

**EFFECTS OF PICTURES AND REALIA ON ACADEMIC PERFORMANCE OF
JUNIOR SECONDARY SCHOOL STUDENTS IN BASIC TECHNOLOGY
IN KADUNA STATE, NIGERIA**

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NIGERIA**

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JULY, 2017

DECLARATION

I declare that, this dissertation entitled: Effect of pictures and realia on Academic Performance of Junior Secondary School Students in Basic Technology in Kaduna State was carried out by me in the Department of Educational Foundation and Curriculum. The information derived from the literature has been duly acknowledged in the text and list of references. No part of this report was previously presented for another degree at this or any other institution.

Aliyu Ayuba Biye

Date.

CERTIFICATION

This dissertation entitled the “THE EFFECTS OF PICTURES AND REALIA ON ACADEMIC PERFORMANCE OF JUNIOR SECONDARY SCHOOL STUDENTS IN BASIC TECHNOLOGY IN KADUNA STATE by AYUBA ALIYU BIYE meets part of the regulation governing the award of master degree of Ahmadu Bello University Zaria and is approved for its contribution to knowledge and literary presentation

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ABSTRACT

This study investigated the effect of pictures and realia on academic performance of junior secondary school students in basic technology in Kaduna State, Nigeria. The study sought to determine the effect of pictures and realia on the academic performance of junior secondary school students in basic technology. This study was guided by research questions and null hypotheses. The study was delimited to only junior secondary school three (III) students of public secondary schools in Zonkwa and Kachia Educational Zones in Kaduna state. The study adopted pre-test, post-test, control group design. A total number of 300 students were sampled from a population of 1235. Basic technology performance test developed by the researcher was validated by a panel of two experts. Research questions were answered using mean, and standard deviation while, t-test statistics at $P = 0.05$ coefficient level of significance was used in testing the hypotheses. From the findings of the study, it was confirmed that, in teaching basic technology, the mean academic performance of students exposed to pictures and realia was higher than those taught the same concept using conventional (lecture method) The performance results obtained revealed that there is no significant difference in the performance of student exposed to pictures and realia materials in rural and urban areas but there was significant difference between the mean academic performance of male and female students. Based on the finding of this study, it was recommended that, the use of pictures and realia materials in teaching basic technology in schools should be encouraged. Federal and State ministries of education should intensify effort to make facilities available to teachers also, teachers should be encouraged to attend conferences, seminars, workshops' and even further studies to widen their scope on picture and realia utilizations in teaching basic technology.

TABLE OF CONTENTS

COVER PAGE	i
TITLE PAGE	ii
DECLARATION	iii
CERTIFICATION	iv
DEDICATION	v
ACKNOWLEDGMENTS	vi
ABSTRACT	vii
TABLE OF CONTENT	viii
LIST OF TABLES	ix
LIST OF APPENDICES	x
DEFINITION OF TERMS	xi
CHAPTER ONE: INTRODUCTION	
1.1 Background to the Study	1
1.2 Statement of the Problem	5
1.3 Objectives of the Study	6
1.4 Research Questions	6
1.5 Null Hypotheses	7
1.6 Basic Assumptions	7
1.7 Significance of the Study	7
1.8 Scope of the Study	8

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1 Introduction	9
2.2 Theoretical Framework	9
2.3 Types of Instructional Materials	11
2.4 Visual Instructional Materials for teaching Basic Technology	11
2.5 Sources of Visual Instructional Materials	13
2.6 Criteria in Selecting Visual Instructional Materials	14
2.7 Characteristics of visual instructional material	16
2.8 The concept of Academic Performance	17
2.8.1 Gender and Academic Performance	18
2.8.2 Factors Affecting Academic Performance in Basic Technology	19
2.8.3 Characteristics of Visual Instructional Materials	21
2.8.4 Problems of using Visual Instructional Materials in Teaching Basic Technology	24
2.8.5 Solution to the Identified Problems of using Visual Instructional Materials in Teaching Basic Technology	25
2.8.6 Empirical Studies	25
2.8.7 Summary of Review of related literatures	31

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction	33
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3.2 Research Design	33
3. 3 Population	34
3.4 Sample and Sampling Procedures	34
3.5 Distributions of sample size	35
3.6 Instrumentation	35
3.6.1 Validity of the Instrument	35
3.6.2 Pilot Testing	36
3.6.3. Reliability of the instruments	36
3.6.4 Procedure for Data Collection	37
3.6.5 Procedures for Data Analysis	37
CHAPTER FOUR: DATA ANALYSIS AND RESULTS	
4.1 Introduction	38
4.2 Analysis and Results Presentation	38
4.3 Response to Research Questions	39
4.4 Hypotheses Testing	41
4.5 Summary of Findings	43
4.6 Discussions of Findings	44
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS	
5.1 Introduction	46
5.2 Summary	46
5. 3 Conclusion	47
5.4 Recommendations	48
5.5 Contribution of the study to knowledge	48

5.6 Limitation of the study	49
5.7 Suggestion for further research	49
5.8 References	51
5.9 Appendices	52

LIST OF TABLES.

Table 4.01 mean and standard deviation of pre-test-----40

Table 4.02 t-test analysis of pre-test-----41

Table 4.03 mean and standard deviation of experimental and control group-----41

Table 4.04 mean and standard deviation of urban and rural students-----42

Table 4.05 mean and standard deviation of male and female students-----42

Table 4.06 T-test analysis between experimental and control group----- 43

T-test analysis between urban and rural students-----44

T-test analysis between male and female students-----44

LIST OF APPENDICES.

Letter of Introduction-----	89
Validation Form-----	90
BasicTechnologyPerformance Test-----	
Marking Scheme for Performance Test-----	92
Answer Sheet for Performance Test-----	93
Lesson Plans-----	

Definition of Operational Terms

The following terms were defined in relation to this study as:

Realia: These are objects from real life used in the classroom instruction by educators to improve Students understanding carefully represented in their realistic background.

Pictures: Are semi-concrete photograph of object, place or illustration in the form of charts, graphs etc.

Basic Technology: Is a vocational education course taught at junior secondary level whose primary aim is to prepare persons for employment in a recognize occupation.

Visual Materials: Involves the use of visual perception in the development of skills and understanding like printed materials, textbooks, journals, magazines newsletter.

An audio material conveys messages through sound production which includes Radio, mp3, record player and tape recorder.

Audio-Visuals: materials which includes; television, computers, CD, DVD, Video tapes.

Educational Resources Center: (E.R.C.) a resource center where variety of teaching and learning materials exist for use by teachers, learners and other interested individual.

Academic Performance is understood to be the display of knowledge attained and skills developed in school subject designated by test and on scores or mark assigned by the subject teacher.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Basic technology is aimed at exposing students to career awareness by exploring usable options in the world of work and enabling youth to have an intelligent understanding of the increasing complexity of technology. (Osuala, 2004) it is meant to provide the technical knowledge and vocational skills necessary for self- reliance. Basic technology is a three year programmes of preparatory instruction in manipulative skills, mathematics, sciences, communicative abilities and leadership skills which prepares individual for self-employment. Some of the instructional programmes of basic technology are; wood work, metal work, electrical/electronic, building architecture/technical drawing.(Federal Republic of Nigeria, 2004).

Basic technology, stresses the preparatory aspect of pre-vocational training offered to student at Junior Secondary School level to introduce them into the world of technology and have an appreciation of technology towards interest arousal and choice of a vocation at the end of Junior Secondary School and professionalism later in life.

As a result of this focus, Osuala, (2004) states that, these are components of the general education curriculum which introduces pupils to the elements of technology in order to acquaint them with the role of technology in a contemporary life and permits them to develop basic practical skills in the manipulation of simple tools and materials. This element is also designed for information and guidance purposes for eventual educational and occupational choice.Federal Republic of Nigeria, (2004) refers to those aspects of the educational processes involving the study of technologies and related sciences, and the acquisition of practical skills, attitude, and knowledge relating to occupation in various sectors of economic

and social life. Okorie, (2000) perceives vocational education as any form of education whose primary purpose is to prepare persons for employment in a recognize occupation.

Rocser, (2005) is of the view that, education consists of two components input and output. Input consists of human and material resources while outputs are the goal and philosophy of the educational process. Both the input and output form a dynamic organic whole and if one want to investigate and assess the educational system in order to improve its performance, effects of one component on the other. Pictures and realia are some of the instructional materials which are among the educational input play a vital role in the teaching and learning process. Saima, (2008) for teaching purposes, we can bring fragments of the physical world into the classroom in the form of objects carefully represented in their realistic background "these fragments of the physical world can be termed Realia.

Realia are objects from real life used in the classroom instruction by educators to improve students understanding of other culture and real life situation. These objects are part of instructional kits. Realia are also used to connect learners with the key focal point of a lesson by allowing tactile and multidimensional connection between learned materials and the object of the lesson (Azikiwe, 2011) Realia is sometimes used philosophically to distinguish real things from theories.

Genesce, (2000) noted that, realia is a term for real things, concrete object that are used in the classroom to build background knowledge and vocabulary. Realia is used to provide experiences on which to build and provide students with opportunities to use all the senses in learning while, using realia in the classroom is not always possible, it is usually the best choice if the student is to learn all they can about a topic, realia allows student to see, feel, hear, and even smell the object being explored. If the real things are not available the teacher must move down the continuum from the concrete (real thing) to a replica such as models, to a semi concrete object such as photograph or illustrations.

Genesce, (2000). Identified the following sequential steps in implementing the use of realia in the classroom. Identify opportunities to use realia, be aware of opportunities to include realia in lesson as you plan. Proof read any story to be read aloud or used for reading instruction to identify vocabulary that may be unfamiliar to the students and locate realia that will be helpful to their understanding.

Begin to collect items that can be stored in the classroom and organize them so that, they can be easily accessed for instruction. Plastic tubes, plastic bags are often used for this purpose. Some items will be used with only one theme or book and should be stored. Chris, (2011) Realia means using real items found in everyday life as an aid to teaching. Using realia helps to make lessons memorable by creating a link between the object and the word or phrase they represents using realia stimulates the mind, and is one way of encouraging creativity by involving the senses. Realia saves time, as recognition of an object is immediate and so cut out the need for lengthy explanation and drawing funny pictures on the board.

Using realia stimulates the mind, encourages creativity by involving sense, realia saves time, and realia makes lessons to be memorable. Ricardo, (2008) defines visual instructional materials as tools used to supplement the written or spoken word in the transmission of knowledge, attitude and idea and to emphasize or clarify the instruction. Olu and Okoye, (2008) opined that, visual instructional materials are all the tools that can be used by the teacher to provide encouragement to learner and learning activities. Adeyemi, (2010), States that, visual instructional materials include all the materials a teacher could use during the lesson to help learning and retention. He further said that, in order to meet individual differences in the classroom, the teacher should employ various types of teaching techniques and aids that would appeal to different senses.

