of the mind. It brings the teacher and the students in close contact and thus the teacher influences the character of the students. In the laboratory the student is free to work in accordance with his/her own conception and there is no bondage of authority.

**Information Communication Technology (ICT) and the teaching of physics**

In recent times when learning is being computerized, global communication has given birth to ICT learning and process learning. This method of teaching and learning is through the internet and making use of films, projector and video tapes. The nature of science makes it imperative that there is need to interact with the students to create the desired learning impact necessary to arouse learners’ interest and creativity, Mundi,Wakawa and Sule (2008). In science the use of many senses appeal more to the learners and makes learning more meaningful. The use of video tapped instructional materials appeals to the sense of sight and hearing respectively. Instructional materials are usually self explanatory and save the energy the teacher would have

**THEORETICAL FRAMEWORK**

Theory can mean different things to different people, in general terms; it is an explanation to what is going on in the situation. A number of theories were relevant to understanding data on the impact of instructional material on lower attaining children in basic schools in Nigeria. They include

* + 1. Behaviourism theory
		2. Cognitive and constructive theory

**The Basics of Behaviorism**

The theory of behaviorism concentrates on the study of overt behaviors that can be observed and measured (Good &Brophy, 1990). In Nigeria, the behaviorist theory has a long tradition in education policies. Many aspects of general education such as curriculum, pedagogy and assessment have been shaped by the principles of behaviorist learning theory. According to James, (2009) bahaviourism considers the environment for learning to be the determining factor. The use of Jean Piaget on the cognitive development and behavioral learning theory which center on the child development knowledge, intelligence and high level of thinking that allows the child to acquire problem solving skills by inventing or constructing reality out of experience and thus mix their observation with their ideas about how the world works. It also provides individual with a certain behavioural management plan or change based on observation in the classroom. On the practical aspect, the findings of the study will benefit the followings, the students, schools, physics teachers, textbook writers, curriculum planners and government

**What is Cognitivism?**

"Cognitive theorists recognize that much learning involves associations established through contiguity and repetition. They also acknowledge the importance of reinforcement, although they stress its role in providing feedback about the correctness of responses over its role as a motivator.

According to James, (2006) the reference to ‘Cognition’ makes that clear, these theorist are interested in mind, thinking, as functioning a (brain). This is based on how people construct meaning and make sense of the world through organizing structure, concept and principles in schema. Problem solving is seen as the context knowledge construction, processing strategies, such as destructive reasoning from principles and inductive reasoning from evidence.

**The Basics of Constructivism**

Constructivist teaching is based on the belief that learning occurs as learners are actively involved in a process of meaningful and knowledge construction as opposed to passively receiving information. Through interaction with the physical situations, or concrete objects, a child’s physical experience accumulates and he is able to conceptualize, think creatively and logically. The child therefore develops skills to abstract problems. According to this theory, learners are the makers of knowledge and meaning Constructivists believe that "learners construct their own reality or at least interpret it based upon their perceptions of experiences, so an individual's knowledge is a function of one's prior experiences, mental structures, and beliefs that are used to interpret objects and events." "What someone knows is grounded in perception of the physical and social experiences which are comprehended by the mind." (Jonasson, 1991).Realistic constructivism - cognition is the process by which learners eventually construct mental structures that correspond to or match external structures located in the environment and radical constructivism - cognition serves to organize the learners experiential world rather than to discover ontological reality..

Constructivists‟ teaching fosters critical thinking, and creates motivated and independent learners. Constructivists suggest that learning is more effective when a student is engaged in the learning process rather than attempting to receive knowledge passively. Children learn best when they are allowed to construct a personal understanding based on experiencing things and reflecting on those experiences.

Piaget‟s theory focuses on how learners interact with their environment to develop complex reasoning and knowledge. As children interact with their environment and new objects, they learn and develop ideas. According to Piaget, knowledge is the interaction between the individual and the environment. He further asserts that experimenting and manipulation of physical objects is the main way by which children learn

John Dewey rejected the notion that Schools should focus on repetitive memorization and proposed a method of directed living where students would engage in real world practical workshops in which they would demonstrate their knowledge through creativity and collaboration Dewey encouraged hands-on learning and states that it is impossible to procure knowledge without the use of objects which impress the mind. As a constructivist, Dewey believed that teachers/instructors are partner in the learning process whose guidance and assistance help learners to construct their learning and independently discover meaning within the subject area. The obvious implication of Dewey’s theory in this study is that in the learning process, students must be engaged in meaningful activities that induce them to apply the concepts they are trying to learn. The teacher’s role should be to provide enabling environment for active learning to take place such an environment could be the guided inquiry approach. This research therefore intends to support either of these two groups of philosophers by investigating the effects of demonstration and lecture methods on students’ achievement and retention in teaching and learning. He called for education to be grounded in real experience.