Adesanya, (2011) affirms that, the use of visual instructional materials like textbooks, chalkboard, and models in the classroom brings about efficacy and efficiency in the teaching

and learning process and invariably, promotes and enhances the achievement of instructional objectives. Abdullahi, (2012), refers visual instructional materials to mean all those resources used to supplement the normal learning process of listening, seeing, reading and writing.

Tukur, (2012) stated that, people generally remember 10% of what they read,20% of what they hear,30% of what they see,50% of what they hear and see,70% of what they say,90% what they say and do. Brown, (2011) asserted that, teachers are like medical doctors and other professional workers, they need essential tools and equipment's to do their work at best.The fundamental factors in any learning situation are always the students and teachers. Thus, the organized combination and utilization of materials facilitates teachers' presentation of content for the realization of the stated objectives. Richard, (2008) InEdward, (2011) claims that, the more senses contributed in a lesson through the use of visual instructional materials, the more reality is stimulated.

Savory, (2004) added that, a well-planned and imaginative use of visual aids in lessons should do much to supplement the inadequacy of books as well as arouse student interest by giving them something practical to see and do and at the same time helping to train them to think individually. Savory, (2004) suggested a catalogue of useful visual aids that are good in teaching basic technology that is models, pictures (motion) charts. The researcher lamented that, the selection of visual instructional materials which are related to the basic content of a course or a lesson, helps greatly in understanding of such a lesson by the student in that they make the lesson attractive thereby, arresting their attention and thus, motivating them to learn. Wale, (2006) is of the opinion that, the use of visual instructional materials would go a long way in enhancing student performance in basic technology.

Acikgoz, (2005) advocates that, the use of pictures and realia will help children to improve on their thoughts and feelings. The scholar further states that, pictures are used as alternatives to real objects. Abayomi (2008) postulated that, Visual instructional materials

like models, posters, photograph in teaching and learning process, will enhance the interest of individual student and also help to the quality of teachers' presentation. It is also very vital to have competent and adequate human resources in terms of teachers' quality for the teaching of not only Basic Technology but all subjects in the school.

Federal Republic of Nigeria, (2004) states that, schools should be properly and uniformly equipped to promote sound and effective teaching. Suitable visual aids, qualified teachers, libraries should be adequately provided for schools. Absence of these visual instructional materials according to Rocser, (2005) will serve as constraints to educational system from responding more fully to new demand in educational process. To improve the quality of education, its efficiency and productivity, despite the role of pictures and realia as instructional materials in teaching basic technology, there is shortage of it in schools or teachers are not effectively utilizing them in teaching. This could be due to costly nature of the material, or lack of technical abilities of using it during the lesson. Thus, this study is carried out to examine the Effect of Pictures and realia on Academic Performance of Junior Secondary School Students in Basic Technology in Kaduna state.

1.2 Statement of Problem

Teachers are faced with obstacles that hinder them from the utilizations of pictures and realia in teaching basic technology in Kaduna state such as insufficient time, non -- availability of funds, lack of motivation, creativity skills, It is also apparently known by the researcher that, teachers in rural schools hardly make use of pictures or realia in teaching, and poor utilizations or in effective use of pictures and realia in both rural and urban schools are responsible for poor academic performance in basic technology. Therefore, the desire to embark on this research started right from the observed problem of poor academic performance of students in basic technology.

Abdulkarim, (2010) opines that if students in junior secondary school are to learn basic technology and boost their critical thinking, they should be given the opportunity to learn by practical using variety of learning resources. This will surely enhance their understanding of the subject concept and improve on their performance. Therefore, this study seeks to examine effect of pictures and realia on academic performance of junior secondary schools students in basic technology in Kaduna State".

1.3 Objectives of the Study

This study has the following objectives:

1. To determine the effect of pictures and realia on the academic performance of junior secondary school students in basic technology in Kaduna State.
2. Find out the effect of pictures and realia on academic performance of junior secondary school students in basic technology located in urban and rural areas in Kaduna state.
3. To investigate the effect of pictures and realia on the academic performance of male and female students in basic technology in junior secondary schools in

Kaduna State Nigeria.

1.4 Research Questions

This study seeks to find answers to the following research questions:

1. What is the effect of pictures and realia on academic performance of junior secondary school students in basic technology in Kaduna state?
2. What is the effect of pictures and realia on academic performance of students in basic technology in junior secondary schools located in urban and rural areas in Kaduna state?
3. What is the effect of pictures and realia on academic performance of male and female students in basic technology in Kaduna state?

1.5 Null Hypotheses

The researcher formulated the following null hypotheses.

H₀₁: There is no significant difference between the mean academic performances of junior secondary school Students taught basic technology with pictures and realia and those who were not in Kaduna state.

H₀₂: There is no significant difference between the mean academic performances of junior secondary school students exposed to pictures and realia located in urban and rural areas in Kaduna state.

H₀₃: There is no significant difference between the mean academic performance of male and female students taught with pictures and realia in Kaduna state.

1.6 Basic Assumptions of the Study

The following assumptions were made in the course of this study:

- i. It is assumed that, teachers at junior secondary school level have the proficiency to utilizations of pictures and realia in teaching basic technology in Kaduna State
- ii. Another assumption is that, pictures and realia are vital instructional materials in teaching basic technology at junior secondary schools level in Kaduna state.
- iii. It is equally assumed that, teachers in Kaduna state have access and provided with pictures and realia in teaching basic technology.

1.7 Significance of the Study

As mentioned earlier in the course of this research, the discipline of basic technology is taught at junior Secondary School level as a compulsory subject for graduation of junior secondary school. The study in no small measure assists and guide educational planners and implementers (teachers) in the following ways.

The study serves as a useful document that will enlighten the teachers on the significance or importance of using pictures and realia in teaching basic technology hence, it

aids retention. It's also a useful document to Educational Resources Centers i.e. (the body responsible for the conduction of junior secondary school examination in Kaduna State) to include the use of pictures and realia as basic instructional materials in teaching basic technology and other related subjects at junior secondary school level in Kaduna State. This research work will immensely help the curriculum developers to incorporate the use of pictures and realia as an important instructional material that will aid retention in teaching Basic technology in Kaduna state. The entrepreneurs benefits by designing and producing pictures and realia to be used in schools thereby getting some financial gains. It is also apparent to know that the result will give policy makers the valuable insight on the importance of using pictures and realia in teaching hence, it promotes creativity in teaching-learning process. It equally identified areas of weaknesses that need improvement. Recommendations arising from the findings of this study will guide the national education policy makers in re-organizing and restructuring the Basic Technology syllabus for Junior Secondary Schools so as to meet student's needs and interest of the changing Nigerian society.

1.8 Scope of the Study

This research work focused on effect of pictures and realia on the academic performance of junior secondary school students in basic technology in Kachia and Zonkwa educational Zones of Kaduna state. The study covered 10 secondary schools offering basic technology in the mentioned Zones. The schools were selected based on gender and geographical locations. The study was limited to government junior secondary schools only.the use of realia and pictures as visual instructional materials in teaching was used throughout the study . However, the concept covers, common hand tools, types of metals, preservation of woods, magnetism, series and parallel circuits of Junior Secondary School III Syllabus of basic technology.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter focused on the review of literature as it relates to the study. The researcher reviewed related literatures on realia, pictures and visual instructional materials, conceptual framework, types of visual instructional materials in teaching basic technology, criteria for selecting visual instructional materials, concept of academic performances, factors affecting performance, characteristic of visual instructional materials, importance of visual instructional materials in teaching basic technology, problems of using visual instructional materials in teaching basic technology, solution to the identified problems of using visual instructional materials in teaching basic technology, empirical studies, summary.

2.2 Theoretical Framework

The organized combination and utilization of materials, equipment's and people facilitates the presentation of content for the realization of the stated objectives. Richet, (2008) in John, (2010) describes visual instructional materials as any device, piece of equipment, graphic representation and illustration designed and used to assist the learners to learn comprehensively. Also, Egunjobi, (2009) is of the view that, visual instructional materials are anything that can be used by the teacher and learners before, during and after the lesson to ease the realization of instructional objectives. In other words, instructional materials are tools that facilitate the transmission, understanding and appreciation of concept.

Silver (2010) asserted that, visual instructional material are written or published textbooks and related core materials, (including those specific materials which are used by teachers for classroom instruction needed by a state or local education authority or any agency for use in primary, post primary and post-secondary schools instruction including, specifically requested teachers edition of such materials. He further lamented that, teaching

aids or instructional materials consist of carefully plan and select an instructional resource that facilitates teaching - learning process.

Egunjobi, (2009) states that, visual instructional materials, facilities, aids are materials which make it easier for the teacher to impart knowledge and skills to the learners. He further stressed that, teaching materials and facilities saves time, make learning more effective and promote interest for both teachers and the learners. Ricardo, (2008) view visual instructional materials as tools used to supplement the written or spoken words in the transmission of knowledge, attitude, and idea to emphasize, clarify or vitalize the instruction. It is in view of this, Olu and Okoye, (2008) lamented that, visual instructional materials are all the tools that can be used by a teacher to provide help and encouragement to learners and learning activities such materials, brings together, human and materials in a systematic co-operation to effectively solve educational problems,

Adesanya, (2011), understands that chalkboard, models, conic charts and other non-projected tools will bring about efficacy and efficiency in the teaching and learning process and invariably, promotes and enhance the achievement of instructional objectives .Visual instructional materials include all the materials a teacher could use during the lesson to aid learning and retention. He further lamented that, in order to meet individual differences in the classroom settings, (Adeyemi, 2010).Visual instructional materials simply means all those instructional resources used to supplement the normal learning process of listening seeing, reading and writing, (Abdullahi,2012) Abirnbade, (2012) re-affirms that, visual instructional materials are those devices which facilitates teaching and learning. It is a general term referring to communication, experiment, equipment and materials used for communication of instruction in which more than one sense is use in learning and retention.

2.3 Types of Instructional Materials

Schools should be properly and uniformly equipped to promote sound and effective teaching-learning process. Instructional materials can be classified as cited by Shuaibu (2011) that, instructional materials are being classified into three major categories; Visual materials, Audio materials, Audio-visual materials

Visual Materials; it involves the use of visual perception in the development of skills and understanding which includes: Three dimensional materials, objects, models and specimen Printed materials that is, textbooks, workbooks, journal, magazines, newsletter etc.

Boards, chalkboards, bulletin, flannel boards. Still pictures, non-projected (photographs illustrations) and graphics, maps, posters, diagram.

Audio materials convey messages through sound production which include the following; radio, tape recorder, record player, MP3.

Audio-visual materials which includes television, computer, video tapes, CD, DVD players etc. Ughamadu, (1992), classify instructional materials into printed media i.e. textbooks, reference books, journal, posters and non-printed media i.e. models, 16mm film projector, transparencies and overhead projectors. We also have audio-visual media which include; instructional television, 16mm and 8mm sound film, Obeka, (2010). Another classification is that of hardware e.g.(audio cassette recorder, video recorder, slide and film strip projector overhead projector, motion pictures projector and software include audio tapes, video tapes, slide films transparencies, motion picture) hardware transmit and retrieve information. (Udo, 2006).

2.4 Visual Instructional materials for teaching basic technology

Instructional materials are educational resources used to improve students' abilities, skills and knowledge to monitor their assimilation of information and contribute to their overall development, (Wathere, 2012). Visual instructional materials according to

Shuaibu,(2011),are important materials which provides and carries information to student and also creates interest in the teaching and learning of basic technology or any other subject. Utilization of visual instructional materials enhances the quality of teachers' presentation.

Importance of instructional media utilization in teaching and learning basic technology.

To focus attention to motivate learners' interest, to reinforce verbal and visual message, to elucidates verbal concepts to save teachers time for presentation, to make learning more practical, exciting and lively. For easy evaluation of learning, if the instructional media is to be effectively used during the teaching and learning process, particularly in teaching and learning of basic technology, the following steps should be followed by the teacher, preparation, presentation, evaluation and follow-up

Preparation: The preparation consist of two steps which are as follows

Teachers' self-preparation and the Class preparation

The teachers self -preparation; the teacher should properly prepare the media to be used before going to the classroom. The media should be previewed properly in terms of visual and audio aspects of the media. The selection should be properly done based on certain criterion that should be followed. The preparation should be effective, systematically done in line with the instructional presentation procedure while going to the classroom. **Class Preparation;** this involves both the learning environment and class preparation for the utilization of the media. The teacher should ensure that, the learners are properly arranged for free movement and adequate ventilation and illumination; the media should be properly arranged for easy viewing and auditory. All forms of noise factors should be eliminated i.e. physiological and linguistic factors for effective teaching and learning process. Presentation charts, models, graphics, posters, and pictures should be used at presentation stage.

Davidson (1996) opines that the use of media in basic technology lesson is imperative as it makes a valuable contribution to the quality of students leaning, such instructional

materials can be used in several ways, during basic technology lesson for example, by pasting them on the chalkboard or wall of the classroom like posters, charts or by holding the visual materials and be moving around within students in the class for students to be looking while the teacher explains or the teacher can ask the students to come forward to see for themselves.

Reece and Walker, (2001) pointed out that it is important to use learning aids to enhance student learning experiences and they stressed the link between poor learning with the failure to use visual aids and similarly effective. The use of visual instructional materials in the classroom by the teacher can be during the introduction, presentation and evaluation of the lesson. The visual instructional materials can be used continuously and sequentially according to the discretion of the teacher and learners interest while noting some points. Teacher should be careful while using visual instructional materials in the classroom. The instructional materials may be underutilized or over utilized while delivering the lesson in the class.

2.5. Sources of Visual Instructional Materials

Thorough studies revealed that, visual instructional materials may be acquired by schools through the following means:

Collecting items from the immediate locality. Based on the above, learners could collect items like milk, beverages containers, discarded plastic container, bottle tops, old magazines, calendars etc. Production process by teachers and learners both can produce some cheap instructional materials like charts and models etc.

Governmental and non-governmental organization acquires and distributes to schools items ranging from chart, maps, textbooks, globe, etc. Non-governmental organization such as United Nations Development Programme, United Nations Children Educational Fund, United Nation Educational, Scientific and Cultural Organization (UNESCO) also donates

instructional materials to schools.(Silver,2010).Donation from other sources e.g. multinational co operations.

Philanthropists and other influential people within the community or society, old students associations, parents association and school based management committee, board of governors and other similar bodies can donate instructional materials to schools.

Donation of produced instructional materials by students in tertiary institutions. Instructional materials produced by student in tertiary institution as part of their projects or assignment is subsequently distributed to neighborhood schools after being graded. These materials are then used in schools for effective teaching and learning process.

Educational Resource Centre (E.R.C); A resources center is a place where varieties of teaching and learning materials exist for use by teachers, learners and other interested individual within a school or area. Education resource centers can be established by institutions, local, state or federal government or non-governmental organizations. Virtually all the state in Nigeria has education resource Centre. These Centre's does not only store, sell and distributes teaching and learning materials they also run short courses on how to use these material.(National Teachers, Institute,2009)

2.6 Criteria for selecting Visual Instructional Materials

The need of individual teacher could vary considerably. To meet these needs, schools or individual teacher could develop their own set of specific criteria, Obeka,(2010). While selecting instructional materials to be use by the teacher, the following has to be put into cognizance according to Udo, (2006).

The learners characteristic and needs should be properly analyzed and address so that selected media may match their individual needs and interest.

Victor, (2011), reported that, so many factors are responsible for the selection of visual instructional materials. These include objectives, subject matter, learner's task, learner's

characteristics, teachers' attitude etc. Udo, (2006) also identifies that, the following steps in selecting and using visual aids, could improve their effectiveness and selection of the materials on the basis of needs. The teacher should be familiar with the materials, Use the materials as it seems best to meet the needs of the class. Have definite follow up to evaluate the effectiveness of the materials. It is essential that, the children are prepared for what they should expect. Suleiman,(2009) also suggested some factors to be considered in selecting materials for instruction in teaching Basic Technology in our secondary schools these are: The nature of objectives, characteristic of the learners, instructional methodology and Constance of the instructional situation.

Tukur, (2012) , also identified fifteen criteria to be considered when selecting visual instructional materials, these are Instructional objectives, learners age, learners interest, background of the learner, learners level of education , ability of the teacher , characteristic of instructional materials, availability and accessibility of the learners, quality of instructional materials, cost benefit analysis, Instructional amenities, competent personnel, popular instructional material, duration of the lesson and official backing. **Instructional Objectives:** These criterions comprise of all what the teacher want to impart to the learner and thus has to do with the well-organized lesson plan. **Learners' Age:** The learners' age must be put into consideration i.e. he should be taught according to his level of age for proper perception of instructional objectives. **Learner's interest:** When selecting instructional materials, learners' interest must be put into consideration for the lesson to be effective. **Learner's level of Education:** is to be taught, the learner should be according to the level of their class. **Background of the learner:** Teacher must find out and know the learners background so that instructional material would be attractive. **Availability and accessibility of visual instructional materials:** When selecting instructional materials, the materials should be available within the neighborhood environment or place where they can be found and utilize easily. **Ability of the**

teacher: while selecting visual instructional materials these should be of help to teacher and the learner for the lesson to be more effective.

2.7 Characteristics of visual instructional materials

The materials should be those that can be moved around i.e. portable, not easily broken, colorful that can arouse the learners' interests. Instructional Amenities: When selecting instructional material this should be done in a place that is equip with amenities and proper lightings, conducive classroom that will be good for showing pictures. Cost benefit: In selecting instructional materials cheap and affordable ones should be purchased this will provide much materials that would be adequately used in teaching - learning process. Quality of visual instructional materials: Good visual instructional materials should be related to curriculum, unit of instruction, the lesson to be taught and suitable for particular aged group and should be free from bias, up to date that reflect current thought and those that can last long without being spoiled or distorted.

Competent Personnel: While selecting instructional materials those individual that have the technical skills should be selected for the effectiveness of teaching and learning process. Popular instructional materials: In selecting the visual instructional materials those that are common i.e. easily found almost everywhere e.g. books, stones, rulers, sticks etc. Duration of the Lesson: The visual instructional materials that will enable the teaching and learning process to be finished within the stipulated period of time should be selected. Official Backing: The visual instructional materials to be use must have an official back-up by the school authority.(Tukur,2012)

2.8 The Concept of Academic Performance

Academic performance has not enjoyed all time and all scholar accepted definition. Definition given by different scholars are: the first dependent variables in the research, Academic Performance is understood to be the display of knowledge attained or skill developed in school subject designated by test and on scores or marks assigned by the subject teacher.

Taiwo, (2007) defined Academic Performance as individual inherent potentials in terms of intelligence combined with other psychological factors. Similarly, Saka, Sam, Yusuf (2008) saw it to be what is measured regarding skills or knowledge developed through specific or training with emphasis on how well instructional objectives have been attained. This meant that, the measurement of performance represent all abilities, that can be evaluated on the basis of observing the individual as he performs the task involved. Skills on the same concept.

Deco, and Crawford, (2008) asserted that academic performance is the process of measuring the students auxiliary (behaviors' which must be acquired at the lower level of the learning structure and terminal performance during and at the end of instruction. In addition, they supplied three uses that can be made with information obtained from academic performance to include; determining how well the student have achieved the instructional objectives, secondly, determine the adequacy of enduring behaviors and lastly, determining the adequacy of our instructional procedures. For the purpose of this research, Academic performance was based on the scores students obtained.

2.8.1 Gender and Academic Performance

Gender issues have become an important subject of discussion at any educational forum. The literacy rate is more among boys than girls. It is interesting to observe that, girl's scores high marks than boys in most of the academic and other competitive examination. (Obafemi, 2015) Academic performance is considered a key criterion to judge one total potentialities and capabilities. In this study, the researcher has analyzed and assessed the gender difference in academic performance of junior secondary school three (III) students offering basic technology comprising male and female student.

An experimental research method has been adopted in this study and eventually, the assessment indicated that, male students performs better in terms of high scores than female students. Most studies showed that on the average girls performs better than boys, girls' gets higher grades and complete high school at a lighter rate compared to boys. Jacob, (2002), a standardized achievement test also indicated that females are better at spelling, pronunciation and perform better on test of literacy, writing and general knowledge (National center for educational statistics,2003). Furthermore, Ismail and Othman, (2006), investigated the effect of student gender and their performance during the first year of the university. Data about students were collected from male and female students from three faculties namely: Economic administration, Arts and social sciences, economic and accounting, research reveals that, female students were found to have better result than their male counterpart and their gender displays an important role in influencing success in the University. Hedges and Norwell,(1995) on the other hand, males perform better in engineering and mathematic than female. However, males and female performs equally well in Basic Mathematic and females actually have better computational skills. Males also display greater confidence in their mathematics skills which is a strong predictor of performance (Casey, 2011).

2.8.2 Factors Affecting Student Academic Performance in Basic Technology

Psychologists and other educational researchers identified some variables that have Effects on Students Academic Performance i.e. Blooms in Towel, (1994). Suggested two long term influences contributing to differences in scholastic achievement between children to include meaning while educational comes to have for the child in respect of his own personal advancement and the role in the society and value placed on education by parents and other significant adult in the child's life.