According to Vygotsky (2002), learning always occurs and cannot be separated from a social context. He affirms that knowledge construction occurs within social context that involves student- student, student- expert collaboration on real world problems or tasks that build on each person’s language, skills and experience shaped by individual’s culture.

In the classroom, constructivist view on learning can point towards a number of different teaching strategies. In the most general sense, it usually means encouraging students to use active techniques (experiments, real world problems) to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing. The teacher makes sure s/he understands the students pre-existing conceptions and guides the activity to address them and then build on them. Students in the constructivist classroom ideally become “expert learners”. This gives them ever broadening tools to keep learning. With a well planned classroom environment the students learn how to learn. Constructivism transforms the student from a passive recipient of information to an active participant in the learning process. Always guided by the teacher, the students construct their knowledge actively rather than just mechanically igniting knowledge from the teacher or the textbook.

**EMPIRICAL STUDY**

**Impact of Instructional Materials on Academic Achievement In Mathematics**

Apondi Jenipher Adipo (2015) carried out a study on the purpose of this research project is to determine the impact of instructional materials on academic achievement in Public Primary Schools when compared to only abstract mathematics symbols. The project was based on four objectives including; to establish the impact of concrete materials on achievement in measurement involving money, to establish the impact of Geo board on achievement in Geometry, to determine the impact of Algebra tiles on achievement in Algebra and to determine the impact of place value blocks on achievement in mathematics number operations. The study adopted experimental design involving pre test, post test of treatment and control groups. The study was conducted in public primary schools in Siaya County. The target population was 20564 Children and 696 standard four teachers and sample size comprised of 392 children and 8 teachers of mathematics. The findings from the research project indicated that teachers have undergone an education system that had enlightened them on need to know when, why and how to use manipulative effectively in the classroom as well as opportunities to observe; first-hand impact of allowing learning through exploration with concrete objects. According to findings, it can be seen that the control group of schools had mean and standard deviation of 52.70and 13.57, respectively, while the experimental group of schools had a mean and standard deviation of 74.30and 8.74, respectively. The difference in performance of children in control group of schools and those in experimental group of schools was found to be statistically significant (t (8) = -5.482, p = .004, two tailed). This suggests that children who are taught mathematics using instructional materials perform better than those who are only taught mathematics using abstract mathematics symbols only. The difference in performance is due to interventions (treatment) done to the experimental group of schools. Instructional material had more impact in achievement in measurement involving money. Further findings show that children in control group scored higher marks when they used place value blocks than children in experimental group where instructional materials were applied. Geo board as an instructional material had big impact on geometry achievement as compared to only mathematical symbols in learning mathematics. Algebra tiles on achievement in Algebra as a concept in mathematics had greatest impact compared to only mathematical symbols. These findings show that children in experimental group scored higher marks than children in control group where instructional materials were not applied. Study recommends that since children taught mathematics using instructional materials perform better than those who are taught mathematics using abstract mathematics symbols only, they should be taught by use of instructional materials for better performance in mathematics. In study where impact of place value blocks in achieving basic operations on numbers in mathematics, Children in control group scored higher marks than children in experimental group where instructional materials were applied. Study recommends that all stake holders involved in the management of mathematics performance to rethink the way forward. Government and ministry of education need to encourage elementary teachers to use manipulative to help teach mathematics thereby positively affecting student learning. Incorporating manipulative into mathematics lessons in meaningful ways helps students grasp concepts with greater ease, making teaching most effective.