The extent to which scholastic achievement are motivated and reinforced by these adults. Wiseman in Lovell (1994), in a study he conducted on 10 year old child who had taken a number of standard tests found that, home circumstances of the child affected school attainment more than the school condition did. He also found that Secondary School Students' economic level and social class are less important to children's progress than the aspect of parental attitudes (their attitudes to books, reading and education).

They also advanced their findings after conducting a follow-up study of 3820 student from birth to 20 years. Rose and Sampson in Lovell, (1994) reported that, differences in ability and attainment are associated with parent's education and family size and that, these two factors continue to influence rate of progress over the period of 8 to 20 years still on the same subjects, the finding of Pigeon in Lovell (1994), reveal that, teacher expectations affect students' performance. As a result, teachers need to think well of their pupils and set standard of work which is high since their expectation to some extent are self-fulfilling.

Sewer, (2004), who studied relationship of study attitude and academic performance at secondary level in pun tab found that, study attitude was positively related to academic performance, study attitude scores of females were more closely related with academic performance as compared to male and the study attitude scores, normal students were more closely related with academic performance as compared to urban student. Furthermore, mean

scores of low and high academic achievers were compared and it was found that, high and low achievers differed in their study attitude and female, male, rural and urban student also differed in their study attitude.

Similarly, Fusita,(2006), in his study that examined the Effect of extracurricular activities on academic performance of high school student related that playing sport, watching television and participating in community service improves academic performance while playing a musical instrument does not improve Academic performance. In another study, the impact of stress factors on college students academic performance. Womble,(2006), found no correlation between the score of the perceived stress scale and academic performance. However, the stress factors that had most negative impact were sleep problem with room-mates and social activities.

Similarly, Ojeride in Adedi Wura and Taiwo, (2007), identifies personality factors (such as anxiety, achievement, motivation and level of interest and teacher variable (such as knowledge of subject matter, teaching skills, attitude in the classroom, qualification and experiences as factors affecting academic performance. In similar effort, the study sought to examine socio-economic factors influencing students' academic performance in Nigeria revealed that, insufficient parental income, family type and insufficient funding by government as the underlying factors.

The work of Lan, (2007), on the relationship between classroom practice and home work on students' performance. However, he identified some factors that accounted for variation in student performance in biology to include language usage at home, mothers level of education, students self-efficacy towards Biology, time spent on homework at home, the frequency of homework assigned, and the focus of homework provided. The work of Aripinetal, (2006), on the student learning styles and academic performance found academic performance based on learning styles. (Six major learning styles were identified) Viz:-

Independent, dependent, collaborative, competitive, and participant and avoidant to be significant. Review of the concept will be concluded with the work of Andrews, (2009) who studies reason why academic performance may be impacted and identified the following reasons as causes of decreased scholastic performance. Food insecurity typically impacting youth with lower income families) and food insufficiency (where the individual intake of foods, due to resources constraint in adequate, combined or individually, these two problems have been linked to poor health and developmental issues within large number of students.

Bilingualism: This has potential of presenting both challenges and advantages to school age children.

Alcoholic family: Dynamic children for alcoholic families were found to be more susceptible to developing life-long psychological and behavioral problems. Unemployment when a number of a family loses job, the change in state showed that when a father becomes unemployed, negative effects on school work is recorded yet, another becomes unemployed positive impact upon school work is recorded.

Peer pressures and school activities as children to feel sense of belonging. Those who have trouble forming friendship develop low self -esteem and performed poorly in school.

2.8.3 Characteristics of Visual Instructional Materials

Instructional Materials which offer content e.g. charts, graphs, audio recording, tools, implement print materials of all kinds of maps, painting and resources in the community, (Bola and Umoh, (2009),instructional aides are essential to effective instruction. The teacher should know how to prepare and use instructional aides and should recognize their values in fostering good instruction. The greatest value of instructional aides lies in:

- i. Their appeal to trained senses of perception,
- ii. Their ability to attract and hold trainees attention and interest
- iii. Helps trainees and understand the relationship between different concepts or

ideas a good instructional aid should promote certain desirable result. It should stimulate interest, command attention, be easily understood and promote a positive reactor on the part of the trainee visual instructional aid should be complete, have some explanation in the form of a table, and finally be as simple as possible. Teachers therefore, have no excuse to avoid using such available visual instructional materials in their teaching and learning process.

Dubey, (2009), noted that teachers should exhibit skills and understanding in the use of some instructional materials for maximum result. The practical use of a few would be described for the purpose of this study as follows: Print Materials: These are also referred to as reading materials, individuals go through them to gather information about people, places, process and event in the class, and they can be used to provide general class discussion. However, the nature of basic technology requires broad and current knowledge therefore, the teacher needs to expose the learner to other print materials such as news magazine, poem, supplementary readers' dictionary and Pamphlets. In using them, teachers should turn the class into reading session through developing skills is important. According to John, (2008) these materials should be used to provide organized subject matter for learners to study, Solves identified problems and suggest rational solution, Stimulates thinking and interest, develop the skills of identifying needed informant on a variety of issues and process. create awareness of current matters of national and international importance.

However, for these purpose to be achieved teachers must ensure that the content of such materials are authentic and accurate suitable to the learners and environment free from destruction and bias. Also, materials should be checked for good illustration, clear print and durability. Furthermore, the teachers should combine the use of reading materials with other categories of materials to practically illustrate and demonstrates process.

Chalkboard and charts are common non-electrically operated instructional materials, they are visual aids. The chalkboard is also a display material which the teacher uses for writing, sketching, illustration and drawing etc. it is therefore, the focal point of learning in the class room, the chalkboard should be properly placed for all learners to learn from materials displayed on them in order to effectively use the chalkboard. Basic Technology teachers should abide by the following standards Okorie, (2004), In Musa,(2010),on entering the classroom, the teacher should ensure that all materials not relevant to the lesson should be completely removed.

Partition the available space into portion to other and orderly presentation of materials.

Begin writing on the chalkboard from the left to the right, Write and draw neatly

Write straight not on a standing manner on the chalkboard

After writing on the board it is a good practice to check materials from the back of the class to ensure clarity and correct any observed error made.

Charts: These are visual materials that carry instructional materials on a subject matter they can easily be prepared by the Basic Technology teacher through local available materials.

Tools: They could be diagrammatically represented which combines pictures, graphs, written materials to give a clear and vivid summary of a vital process, conception set of relationship there are also cheap and commercial produced charts that can be procured and used to meet the needs of Basic Technology class. In order to effective, use the chart as visual instructional materials teachers need to check and master the subject content and skillfully use them at the most appropriate time in the lesson as a concept of process is being developed the) need also to be adequately managed for the learners to see and benefits from the information they carry. It is purposively wrong for the teacher to ask the learners to hold up charts in their hand, while teacher explains points in the lesson. (Okorie, 2004 in Musa, 2009). Teachers should creatively provide means to hold up charts in the classroom either on

the walls or somewhere provided on the chalkboard, care should be taken so that charts do not distract the attention of the learners. They should therefore be used to encourage skills of observation and critical thinking,

2.8.4 Problems of using Visual Instructional Material in Teaching Basic Technology

Going by the experience of the past researchers, use of visual instructional materials in teaching and learning caused some problems in the act of teaching Basic technology, some of the teachers are not professionally trained, this category of teachers usually face the problems of selecting and using the most appropriate materials for teaching Basic technology subject. According to Agunjobi, (2009), Visual instructional materials such as charts, pictures and even bulletin board required a competent and skillful teacher to use them occasionally in teaching.

Federal Republic of Nigeria (2008) curriculum review and reforms created some problems in using instructional materials to teach not only Basic Technology but also other subjects. This is because whenever there is a change in the curriculum content, there is the tendency that learners face some problems in the use of the absolute types of materials to teach the newly develop curriculum, they knew and the relevant materials for the new curriculum are not yet readily available for use in schools and colleges, Eze, (2010), today, though money was provided for education sector, finance is still an important factor hindering successful purchase and use of visual instructional materials. (Eze (2010). This is due to the fact that government cannot afford to buy and supply all the relevant material for teaching and learning. These financial constraints can hinders the teacher from supplying the needed and relevant visual instructional materials for the Teaching and learning of Basic technology subject, instructional material accessibility act, (IMAA,2008).

2.8.5 Solution to the Identified Problems of using Visual Instructional Materials

The following are the solutions to the identified problems according to Agunjobi, (2011). Students and parents should provide visual instructional materials commonly found in and around the community of the school. The government and other influential individual should assist in introducing instructional material, tax fund to be financed by companies, Banks, multinational companies. All secondary schools in Kachia and Zonkwa educational zones should be encouraged to establish mini-research and development center and equip with enough local community resources.

Principals, of post primary school should embark on the acquisition of relevant teaching materials through education donor agencies, such as British Council, UNICEF, UNDP, ETF, and PTA. Since the provision of instructional materials is expensive hence fund should be provided by the Kaduna State government for mass purchase and distribution of visual instructional materials in schools and colleges. Government should endeavor to make the use of visual instructional material in teaching as a compulsory ethics in all subject area and should form part of consideration for promotion to the next grade level. Government should also embark on a massive sensitization programmes which will help to awaken teachers from their apparent state of slumber and laziness in the area of improvisation in teaching. This could attract some incentives in the form of allowances to encourage teachers in the teaching profession.

2.8.6 Empirical Studies

Various researches were carried out on visuals, pictures and realia as instructional materials by different researchers on basic technology and non-basic technology subject. Suleiman, (2006) Carried out a research to determine the effect of visual instructional materials on student academic performance in geography in some selected secondary schools in Wamako Local Government Area in Sokoto State. The researcher used quasi-experimental

design and his sample population covered 305 students. After analysis with t-test at 0.05 level of significant. The researcher developed geography performance assessment test as an instrument to collect data. The findings revealed that, students taught with visual instructional materials performed significantly better than lecture group. He further concluded that, the use of visual instructional materials in teaching enhanced retention and productivity. He therefore recommended that, visual instructional materials should be provided and utilized in the classroom

Halilu, (2001) in his study, determined the effect of visual instructional materials on the achievement of primary school pupils in social studies at primary school in Jalingo Area of Taraba State. The researcher used quasi-experimental design with 240 sampled populations after analysis, with spearman rank order correlation coefficient test statistic at 0.05 level of significant. The researcher use questionnaire and interview to collect data. The findings revealed that, visual instructional materials have a significant role on the achievement of primary school pupils. He concluded that, the use of visual instructional materials at primary school level arouse interests and recommended that, teachers should always make use of visual instructional in teaching at primary level.

Musa, (2002), conducted a research to determine the effect of visual instructional material on the Academic performance in Biology in some selected schools in Rano Local Government Area of Kano State. The target population was 250. However, the researcher used survey research design and questionnaire was used to collect data for the study and tested at 0.05 level of significant. After analysis the result revealed that, visual instructional material play a vital role in arousing student interest, better understanding. He recommends that, visual instructional materials should be utilized when teaching in secondary schools in Kano State.

A study was conducted by Odu (2011) on the impact of pictures in teaching and learning biology among students in senior secondary schools in Enugu North local Government Area. The research questions were reviewed and answered. The literature related to the study was also reviewed under the following topics; uses of pictures as instructional materials; importance of pictures as instructional materials in teaching and learning, the availability of pictures as an instructional materials, the extent of usage of these materials, the level of interests showed by students in biology. The researcher used survey research design, the population of the study was 2700 Senior Secondary School Students, the sample size was 262, questionnaire was also used as an instruments and the instrument was validated by 2 experts in the School of Science Education. The instrument reliability was obtained using test, re-test method. Data was collected using questionnaire as the instrument and the data was analyzed using mean and percentage. The results showed that the selected schools are not enough to guide and direct learning experiences. The available ones in the school are frequently used. The extent of usage of these instructional materials are very poor finally, the extent of students' interests in Biology lesson using pictures as an instructional materials was very high in some Secondary Schools. He recommended that, teachers should always use pictures as instructional materials.

Another research was conducted by Dwi and Yusuf (2010) to investigate the use of authentic materials in writing procedural text in English classes of vocational Schools in Kuningan Indonesia. The researcher used quasi-experimental research design. The population of the research was the eleventh grade students of vocational Schools in Kuningan. From ten classes, two classes were taken as sample using purposive sample technique. A class taking Automobile course consisting of 30 students serves as the control group and another class taking Agricultural product Technology course consisting of another 30 students as experimental group.

The research used pre-test and post-test design. The treatment in the experimental group involved four kinds of authentic materials; Instant coffee packages in the first meeting; instant noodle packages in the second meeting; a recipe in the third meeting and two videos in the fourth meeting. The treatment also involved pictures, realia and demonstration as part of the teaching-learning process, there were two instruments utilized in collecting data to answer the aims of the research. There were written test including a pre-test and an interview. The pre-test was a writing composition test about text procedure.

The post-test administered was a bit similar to the pre-test the students were asked a text of procedure yet in the post-test here was only one topic given, how to serve a glass of strawberry juice. The statistical computation using independent t-test on pre-test showed that the two classes were equal; there was no significant difference between the experimental and control group. The researcher concluded that, students taught with authentic material performed better than those taught with conventional method. He recommended that, relevant and adequate teaching materials be provided.

Another research was conducted by Saima (2008) On realia for teaching descriptive writing at primary level. The objective was to find out the effect of using realia in teaching descriptive writing at primary school level. researcher used a quantitative type of research this is according to her, will give a statistical view of the study. The design of the study is quasi experimental with randomized pre-test and post-test.

The researcher had chosen this design according to her because it has greater internal validity. There were 48 students that participated in the experiment; they were divided into two equal groups on the basis of random sampling. One group acted as an experimental and the other as control group both of them attempted the pre and post-tests, both of them were taught few lessons about the topic but different methodologies were applied to both of them. The researcher found and concludes that, Realia can improve the process of teaching

descriptive writing at primary level. Therefore, she recommended that, teachers should always use realia in teaching especially at primary school level

Muhammad(2000) conducted a research on the effectiveness of using visual instructional materials in teaching and learning analytical concept of chemistry in some selected Senior Secondary School in Bakori Local Government Area of Katsina State. One of the objectives was to find out the effectiveness of using visual instructional materials in teaching and learning analytical concept in chemistry. The sample population covered 80 students from two different classes; t-test was used for data analysis at 0.08 level of significant. The researcher developed chemistry achievement performance test as his instruments for data collection. The findings indicated that, better achievement in the student taught with visual instructional material (experimental group) than those taught without visual instructional materials (control group).He therefore recommends the use of visual instructional materials in teaching chemistry at all level of secondary school.

Kola (2007) carried out a research to determine the effect of visual instructional material on Students in teaching Geography in Pategi local government area of Kwara state, the researcher use gender as variables. Quasi-experimental involving 3x2 factorials were used. The sample for the study covered 150 students. The students were pre-tested and post-tested; Analysis of Variance (ANOVA) was used for data analysis at 0.05 level of significance. The findings of the study indicated that, gender has no significant influence on the academic performance of Students. The researcher also concluded that, students exposed to visual instructional materials were better than their counterpart i.e. (control group).Therefore, He recommended that, visual instructional materials be available for classroom instructions

Anthony Oyetunde and John Oladipo (2012) conducted a research on the psycho-social factors affecting the teaching and learning of introductory technology in junior

secondary schools in Ijebu-Ode Local Government Area of Ogun State. In the study, five Junior Secondary Schools were randomly selected from 13 public schools in the Local Government. One of the objectives of the study was to find out the psycho social factors affecting teaching and learning in intro-tech. A questionnaire was used as an instrument where the respondents were required to select answers from the alternatives given. The reliability of the instruments was determined by using cronbach Alpha reliability technique. The results showed that; mean of male student and mean of female students disagreed with the statement that not all their introductory technology teachers are hard working. They therefore recommended that, those factors responsible their teachers laziness should be address and those that are hardworking should be motivated with more incentives.

Another research was conducted by Tsabalala and Champion Ncube (2012).On teachers' perception on challenges faced by rural Secondary Schools in the implementation of Vocation and Technical Education policy in Nkayi district, Zimbabwe. The study adopted the quantitative research paradigm and made use of descriptive survey design. The results showed that there were more female respondents than male which means most schools had more female teachers than male ones. The results showed that majority of teachers teach arts subjects, than those to teach sciences and those who specialized to teach practical's and technical subjects are only few The results equally showed that the majority of the teachers that teach technical subject do not have the qualifications to teach those areas.

A research also was conducted by Ibukun Alonge (2012) on the effect of video compact disc (VCD) based instruction on Students learning outcome in an Introductory Technology Class in Nigerian Secondary Schools. The Study investigated the effect of Instructional video Compact disc (VCD) on students learning outcome in introductory technology. The subject consisted of 60 students randomly Selected from Junior Secondary School II from Kasofe Local Government in Lagos state. The students were randomly

assigned into group A and B respectively. Group A was used as Control group while group B was used as experimental group, the researcher developed Students Achievement Test on Introductory Technology as an instrument after teaching, the teacher administered post-test to both classes. The mean scores and the standard deviation of the scores of both classes were determined. A t-tests' statistics was used to determine whether there is significant difference between the performance of the group in the post test. The mean scores of the experimental group are superior to that of control group.

Akpan Godwin, e-tal (2010) investigated the effect of team teaching on students' performance in Introductory Technology in Secondary Schools in Akwa-Ibom state, Nigeria. The population of the study comprised Junior Secondary School II Students in public Secondary Schools offering introductory technology. Criterion sampling technique was employed to select schools from senatorial districts. By criterion, each of the selected public schools had a well-equipped functional Introductory Technology workshop with at least four Introductory Technology teachers. The study involved a pre-test, post-test, non-randomized and quasi-experimental design. The comparison of student mean performance in Introductory Technology taught fewer than 2 pedagogic approaches called for a quasi-experimental design.

2.8.7 Summary of Review of Related Literature

The study of basic technology is very important and essential particularly among the Student of post-primary and tertiary level of education because it is more about the study of Technologies and related Sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupation. The conceptual frame work which mark as the basis of the literature review which has also given us an insight on the types and sources of visual instructional material in addition, Realia and the criteria for selecting such materials.

Thus after conceptual frame work, the concept of Academic performance will never be ignored in the literature review which gives rise to gender and academic performance and the factor affecting the performance it has once again given us an insight on how important visual instructional materials are and the problems, so also, the solution to the problems of using visual instructional material in teaching basic technology in junior secondary schools in Kaduna State. Conclusively: the reviews has also provided some insight on the need for basic technology teachers to go for re-training services in order to update their knowledge and be more competent in their discipline. The research which was conducted by Dwi and Yusuf(2010) who investigated the use of authentic materials in writing procedural text in English. The researcher use the same research design with the present research study but two types of instruments were used in collecting the data that is written test and interview and the results revealed that there was no significant difference between the control and experimental group which is contrary to this study which indicated significant difference between the experimental and control group.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology that was employed in carrying out this study. It also presented the research design, population of the study, sample and sampling procedure, instrumentation, validity of the instruments, reliability of the instruments, pilot testing, procedure for data collection, procedures for data analysis.

3.2 Research Design

The study was a quasi- experimental and adopted pre-test, post-test control group design. The researcher had chosen this design because Saima, (2008) uses the same research design and due to its greater internal validity, the researcher decided to adopt the research design. In this design, the following steps were taken to remove all the threat.

Students were divided into two groups. The same amount of time was used for both the groups both the groups experienced the same developmental process. The same measurement methods and instrument were applied to both the groups. Both experimental and control group were subjected to a test at the same time later, the experimental group received treatment while the control group under goes through the conventional treatment for an interval of eight weeks. Post test was administered to both the experimental and control group as shown below; Schematic representations of the Research design.

O1 X O2

O1 X O2

Key:-

O1 - Pre-test

O2 - Post test

X - Treatment

3.3 Population

The population of this study was 1235 students of junior secondary school III from Zonkwa and Kachia Educational Zones of Kaduna state. The population included all the boys and girls in the area under referenced. In Zonkwa Zonal Education Area, there were 45 government secondary schools offering basic technology with a population of 379 while Kachia Zonal Education area have 49 government secondary schools offering basic technology with a population of 856 The population of students in both the two Educational Zones includes, male and females, average age and average abilities.

3.4 Sample and Sampling Procedures

An intact class was used to select a sample size of 300 out of a total population of 1235 according to Research Advisors (2006), 300 was used as sample size this is because the schools involved four groups and one could choose an equal number of attributes either 1 class as control group and 1 class as experimental group consisting of 150 students each. Each stratum is then sampled as an independent sub-population out of which each individual element may be selected. The potential benefits of this according to Ado, (2015) dividing the population into distinct independent strata can enable the researcher to draw inferences about specific subgroups that may be lost in a more generalized sample. He also said, utilizing an intact class may lead to more efficient statistical estimates and sometimes data are more readily available for individual pre-existing strata within a population than for the overall population. Therefore, all the boys and girls in the two schools from urban and rural areas offering basic technology were sampled.