**Impact of instructional materials in teaching and learning of physics**

Okonkwo Perpetua (2016) The study is geared towards assessing the impact of instructional materials in teaching and learning of physics in senior secondary schools with special reference to secondary schools. The study utilizes the simple random sampling technique. Physics Achievement Test (PAT) and questionnaire are the instrument used for data collection. The (PAT) at 0.82 reliability was used to measure the achievement of the students in physics and the questionnaire was used to ascertain how the use of instructional materials improved the performance of the physics teachers. The students were divided into two groups (experimental and control) groups. The experimental group was taught using instructional materials while the control group was taught without instructional materials. Data collected analyzed using mean, simple percentage, and z- test statistics. The findings revealed that students taught with instructional materials performed better than those taught without instructional materials. The findings also showed that the use of instructional materials in teaching influences the performance of the physics teacher positively. The null hypothesis tested at 0.05 level of significance indicated that there is significant difference between the physics achievement scores of those taught with instructional materials and those taught without instructional materials. Based on the above findings, the researcher recommend that teachers, students, parents and educational administrator and policy makers should make concerted efforts to make sure that instructional materials is to be use in teaching and learning of physics in our secondary schools.

**Effects of Instructional Materials on Secondary Schools Students’ Academic Achievement**

Abdu-Raheem Bilqees Olayinka1,(2016) The aim of this paper is to highlight the contribution of instructional materials to the academic achievement of secondary school students in Social. The population for the study comprised of all Junior Secondary School Class II students from among which 180 were sampled. The instrument for the study is a 30 multiple-choice self- designed Social Studies Achievement Test (SSAT).The instrument was validated by specialists in Social Studies Test and Measurement and Educational Management. Test-re-test method and estimation of internal consistency was used to ascertain the reliability. The reliability co-efficients of 0.73 and 0.75 were obtained respectively. The study generated four hypotheses that were tested at the significance level of 0.05. ANOVA and ANCOVA statistical tools were used to analyse the data collected. The study found that there was a significant difference in the pre-test and post-test of students in the experimental group. The study also found that gender effect was not statistically significant in social studies. The study concluded that students who were taught with instructional materials performed better than those taught without. The study therefore recommended that teachers of Social Studies should employ the use of essential instructional materials for their teaching and also improvise where and when the materials are not available. It therefore becomes imperative to have concerted efforts among parents, school and the government to make available important and necessary instructional materials to teachers of Social Studies for enhanced teaching and consequents improved achievement of students in the subject.

**Effect of instructional material on the achievement and retention of biology concept**

Victoria Ozoemezinem Enohuean (2015) carried a study on the effects of instructional materials on achievement and retention of biology concepts among secondary school students (SS II). The study consisted of 86 ss2 biology students randomly selected from a population of 5, 626 students drawn from 18 public schools. An instrument designed and developed from past WAEC questions by the researcher known as biology achievement test (BAT) was validated by some lecturers in science, English and Statistic from Ahamudu Bello University and senior biology teachers in delta state. The instrument used was tested and certified to be reliable at 0.65 coefficient. Quasi-experimental design was adopted which involves two groups, experimental and control groups. The experimental group was subjected to instructional material while the control group were taught without instructional material. Four null hypothesis were tested using t-test statistics.

**Studies on Gender and students’ academic achievement in physics.**

Ukozor and Uzomah (2011) investigated the effect of constructivist teaching strategy on senior secondary school students’ academic achievement and self-efficacy in physics. The study employed a quasi experimental design. The sample size of the study comprised of 184 students from four secondary schools (two boys and two girls), drawn from the population of the study. Five research questions and three null hypotheses guided the study. Mean and standard deviation was used in answering the research questions and ANCOVA used in testing the hypotheses. A significant effect of gender on students’ physics academic achievement was found in favour of male students. This study is related to the present study because gender is a moderating variable in the study, but the two studies differ in terms of the methods employed in the study. This study is related to the present study because it investigated the influence of gender on students’ achievement in physics, but differs in terms of the methods that were used to carry out the two studies.

**SUMMARY OF LITERATURE REVIEW**

The review of related literature on the perception of teachers on the effect of instructional material in the study habits of students reavealed that instructional material maybe print and non-print items that are rested to impact information to students in the educational process They give room for acquisition of skills and knowledge and development of self- confidence and self- actualization.. From the review, physics was seen as a branch of science that deals with the nature and properties of energy and matter. It is a natural science based on the experiment, measurement and mathematical analysis with the purpose of finding quantitative physical law for everything. The performances of students depend on the effect of instructional material like physics laboratory, ICT, electronics in physics by the physics teacher depending on the topic in order to arose the interest of the student. Therefore the effecting method Therefore, the teachers should change their attitude towards teaching especially the male teachers.