The treatment in the experimental group involved authentic materials; hand tools, it also involves the use of pictures, realia and demonstration as part of the teaching-learning process. While the control group will be treated using the conventional method of teaching (lecture method) for easy classification and identification as shown in table 3.2

3.5: Distribution of Sample Size

S/NO.	Name of Selected School/Group	Educational Zone.	No. of Student.	Group.
1.	G.S.S. Kachia/ U	Kachia	150	Experimental
2.	G.S.S. Fadan Kamantan/ R	Zonkwa	150	Control
<u>TOTAL</u>			<u>300.</u>	

KEY: R= Location of Schools in Rural Areas, U= Location of Schools in Urban Areas

3.6 Instrumentation

Instrument for this study was tagged Basic Technology Performance Test (BTPT). The instrument comprised of 50 objective test items developed from Blooms Taxonomy of Educational objectives and adopted from the standards of junior secondary school examinations. The test items covered five topics and the options for the objectives tests were four (4) i.e. A.B.C.D. and 1hour,(30 minutes) was allowed as the duration for the examination and each question attracted 2marks which gives a total of 100 marks.

3.6.1 Validity of the Instruments

Validity of the instruments (content and face validities)were ascertained by given the basic technology tests items to the research supervisor for scrutiny and criticism where some of the test items were dropped due to observed ambiguity. The researcher also presented the instruments to a panel of two experts' one senior lecturer from the Department of Technical Education in Nuhu Bamalli Polytechnic Zaria and the other a senior master (Intro-Tech) from Demonstration schools in Nuhu Bamalli Polytechnic, Zaria. The judgment and assessment of the specialist helped to determine the extent to which the tests items accurately cover the area of the study domain. A Validation forms were collected from the Department of Educational

Foundations and Curriculum, Ahmadu Bello University, Zaria .The forms were duly completed by the panel of experts. Zubairu, (2014) states that, validating an instruments require the services of a panel of experts who will ensure that, the test items corresponds with the purpose of the study i.e. research questions and Hypothesis.

3.6.2 Pilot Testing

A pilot testing was conducted at Government junior Secondary School Zaria, in Zaria Local Government Area. This is because, the pilot school was not part of the sampled schools and was far away from the study area, no interaction occurred between them and the school was similar to those that were used in the study in terms of location and other features like, Gender and environmental condition. The pilot study was also aimed to determine the effectiveness of the research instruments, validity and reliability of the test items and also meant to test the students' performance. The results showed that, the experimental group performed better than the control group in all respect. Test involved the administration of basic technology performance test items to the groups (experimental and control) in the school. Researcher make sure that, problems encountered in the process of pilot testing were taken care of and test items that require replacement or drop were addressed immediately.

3.6.3. Reliability of the instrument

To determine the reliability of the instrument (test items) from the pilot study conducted was to ensure consistency and reliability coefficient for basic technology. Pearson Moment Correlation coefficient of statistic was used to obtain the reliability coefficient of the instruments. Firstly, a test-retest and Pearson Product Moment Correlation Coefficient of statistic was used to determine the reliability of the test items and the reliability coefficient of the test items was estimated to be 0.84. The pre-test was aimed to ascertain the homogeneity of junior secondary school III Students in basic technology and also to test for their average abilities

3.6.4 Procedure for Data Collection

The researcher obtained an introductory letter from the Department of Educational Foundation and Curriculum Ahmadu Bello University, Zaria to ease and facilitates the administration of the test items in the respective study area, after the introduction and briefing in respect of the purpose and nature of the research, the researcher, spent eight weeks with the experimental group while the control group were taught through their normal lecture method for eight weeks. Then after the pre-test, the experimental and control group were subjected to a treatment at the same time under close supervision of the research assistants.

Two weeks were given as a break before the basic technology performance test was administered to both the experimental and control group. Two research assistants helped in the administration of the test items to the participants who ascertained that, the test items were duly returned.

3.6.5 Procedure for Data Analysis

Data collected from the respondents was compiled and re-arranged. The raw scores of all the groups were computed using mean and standard deviation and descriptive statistic tool to answer research questions. while the formulated hypothesis were tested using independent t-test statistic at $p \leq 0.05$ or $p \geq 0.05$. Level of significance. The choice of t-test was due to the fact that, the data collected is continuous in nature and the researcher was to test two independent groups.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.1 Introduction

This chapter focused on data analysis presentation and discussion of results obtained from the study. Data were collected using basic technology performance test (BTPT) instrument from the respondent. Data collected were analyzed using descriptive statistics of mean and standard deviation. While in analyzing the null hypothesis, the data collected were analyzed using inferential statistic of t-test and alpha value at $P \leq 0.05$ or $P \geq 0.05$ the details of the analysis were as follows:

4.2 Analysis and Results Presentation.

Table 4.01: Mean and Standard Deviation of pre-test academic performance of junior secondary school students.

Variable	N	Mean	SD	Mean Difference
Experimental Group	75	44.48	20.52	0.05
Control Group	75	44.43		

What is the difference between the academic performances of junior secondary school students taught basic technology with pictures and realia in Kaduna state? The answer to this question, the descriptive mean and standard deviation of pre- test academic achievement of experimental and control group is presented in the table above which revealed that, the academic performance of experimental and control group is the same. Reason been that, the students were of the same average abilities and both the students have the same characteristic in terms of age, location and sex.

T-test analysis results of pre-test.

Table 4.01: Independent sample t-test on the performance of J.S.S 111 students taught basic technology using pictures and realia in Kaduna State.

Variable	N	Mean	SD	T-cal	df	P-Value	Remarks
Exp.grp		7544.48	20.5	0.01	148	0.99	Not Significant
Contrl.grp	75	44.43					

*Significant at $P \leq 0.05$ $t(148) = 0.01$, $P = 0.99$

Table 4.04 results showed that, the t-value computed is 0.01 and the p-value of 0.99 is observed and degree of freedom of 148 since the critical p-value of 0.99 is more than the alpha value of 0.05, there is no significant difference in the academic performance of students in experimental and control group. Thus, null hypothesis which stated that, there is no significant difference between the mean academic performance of junior secondary school students taught with pictures and realia (experimental group) and those who were taught using lecture method. (control group) is retained.

4.3 Response to Research Questions

Research Questions 1: What is the difference between the mean academic performance of junior secondary school students taught basic technology using pictures and realia between experimental and control group in Kaduna state? To answer this research question, a descriptive statistic of mean and standard deviation were carried out as presented below.

Table 4.03: Descriptive Mean and Standard Deviation of Experimental and Control group academic performance.

Variable	N	Mean	SD	Mean Difference
Experimental Group	150	64.73	8.612.17	
Control Group	150	40.30	6.44	

The result in Table 4.03 indicated that the experimental group has a mean score of 64.73 and standard deviation of 8.61 which is greater than the control group that has a mean of

40.30 and standard deviation of 6.43. This result revealed that, experimental group students performed higher than the control group.

Research questions 2: What is the difference between the academic performance of junior secondary school students taught Basic Technology using pictures and realia in Urban and rural areas? To answer this question, a descriptive statistic of mean and standard deviation were carried out.

Table 4.04: Descriptive Mean and Standard Deviation between Urban and Rural students' taught Basic Technology using pictures and realia in Kaduna State

Variable	N	Mean	SD	Mean Difference
Urban	150	46.43	17.10	3.33
Rural	150	43.10	17.78	

From the results obtained in table 4.04 above, mean and standard deviation of academic performance of Urban and rural area students, showed that, the students that are taught basic technology using pictures and realia in urban areas has a mean score of 46.43 and standard deviation of 17.10 which is greater than the students taught basic technology using pictures and realia in rural areas which had a mean scores of 43.10 with a standard deviation of 17.78. The results showed that, the urban area students performed higher than the rural area students.

Research questions 3: What is the difference between the academic performance of male and female students taught Basic Technology using pictures and realia in Kaduna State? To answer this question, a descriptive mean and standard deviation were carried out.

Table 4.05: Descriptive Mean and Standard Deviation of male and female academic performance of students in Basic Technology.

Variable	N	Mean	SD	Mean Difference
Male	178	63.22	9.00	20.96
Female	122	42.26	5.61	

Table 4.05 above revealed that, the mean and standard deviation of academic performance of Male Female students. The male students taught basic technology using pictures and realia has a mean score of 63.22 and standard deviation of 9.00 which is greater than the female students taught basic technology using pictures and realia which had a mean scores of 42.26 with a standard deviation of 5.61. The results revealed that, the male students performed higher than the female students.

4.4 Hypothesis Testing

The summary of data collected from the respondents and analyzed in respect to null hypothesis using t-test at 0.05 alpha level of significance.

Hypothesis1: There is no significant difference between the mean academic performance of junior secondary school Students taught with pictures and realia (experimental group) and those who were not (control group) in Kaduna state. To answer this hypothesis, an independent t-test on the performance of J.S.S.111 students taught basic technology using pictures and realia between experimental and control group was carried out as presented in Table 4.06

Table 4.06: Independent t-test on the performance of J.S.S.111 student between experimental and control group in Basic Technology.

Variable	N	Mean	SD	t-cal	df	P-Value	Remarks
Exptl Group	150	64.73	8.6	27.83	298	0.01	Significant
Contrl Group	150	40.30	6.44	27.82			

$$t(298) = 27.83, P = 0.01$$

Table 4.06 results showed that, the t-value computed is 27.83 and the p-value of 0.01 is observed and degree of freedom of 298 since the critical p-value of 0.01 is less than the alpha value of 0.05, there is significant difference in the academic performance of students in experimental and control group. Thus, null hypothesis that stated that, there is no significant difference between the mean academic performance of junior secondary school students

taught with pictures and realia (experimental group) and those who were not (control group) is rejected.

Hypothesis 2: There is no significant difference between the mean academic performances of junior secondary school students exposed to pictures and realia located in urban and rural areas in Kaduna state. To answer this hypothesis, an independent t-test was carried out as presented in Table 4.07

Table 4.07: Independent sample t-test on the difference in the performance of J.S.S 111 students taught basic technology using pictures and realia between urban and rural students in Kaduna State.

Variable	N	Mean	SD	T-cal	Df	P-Value	Remarks
Urban	150	46.43	17.10	1.66	248	0.098	Not Significant
Rural	150	43.10	17.78				

$t(248) = 1.66, P = 0.098$

Table 4.07 shows that, the t-calculated value of 1.66 is obtained and the p-value of 0.098 and the degree of freedom 248 was obtained. Since the critical p-value of 0.098 is greater than the alpha value of 0.05 the results revealed that, there is no significant difference. Therefore, null hypothesis which stated that, there is no significant difference between the mean academic performance of students taught basic technology using pictures and realia between urban and rural areas students in Kaduna State is retained.

Hypothesis 3: There is no significant difference between the mean academic performance of male and female students taught basic technology using pictures and realia in Kaduna state? To answer this hypothesis, an independent t-test statistic was carried out as presented in Table 4.08

Table 4.08: Independent t-test on the difference between the academic performance of male and female students taught basic technology using pictures and realia in Kaduna State.