The theoretical frame work by Jean Piaget on the cognitive development and behavioral learning theory which center on the child development knowledge, intelligence and high level of thinking that allows the child to acquire problem solving skills by inventing or constructing reality out of experience and thus mix their observation with their ideas about how the world works. It also provides individual with a certain behavioural management plan or change based on observation in the classroom. Constructivist teaching is based on the belief that learning occurs as learners are actively involved in a process of meaningful and knowledge construction as opposed to passively receiving information. Through interaction with the physical situations, or concrete objects, a child’s physical experience accumulates and he is able to conceptualize, think creatively and logically. The child therefore develops skills to abstract problems. According to this theory, learners are the makers of knowledge and meaning Constructivists believe that "learners construct their own reality or at least interpret it based upon their perceptions of experiences, so an individual's knowledge is a function of one's prior experiences, mental structures, and beliefs that are used to interpret objects and events." "What someone knows is grounded in perception of the physical and social experiences which are

In the review of empirical studies, studies on impact of instructional materials, studies on gender and location were reviewed. From the reviewed studies, despite the importance of physics in nations building and in the educational sector, the achievement of students in the subject appears to be very poor and this poor academic achievement of students in the subject was because of lack of instructional material, interest and teachers attitude to the learner the nature of instructional materials used by the teachers. It was also seen that there have been studies carried out on the effect of instructional materials on students’ academic achievement in different subject areas and in different locations, but no study has been carried out on effect of instructional material on academic achievement of physics student in secondary therefore study investigate the influence of gender, teaching method, different teaching aids, interest and teachers attitude.

CHAPTER THREE

RESEARCH METHODS

In this chapter the research describes the methods adopted for the study under the following headings. Design of the study, Area of study, Population of the study, Sample and sampling technique,Validation of instrument for data collection, reliability of instrument,Effect of pretest on post test, instructional situation variables, method of data collection and method of data analysis.

RESEARCH DESIGN

Ogula (2005) describes research design as a plan, structure and strategy of investigation to obtain answers to research questions and control variables. The study design used Quasi-experimental design. The design involved students from intact classes. The study made use of experimental group and the control group. The experimental group was taught with instructional materials while the control group was taught without instructional materials. A pre-test on physics achievement on the selected topics was administered by the teachers to ascertain the present level of achievement of the Control and experimental groups of the student. After the pre test, the regular physics teacher commenced the experiment in the selected Schools, adhering strictly to the topics given by the researcher. The experimental group was provided with the instructional materials needed to teach the selected topics, including electromagnetic induction, wave and electricity using electronics, computers and projectors etc. The control group was taught without using the instructional materials. After the treatment lessons for the experimental group, the post-test was administered on the two groups to test their level of achievement.

The study design in illustrated below

Group I O1 X1 O2

Group II O1 X2 O2

Where O1 = pretest

 O2 = post test

XI = Experimental variables

XI = control variables

**Area of the Study**

The area of the study is Udi Education Zone of Enugu State, which comprise of Udi L.G.A, and Ezeagu L.G.A. The choice of the zone is borne out of the fact that researchers have shown that students in the zone have a lot of problems in physics especially in the area of motion, electricity, electromagnetic induction and wave.

**Population of the Study**

The population of the study comprised of all the government secondary school two Udi L.G.A. There are 17 governments owned senior secondary schools in UdiL.G.A, 4 schools were selected. There population is 525

**Sample and Sampling Techniques**

The investigator used multistage procedure because the experimental class lasted for a period of time before administering the second test. Simple random technique was used. The two intact classes of senior secondary two were randomly selected for the study. One forms the experimental group and the other one form the control group. in the select five secondary schools from Udi L.G.A of Enugu State, since a standard and centralized curriculum is used in all schools thus what is taught in one school is the same everywhere. Twenty senior secondary two (SS2) physics students randomly selected and all the physics teachers from each of the four selected schools were used for the study. The researcher through random sampling selected five schools in Udi L.G.A of Enugu state. Eighty (80) copies of test were administered to the physics student.