Variable	N	Mean	SD	T-cal	Df	P-Value	Remarks
Male	178	63.22	9.0	17.10	148	0.01	Significant
Female	122	42.26	5.61	17.10			

t(148)=17.10, P=0.01

From the results obtained in table 4.08 it is observed that, the t-calculated value of 17.10 is obtained and p-value of 0.01 at the degree of freedom of 148. Since the critical p-value of 0.01 is less than the alpha value of 0.05. This shows that there is significant difference in the academic performance of the students taught basic technology using pictures and realia between male and female in Kaduna State. Thus, null hypothesis which stated that, there is no significant difference between the mean academic performance of male and female students taught with pictures and realia is rejected.

4.5 Summary of Findings.

The study was summarized as follows:

- (i) It was found that, significant difference exist between the mean academic performance of junior secondary school Students taught with pictures and realia and those who were taught using lecture method in Kaduna state. The critical p-value of 0.01 was obtained which was less than the alpha value of 0.05.
- (ii) The results also revealed that, there was no significant difference between the mean academic performances of junior secondary school students exposed to pictures and realia located in urban and rural areas in Kaduna state. Since the critical p-value of 0.098 is greater than the alpha value of 0.05.
- (iii) The results also showed that, there was significant difference between the mean academic performance of male and female students taught with pictures and realia in Kaduna state since the critical p-value of 0.01 is less than the alpha value of 0.05.

4.6 Discussion of findings

The study revealed that, experimental group has the highest mean score than the control group which showed that, there is significant difference in the academic performance between the experimental and the control group. A significant difference implies rejection of null hypothesis. Significant difference indicates that teaching using pictures and realia enhances academic performance of basic technology students than lecture method. This findings is in agreement with the findings of Recece and Walker, (2001) and Wathere,(2012) pointed out that it is important to use instructional materials to enhance students achievements and they stress the link between poor learning with the failure to use visual materials.

The visual instructional materials can be used continuously and sequentially according to the discretion of the teacher and learners interest while noting some points. Teacher should be careful while using visual instructional materials in the classroom. The instructional materials may be underutilized or over utilized while delivering the lesson in the class. Odu, (2011) investigated the impact of pictures in teaching and learning biology among students in senior secondary schools in Enugu North local government Area. The results revealed that, the level of interests showed by students in Biology, the extent of usage of these instructional materials are very poor and students' interests in Biology lesson using pictures as instructional materials was very high in some Secondary Schools. This also agree with the findings of this study

Ismail and Othman,(2006) investigated the effects of student gender and their performances. Research results revealed that, female students were found to have better results than their male counterpart and that gender play an important role in influencing success in the university. Contrary to this study which revealed that, male students performed better than their female counter part. Casey,(2011) conducted a study to investigate the

academic performance of male and female students in engineering in his study, male students performs better in engineering and mathematics than female students this agreed with this study which revealed that, male performance was significantly higher than the female students

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study investigated the effect of pictures and realia on academic performance of junior secondary school students in basic technology in Kaduna State. The research was as a result of low or poor academic performance of basic technology students at junior secondary school level, the study has three main objectives and three research questions were formulated and hypothesis. The study was limited to junior secondary school three (.iii) Students in public Schools in Kachia and Zonkwa Educational Zones of Kaduna State.

The study review had pointed out that, visual instructional materials implies any materials within the reach of teachers/students that we can see and present some illusion of graphic and illustration to aid teaching and facilitates learning of concept. The study also adopted quasi-experimental with pre-test and posttest experimental and control group design. Experimental group received experimental treatment using pictures and realia while control group received their normal lecture method only. Sample size of 300 using intact class of J.S.S.(111) students from a population of 1235Students for the study. Basic Technology performance test was developed by the researcher and validated by experts. In data collection, mean and standard deviation as well as t-test statistic are the procedure for data analysis.

Research questions raised were answered using mean, standard deviation while hypothesis testing involving the use of t-test at 0.05 level of significant using statistical package for social sciences(SPSS) from the findings, it was revealed that, there was significant difference in the academic performance of basic technology students exposed to pictures and realia and those taught the same concept using lecture method. Students in the experimental group performed higher than the control group.

The results obtained revealed that, there was no significant difference between the academic performance of students exposed to picture and realia in the urban and rural areas. The results further confirmed that, there was significant difference between the academic performance of male and female students exposed to pictures and realia which is termed gender unfriendly. The study concluded that, the use of pictures and realia enhances academic achievements of students. Therefore, the study recommend among others that, Kaduna state ministry of education should make provision of instructional materials such as Audio, Audio-visuials, Realia and all other related teaching aids in our secondary schools to enhance productivity and improve quality in our educational sector.

5.3 Conclusion

Based on the findings, the following conclusions were drawn.

- i. Students exposed to pictures and realia(Experimental group) performed higher than the (Control group) lecture method group
- ii. Urban and rural students taught with pictures and realia did not differ significantly in their performances.
- iii. There was significant difference between male and female students taught with pictures and realia.

5.4 Recommendations

The researcher proffers the following recommendations:

- i. There is need for teachers to bridge the gap that existed between the male and female students by employing more and various teaching techniques and methodologies so as to have meaningful teaching learning process.
- ii. Pictures and Realia should be made available either by parents, government agencies or non-governmental organizations for teachers' utilization as it enhances and promotes productivity among students.
- iii. There is need for federal and state ministries of education to provide adequate and qualified teachers who can utilize all sort of Instructional materials especially in teaching basic technology at J.S.S. level throughout the federation.
- iv. Curriculum development bodies in Nigeria especially National Educational Research and Development Council to design programmes to incorporate the utilization of pictures and realia in teaching and learning especially at junior secondary school level.
- v. Federal, State Parent-Teachers Association,(PTA)and other non -governmental organizations should in collaboration with National Teachers Institute organize, encourage and sponsor training and re-training of teachers on the utilizations of pictures and realia on all subject at junior secondary school level

5.6 Contribution of the study to knowledge

The researcher had developed basic technology achievement test and measured students' performance which involves gender and location.

The researcher also examined the efficacy of the use of pictures and realia in teaching male and female, urban and rural areas students. The findings also, contribute to the body of

knowledge in proven that, the use of pictures and realia in teaching stimulates learning and aids retention there by enhances academic performance among students.

The study also had proven that, school location has an effect on the academic achievement of students. Therefore, government and other bodies should note that.

5.7 Limitations of the study

In the conduct of this study, the following are the limitations

- i. The samples used for the study were limited to public schools only. Others such as private and federal government colleges were not involved in the study. If such schools were involved, the results may be different
- ii. The time taken in conducting this study was eight weeks if adequate time were given the results of findings may also be different.
- iii. The samples were relatively homogeneous with mostly students who lived in a relatively urban and rural community. Therefore; the results might not generalize to other students' community with greater diversity, ethnicity and social class.
- iv. The study was limited to the use of basic technology performance test instruments adopted by the researcher. Other instruments that might be useful were not used in this study.
- v. Pre-test and post test control group design were adopted in the conduct of this study. Other research designs were not used in the conduct of this study.

5.8 Suggestions for further research

Educational researchers need to continue in conducting empirical researches to ascertain or proffer solutions to factors responsible for poor or low academic performance among students in basic technology.

ii. Researchers need to identify other types of instructional materials that could be useful and required in teaching basic technology especially those that can influence or facilitates better academic performances irrespective of gender, and location.

iii. An appropriate teaching methodologies and techniques should be adopted by researchers especially those who wish to teach basic technology.

Iv. Other researches need to be conducted in private and federal government schools to investigate the effect of pictures and realia.

V. Researches need to be conducted using ICT resources to teach basic technology at junior secondary school level especially now that we are in computer age.

REFERENCES

- Abayomi, B. S. (2008).The Role of Visual Instructional Materials on Teaching and Learning of Education. *Protecting of West Africa Examination Seminar paper,4 (20), pg 31-42*
- Abdullahi, B. I. (2012). *The Relevance of Instructional Materials in Teaching and Learning*. Port-Harcourt Harvey.
- Abimbade, S. A. (2012). Selection and Utilization of Visual Instructional Materials for Effective Practice Teaching. *Journal of Education, 3 (3), 120-125*.
- Adeyemi, O. N. (2010). *The Socio-Economic Impact of Visual Instructional Materials*. Harvey Publication.
- Ado, I.K. (2015). *A handbook for writing project reports, theses and journal articles* Tertiary education trust fund
- Adesanya N. G (2011). *Visual Instructional Materials and Techniques of Teaching* FAB Publication.
- Abdulkarim, T. L. (2010). Evaluating the Use of learning Materials for Geography Education; Implication for Learners. *Journal of Geography Teachers Association Nigeria 36th Annual Conference Proceedings*.
- Acikgoz, D.O. (2005). Performance Oriented Teacher Education; *Report of the 5th Annual Conference, Western Council of the Association for Teacher Education. pp 59*.
- Akpan, G. A. & Usoro, H. S.& Akpan, I. G. And Ekpo, A. B. (2010). Effect of Team Teaching on Students Performance in Introductory Technology in Secondary Schools in Akwa-Ibom State Nigeria. *African Research Review, an International Multi-Disciplinary journal, Ethiopia Vol.4 (3b) 2010*.
- Anthony, & John O. (2012). Psycho-Social Factors Affecting the Teaching and Learning of Introductory Technology in Junior Secondary Schools in Ijebu-Ode Local Government Area of Ogun State, Nigeria. *journal of educational psychology Vol.3 (2) 2012*.
- AdediWura, R.N. & Taiwo, H. (2007). Determinant of Academic Performance's multinomial logic approach. *Journal of Economic Education 2(2)101-111*.
- Andrews, S. I. (2009). Parental Involvement Interest in Schooling Environment as Predictors of Academic Performance Among fresh Secondary Schools in Oyo State Nigeria. *Electronic Journal of Research in Education and Psychology 5 (1) 163-180*.
- Brown, H. T. (2011). Learning Materials Towards Education in the Year 2011. *Journal*

of Education and Development 2 (5)402-407.

Casey, H. L. (2011). Students Learning Styles and Academic Performance. 22nd Annual Malaysian Conference from 15 July, 2008. Kuala Lumpur Convention Centre, Kuala.

Christ, S. (2011). *Using realia in the classroom*. <http://www.esc/teachersboard.com> retrieved on 29th march, 2016.

Deco, T.S & Crawford, L.B (2008). Self Motivation for Academic Performance: The Role of Self- efficacy belief and Personal Goal Setting. *American Educational Research Journal 29 (3) 663- 676.*

Davidson, R.L. (1996). Motivating greater use of the Visual Instructional Media in Nigerian Universities. *A Case Study of Learning Resources Unit of the College of Medicine, Lagos Library.*

Dwi & Yusuf, (2010). Utilizations of visual instructional materials. *Journal of university of calabar(3)2. 56-58*

Dubey, (2009). Teaching with Realia, an alternative methodology in teaching at primary school level. *Journal of Education , University of Lagos (3)2 40*

Edward, R.O. (2011). *Instructional Objectives and Collective use of Visual Instructional Materials*. Pet and Grabinger press Lagos.