**Instrument of Data Collection**

The principal instruments for data collection used in this work Physics Achievement Test (PAT). The physics achievement test contains Twenty (20) items and four multiple choice options objective questions, A, B, C and D based on the selected contents in the SS 2 Physics curriculum which proved challenging for the pupils over the years A pre-test on Physics achievement on the selected topics was administered by the teachers to ascertain the present level of achievement of the Control and experimental groups of student. After the pre test, the regular teachers of physics commenced the experiment in the selected Schools, adhering strictly to the topics given by the researcher. The experimental group was provided with the instructional materials needed to teach the selected topics, including Wave, linear motion, electromagnetic induction, electricity. The control group was taught without using the instructional materials.

**Validation of Instruments**

The face and content validity of the instrument was done by a physics teacher and Educational Test and measurement experts. The experts were requested to validate the instrument and lesson notes in a clear language, inorder to measure what it suppose to measure.

**Reliability of Instrument**

Reliability refers to the consistency of the scores obtained, how consistent they are from one administration of an instrument to another (Kombo & Tromp, 2006). A reliable one will constantly produce the expected results when used more than once to collect samples from two samples randomly drawn from the same population. The researcher used test-retest reliability the teat-rest was conducted in Godfrey Okoye Secondary school. The test-retest reliability was use to administer PAT to total number of 10 students tested and the data obtained from the response of the student were used to estimate the reliable of the instrument. The reliable coefficient of Pearson product was used to determine the reliability showing the relationship between the tests scores in the two groups of students which 1.0. which means, it is strongly reliable

**Control on extraneous variable**

The test is been administer with the influence of the physics teacher dividing the class in groups to avoid malpractice and indiscipline and also to be able to control the control group for them not to think that they not intelligent

**Effects of pretest on post test**

The pretest and post test administration gap was done within four weeks in order to settle the student’s tendency of becoming familiarized with the test.

**Instructional Situation Variable**

The researcher developed an instructional guide for both experimental and control groups in order to ensure that the instructional situation is the same for all the schools selected for the study. In teaching and testing were conducted in up to two classes of SSII in the intact classes drown.

**Method of Data collection**

The Achievement test was administered by the researcher at the school. The test was administered to a total number of twenty physics students from each school that was selected through simple random sampling. Based on pre test administered to the students, two equivalent groups, group A and group B comprising of twenty (20) physics students were used for the study. The students under experimental group were taught with instructional materials while the students under control group were taught without instructional materials. At the end of the teaching period, physics Achievement test containing twenty question items based on the content taught were administered to the students under thorough supervision. The test materials were retrieved from students after thirty minutes

**Method of Data Analysis**

The statistical method use in analyzing the data collected from the pretest and post test is t-test for independent group and Analysis of Covariance (ANCOVA) is use for testing the hypothesis at 0.05% level of significance because the experiment involved pretesting of the subject. ANCOVA was used to remove the effect of the covariate/pretest on posttest using regression of mean

**Ethical Considerations**

Ethics is the division in the field of philosophy that deals with values and morals .people may disagree because it is based on peoples‟ personal value system on a topic. What one person or group considers being good or just might be considered bad or wrong by another group or person. In this chapter we define ethics as the principles and guidelines that help us uphold the things that we value.

The researcher explained to the respondent about the research and that the study was for academic purpose only. It was made clear that participation would be voluntary and the respondents would be free to decline or withdraw anytime during the research period. The respondents were not coerced into participating in the study .The participants had informed consent to make the choice to participate or not. They were guaranteed that their privacy would be protected by strict standard of anonymity. High standard of professionalism was observed as the researcher avoided fabricating or altering result by scientists to suit her study.

**CHAPTER FOUR**

**RESULTS**

This chapter presented results of data analysis based on four research questions and four null hypotheses that guided the study. Results were presented in tables according to the four research questions and four hypotheses.

**Research Question 1**

What is the achievement score of student taught with instructional material and without instructional material?

**Table 1: Mean (**x**) and Standard Deviation (SD) Scores of Students’ Mean Achievement Scores in physics**

**Group N Pre-test Post-test Mean gain score**

 SD1 ᵡ SD1 ᵡ

Experimental 40 1.3 5.90 1.8 12.98 7.08

control 40 1.5 7.08 1.35 8.88 1.80

**Note:** N= number of student, SD1= standard deviation for pretest, SD2= standard deviation for posttest, X = mean

The data on students’ achievement in **table I** revealed that students taught Physics using instructional material had mean score of 12.98 with standard deviation of 1.89 while the mean achievement score of students taught without instructional material was 8.88 with standard deviation of 1.35. Also the experimental group had a gain score of 7.08 over the control group who had a gain score 1.80. Therefore Students taught Physics using instructional material performed better than students without instructional materials.

**Research Question 2**

What is the academic achievement score of male and female students taught using instructional material?

**Table 2: Mean (x) and Standard Deviation (SD) Scores of Male Students’ Mean Achievement Score in Physics**

**GROUP N Pre - test Post – test Mean gain score**

 SD1 ᵡ SD1 ᵡ

Females 20 1.2 9.08 1.33 12.09 3.01

Males 20 1.05 7.06 1.25 13.05 5.99

**Note:** N= number of student, SD1= standard deviation for pretest, SD2= standard deviation for posttest, X = mean.

The data on male academic achievement score in table 2 revealed that male students taught Physics using instructional material had mean score of 13.05 with standard deviation of 1.33 while the female students taught with instructional material had academic achievement scores of 12.09 with standard deviation of 1.25. Therefore, there is significant difference between male and female students taught physics using instructional material due to the belief that physics is meant for boys because it involves calculation.

**Hypotheses 1**: The achievement mean scores of students will not be significantly different in the experimental and control group.

**Table 7: Analysis of Covariance of Students’ Mean Achievement Scores in Physics**

SOURCES OF SUM OF DF MEAN F SIG

VARIATION SQUARES SQUARE

Corrected model 11713.487 4 2913.372 38.258 0.05

Intercept 2623.714 1 2623.714 33.669 0.05

Pretest 8974.333 1 8974.333 137.996 0.05

Method 2148.256 1 2148.256 25.311 0.05

Gender 156.749 0 156.749 1.883 0.05

Method x Gender 1.126 0 1.126 .016 0.05

Error 5744.501 77 77 .937

Total 42933.000 80

Corrected total 1657.987 80

Data in table 5 showed that there is a significant mean effect for mode of instruction on students achievement in physics f(1, 80) p<.0.05. The null hypothesis therefore was rejected, indicating that there was significance difference in the mean achievement score of physics students taught with instructional material than those in the control group.

**Hypotheses 2:** The achievement of students in Physics will be significantly different based on gender.

Table 2 Therefore, there is significant interaction effect of treatment and gender on students’ achievement in physics (F = P> 0.05). The null hypothesis is therefore accepted. However, gender has statistical significant effect on the academic achievement of students in physics. (F = p> 0.05). Again, the main effect of treatment on the achievement mean scores of students is significant at 0.05 level (F = P< 0.05).

**CHAPTER FIVE**

**DISCUSSION, CONCLUSION AND SUMMARY**

In this chapter, the findings of the study based on the four research questions and four nullhypotheses that guided the study were discussed. The conclusion, educational implications,recommendations, limitations of the study, suggestions for further research and summary of thestudy are also presented.

**Discussion of the Result**

From the response of the achievement test administered to the students, the researcher was able to find out the importance of instructional materials in teaching and learning of physics in senior secondary schools in Udi L.G.A of Enugu state.

**Data in table 1** showed that there is a significant mean significant different between those taught with instructional material and without instructional. Therefore null hypothesis was rejected effect for mode of instruction on students achievement in physics f(1, 80) p<.0.05. The null hypothesis therefore was rejected, indicating that there was significance difference in the mean achievement score of physics students taught with instructional material than those in the control group. The findings provided the researcher the concept of the effect of instructional materials in academic achievement of physics students in secondary schools. The use of instructional material in teaching and learning of physics influences the cognitive, affective and psychomotor achievement of physics students when evaluating or improvising instructional material. It helps the physics students in recalling and recognition of information and principles of physics develop intellectual ability of the physics. It helps to make teaching and learning of physics fun by providing the students of physics a firsthand experience. The use of instructional materials in teaching and learning of physics influences the classroom performance of the physics. It makes the teacher to teach without stress.

**Table 2**: seeks to find out the extent to which gender affects the mean achievement scores of physics students taught with instructional material. The findings showed that there is difference between the mean achievement scores of male and female students. Therefore, there is significant interaction effect of treatment and gender on students’ achievement in physics (F = P> 0.05). The null hypothesis is therefore accepted. However, gender has statistical significant effect on the academic achievement of students in Social Studies. (F = p> 0.05). Again, the main effect of treatment on the achievement mean scores of students is significant at 0.05 level (F = P< 0.05). . For instance, careers or subject that are feminine in nature such as catering, is practiced by boys while girls are studying engineering and carpentry meant for boys previously. For further mathematics in school certificate Examination, 181 males and 34 females. The analysis indicates low participation of females 16%s to 84% male but yet the females performed better than their male counterparts at credit levels in other subjects. This low participation of female students in science related subjects were attribute factors such as: - attitude of teachers, students and parents to the idea of women engaging in male career such as Engineering, Technology, Architecture etc. Some teachers and women are of the view that girls are intellectually incapable of competing in science and mathematics and difficult task with the boys (Joseph 2000).

**Conclusion**

The purpose of the study is to examine the effect of instructional material in the academic achievement of physics student in secondary school in Udi Local Government Area in Enugu State.

Findings from the analysis showed that the effect of instructional materials in these schools is poor due to lack of instructional material, unqualified and teachers attitude towards the teaching , lack of laboratory and improper teaching method use due to lack of skills by teachers. Teacher’s attitude towards the student in effective teaching and learning of physics is very poor, nobody wants to improvise material or use teaching aids related to the topic therefore making the lecture very boring to the student

Lack of student interest towards teaching due to lack of availability of instructional material. Lack of student interest base on gender, this is due to female teachers felt that science courses like math’s, physics is meant for male students and parents/guidance believing that female education ends in the kitchen

.

**Implication of the study**

The study has implications to the effective teaching and learning on academic performance in secondary school

It has been observed that there is an increased rate of poor academic performance of physics students due to lack of qualified teachers and teacher’s attitude towards teaching, lack of student interest, gender and lack of instructional material in teaching like in adequate laboratory, ICT, and some other electronic gadget

**Recommendations**

Based on the findings, the following recommendations were made;

1. Teachers, student and educational administrators and policy makers, should attach greater importance to the use of instructional materials in teaching and learning of physics in our senior secondary schools, knowing and appreciating fully well, the enormous benefits that come with it.
2. Government, Ministries of education, educational agencies should provide instructional materials in secondary schools to enhance effective teaching and learning and make it compulsory in the curriculum. They should also ensure the number of physics student in the classroom
3. Seminars, workshop on the use of instructional should be organized for physics teachers in order to help update their knowledge and improve on their teaching effectiveness.
4. Teachers and students should be encouraged to form the habit of improvising instructional materials to make up the shortfall in supply.

**Educational Implications of the findings**

It is recognized there is need for instructional material in teaching and learning of the student in all secondary schools within Udi Local Government Area of Enugu state so as to enhance a quality academic performance of physics student. The acquisition of the knowledge can be effective when teachers combine theoretical knowledge with practical concept in teaching of physics.

The findings of this study have implications for education particularly in teaching physics in secondary schools. The implications of this study border on development of teachers using instructional materials in teaching and learning of physics. The study revealed that experimental group was higher than control group. The findings of this study equally implicated the science teacher’s attitude and methods use in teaching physics like the use demonstration, evaluation, and explanation. In addition, science teachers should ensure that students’ cognition during are activated during teaching and learning, this will make them to focus on the learning task. Also, the finding of the study shows that male and female students exist in separate conceptual world. Hence, science teachers should consider the gender of their students when teaching and there interest.

It has been observed that there is an increased rate of poor academic performance of physics students due to lack of qualified teachers and teacher’s attitude towards teaching, lack of student interest, gender and lack of instructional material in teaching like in adequate laboratory, ICT, and some other electronic gadget

**Limitations of the Study**

The generalizations made with respect to this study are however subject to the following limitations:

* 1. Since the same teacher was used for different groups, it could be assumed that he might not have been of equal attributes in terms of method, cognition, personality and affective functioning.
	2. There was also the problem of absenteeism among the students. The fact that some students skipped classes may have influenced their performance.

**Suggestions for Further Study**

Based on the factors that might have affected the findings of the study, thefollowing suggestions were made by the researcher;

1. Effect of instructional material on student interest and retention on the academic performance of physics student in secondary school.
2. The effect of using improvised or standardize instructional material in teaching and learning of physics
3. The use of large class in administering instructional material in Secondary School.

**Summary**

The main purpose of the study is to examine the effect of instructional material in academic achievement of secondary school physics student in Udi Local government area of Enugu state.The population of the study comprise of all the government secondary school in Udi local government area of Enugu State. Simple random technique was used in sampling five schools. Physics achievement test was used in data collection. It was validated by a physics teacher and expect in test and measurement.

The result from the analysis showed that the effect of instructional material on the academic performance of physics student in secondary schools. Shows that there is need for instructional material, method gender and student interest towards teaching and teachers performance.

Some solutions include: the Government/Ministry of Education should provide adequate qualified teachers, instructional, laboratory and regular supervision on schools on the use of instructional material.

There is need of competent physics teacher in the use of instructional material and the use of adequate laboratory in relating abstract ideas/theoretical aspect to practical view. According to (2001), the quality of education not only depends on the teachers as reflected in the performance of their duties, but also in the coordination of school environment.

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APPENDICES

APPENDIX I:

Letter of Introduction

University Of Godfrey Okoye University Thinker’s Corner, Ugwuomu Nike

Dear Sir/Madam,

Re: Research on Effect of Instructional Material in Academic Performance Of Physics Student In Secondary School in Udi Local Government Area Of Enugu State

I am a student of Godfrey Okoye University pursuing a degree in physics education

I would like to carry out a research on the above topic. Data will be collected using physics achievement test SS II Student. One group will do pre-test examination, two groups will do post-test examination. Experimental groups will be taught using instructional materials, while the control group will not be taught using instructional materials.

Yours faithfully,

OKPE VENANSIA.O

APPENDIX III

Reliability

Using Karl Pearson product correlation. Using the formula below

r =$\frac{N∑XY-∑X∑Y}{\sqrt{N}∑Y2\left(∑X\right)2 \left(N∑X\right)2-(∑Y)2}$

TABLE

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **X** | **Y** | **XY** | **(X-X)** | **(Y-Y)** | **(X-X)(Y-Y)** | **(X-X)2** | **(Y-Y)2** |
| 1 | 1O | 15 | 150 | 1.4 | 5 | 7 | 1.96 | 25 |
| 2 | 8 | 10 | 180 | -0.6 | 0 | 0 | 0.37 | 0 |
| 3 | 9 | 12 | 108 | 0.4 | 2 | 0 | 0.16 | 4 |
| 4 | 11 | 8 | 198 | 2.4 | 2 | 4.8 | 5.76 | 4 |
| 5 | 4 | 11 | 44 | -4.6 | 1 | 4.6 | 21.16 | 1 |
| 6 | 6 | 5 | 30 | -2.6 | -5 | 13 | 6.96 | 25 |
| 7 | 9 | 6 | 54 | 0.4 | -4 | 1.6 | 0.16 | 16 |
| 8 | 8 | 12 | 96 | -0.6 | 2 | 1.2 | 0.36 | 4 |
| 9 | 10 | 11 | 110 | 2.4 | 1 | 2.4 | 5.76 | 1 |
| 10 | 11 | 11 | 121 | 2.4 | 1 | 2.4 | 5.76 | 1 |
| **TOTAL** | **86** | **100** | **109** | **17.8** | **37** | **37** | **48.44** | **81** |

N = 10

$\frac{∑X}{N}$ = $\frac{86}{10}$ = 8.6, X = 8.6

$\frac{∑Y}{N}$ = $\frac{100}{10}$ = 10, Y = 10

Therefore r =$\frac{N∑XY-∑X∑Y}{\sqrt{N}∑Y2\left(∑X\right)2 \left(N∑X\right)2-(∑Y)2}$r =$\frac{10\left(109\right)- (86)(100)}{\sqrt{10\left(100\right)2 \left(86\right)2 (10\left(86\right)2-\left(100\right)2}}$

r =$\frac{1090-8600}{10\left(10000\right) (7396 (10\left(7396\right)- 10000}$

r =$\frac{7510}{\sqrt{100000 X 7396 X (73960-10000)}}$

r =$\frac{7510}{\sqrt{100000 X 7396 X 63960 }}$

r =$\frac{7510}{\sqrt{4.7304816 X 10}}$

r =$\frac{7510}{6877,849.664 } =$r. 1.0