Egunjobi, L. R. (2009). The use of Visual Instructional Materials in Teaching and Learning of Geography Challenges and Possible Solutions. *Proceeding of West African Examination Seminar paper 3 (14).*

Eze, P.T (2010). *Curriculum Development in Nigeria for Colleges and Universities*. Owerri Whyte and Whyte Publishers.

Federal Republic of Nigeria, (2004). *National Policy on Education (Revised)* Lagos Federal Government Press.

Fusita, R.L. (2006). *Learning Styles and Students Academic Performance in the Classroom*. Busto Henley Publishers.

Federal Republic of Nigeria, (1981). *National Policy on Education* Lagos. Federal Government Press.

Federal Republic of Nigeria, (2008). *National Policy on Education, Basic Classification of Instructional Materials*. King Publishers Ibadan. (2)7-8

Genesce, (2000). The effect of using realia in teaching at senior secondary school. M.Ed unpublished thesis university of Nigeria Nsukka.

- Hedges, T.R & Norwell, R.G. (1995). The Effect of Gender and Age on mathematical Students Performance. *An Important Interactions Advance in Science Education* 5 (3) 197_205.
- Halilu, L. (2001). The Effect of Visual Instructional Material on the Performance of Primary School Pupils in Social Studies in Katsina State Unpublished M.Ed Thesis A.B.U. Zaria.
- Instructional Material Accessibility Act (IMAA).Retrieved from <http://www.tsbvi.edu/textbooks/afbuma/summary.htm> on 6/2/2008
- Isma'il, I.N. & Othman, B.B. (2006). Predictor of Student Academic Performance in Introductory marketing course. *Journal of Education for Business* 73(5) 302-307.
- Ibukun, A. (2012).Instructional materials for introductory technology. *Journal of research in education and society*.vol.4(2)
- John, Z.O.(2008). *Psychology of learning and teaching*. New York. McGraw Hill Book Company
- John, O.M.(2010).Effect of standardize and improvise instructional materials students a Academy achievements in secondary school biology. Med thesis university of Ibadan
- Jacob, M.T. (2002). An Investigation in the Effect of Gender, Prior Academic Achievement Place of Residence age and attendance in First Year Undergraduate attainment *Journal of Applied Research Higher Education* 1 (1)13-28.
- Kerlinger, F. N. (1973).*Foundation of Behavioural Research*, London Holtand Winston.
- Khan, M. M. (2011). The use of Visual Instructional Material for Teaching. *6th Annual Conference*. National Teachers Institute Kaduna.
- Kola, D. (2007). Personality Traits and Academic Performance of Potentiality Creative Students in Some Selected Secondary Schools in Pategi Local Government Area of Kwara State, Nigeria.An unpublished M.Ed Thesis Department of Educational psychology A.B.U Zaria Nigeria.
- Lan, M.O (2007). The Relationship between Classroom Practice on Home work and Student Performance in Mathematics <http://www/prelibrary.com> accessed 20/01/11.
- Lovell, B.W. (1994). *Educational Psychology and Children*. London Holder and Stoughton Publishers
- Muhammad, T.O (2000). Effect of Visual Instructional Material Quality on

Students Performance in Science in Senior Secondary School in Zaria Local Government Area of Kaduna State. Unpublished M.Ed Thesis A.B.U Zaria,

- Musa, R.A (2002). Evaluating the use of Learning Materials for Biology education Implication for Learner. *Journal of Science Teachers Association of Nigeria 40th Annual Conference Proceedings*.
- Mahmood,E, E. S & Othman, T. (2006) Impact of Broken Home on Academic Performance of Secondary School students in English Language *Journal of Research in Counselling Psychology 4 (1) 84-87*.
- Morgan, T.O. (2009) Learning Materials Towards Education in the year 2000 *Journal of Education Media Development (2) (3) 507-600*.
- Okorie, I.U. (2000). *Developing Nigeria's work force*. Calabar: pager Environs publishers
- Odu, C. (2011).Impact of pictures in teaching and learning biology among students in SSS in Enugu North local government. Unpublished M.Ed thesis, University of Nigeria Nsukka.
- Obeka, S. S. (2010). *Current trend on Geographical and Environmental Evaluation*, Zaria A. B.U. Press Limited.
- Olaofe,I, I.A.(2010). *Research writing for academic growth*. Ahmadu Bello University Press ltd Zaria, Practical guide UK Springer Publishing ltd.
- Osuala, E. C. (2004). *Foundations of Vocational Education* 5th Edition, pg 13. Cheston Agency Ltd 104 Agbani Road Enugu.
- Okoye Y. & Olu T. (2008). *Instructional Materials for Teaching. A paper presented at the National Teachers Institute Kaduna, Kaduna State*.
- Obafemi, D.T.A. (2015). Bridging gender in the physics classroom, the instructional method perspectives. *Journal of education and practice vol.6(20)2015*.
- Parades, O. (2008).*Realia and vocabulary learning among young learners*. Unpublished Med Educational Technology, University of Magellan's, Chile.
- Ricardo, C. P (2008). *Teaching Methods Instructional Materials Researchers*. A cad Peak Publishers Owerri Nigeria.
- Richet, Z. S. (2008).Assessment of Adequacy, Functionality and Utilization of Instructional Materials for Teaching in Tertiary Institution in Kogi State . *Business Education Journal 10 (1)*.
- Research advisors, (2006).*Determining sample size for research activities educational and psychological measurement*. Research division publishers
- Recece & Walker, O. S.(2001).The use of instructional media in Nigerian

Universities. *African Journal of Archives and Information Science* 11(2)119-126.

Rocser, (2005). Learning materials toward education in the year 2020. *Journal of education media Development* (2) 3 507-508

Saka, B. L, & Sam, H. & Yusuf, R. O. (2008). *A Comparison Between the time management skills and Academic Performance of Mature and Traditional Entry University Students into Higher Education* 32(2) 199-215.

Shuaibu, T. H (2011). *Instructional materials for teaching geography, a paper presented at Isa Kaita college of Education Dutsin- ma 20/2/2011*

Saima, A. (2008). *Using realia for teaching descriptive writing at primary level*. Unpublished M.A English language and applied linguistic (Allama Iqbal Open University Islamabad.

Suleiman, B. (2006). *Impact of the use of Visual Instructional Materials on Academic Performance in Geography, An Experimental Approach* Unpublished Undergraduate Project ABU Zaria.

Savory, F. O (2004). *Visual Aids in Teaching Geography*. *West African Journal of education* 2(2) p5-9.

Silver, B. T. (2010). *Potential of Visual Instructional Materials in Africa an inter-learning of Education Innovation Dakar UNESCO BREMA, 60_65. Dutsin-ma 20/2/2011.*

Suleiman, A. U. (2009). *Effect of Instructional Materials Quality on student Performance in Science in Senior Secondary Schools in Wamako Local Government area of Sokoto State* Unpublished M.ED Thesis..

Sewer, L. L. (2004). *Mature Students in Higher Education Academic Performance and Intellectual ability*. *Higher Education* 28(3) 373-386.

Tukur, A. K. (2012). *Teachers Guide to Improvisation and Utilization of Instructional Materials*. pgs 13,30,138 A.B.U Press.

Thembinko, T, T. & Alfred, C. N (2014). *Teachers perceptions on challenges faced by rural Secondary Schools in the implementation of the vocational and technical education policy in Nkayi district, Zimbabwe. International Research Journal of Teacher Education. Vol. 1 (2) 2014.*

Umoh, H. R & Bola, T. (2009). *Characteristics and utilizations of visual instructional material a Journal of University of Calabar.*

Udo, E. U. (2006). *Availability selection and utilizations of instructional materials resources*

for teaching primary science in Uyo local government authority, Akwa -Ibom state
7th annual conference.

Ughamadu, J. O.(1992).*Re-encyclopedia education media communication and
technology 2nd edition pp39.*

Victor, B. L. (2011). *Teaching Aids Utilization in Nigeria.* Ilorin Atoro Press.

Wales, J. (2006). The place of teaching aids in Nigerian education, *West African
Journal of Education Vol.3 pp7-10*

Womble, A. B (2006). Impact of stress factors on college students academic
performance @[http/www.freelibrary.com](http://www.freelibrary.com)

Wathere, N. G. (2012).Utility of visual instructional materials in teaching of
geography at higher secondary school level” *International Education E-
Journal (iii) pp116-122*

Zubairu, S. (2014). Availability, accessibility and utilizations of ICT resources in
content delivery among lecturers in colleges of education in Nigeria.
Unpublished PhD theses, Ahmadu Bello University, Zaria.

APPENDIX B

LESSON PLAN I

EXPERIMENTAL GROUP

Subject; Basic Technology

Class; J.S.S. III

Topic; Series and Parallel Circuits

Behavioral objectives;By the end of the lesson, the students should be able to draw and differentiate between series and parallel circuits

Instructional Materials; Drawings,illustrations

Methodology;Demonstration method

Previous Knowledge; Students have been seeing circuits but they don't know whether the connections are in series or parallel also they don't know why the circuits are connected in series or parallel.

Introduction; the teacher introduces his lesson by asking the student some questions based on their previous knowledge i.e.

- i. What is a circuit?
- ii. Mention only 2 types of circuit connection you know

Presentation; The teacher presents his lessons based on the following steps;

Step I. The teacher presents to the students the pictures/drawings of a circuit that is connected in series and parallel

Step II. The will continue to discuss about the classification with relevant examples.

Step III. The teacher with the aid of pictures presents to the students the differences between the series and parallel connections of the circuits

Pupils Activity;The teacher will draw the circuits and ask the students to take round the picture to make comments

Evaluation; the teacher evaluates his lesson by asking question based on the topic/lesson

Students will be asked to come out to the board and draw the circuits in series and parallel individually.

Conclusion: the teacher concludes his lesson by summarizing the entire lesson and asks the students to copy the lesson notes in their exercise books.

Lesson plan for control group is the same only that the experimental group under goes through the use of pictures and realia while the control group used lecture method only.

Lesson plan for control group is the same only that the experimental group undergoes through the use of pictures while the control group used lecture method only.

Lesson Plan II

Experimental Group

Subject: Basic Technology.

Class: J.S.S.III

Date: May, 2016

Topic: Magnetism.

Duration: 45 Minutes.

Sub-topic: Verification of First law of Magnetism.(Like poles repel while unlike pole repels)

Behavioral Objectives: By the end of the lesson, the student should be able to differentiate between like pole repels while unlike poles attracts.

Instructional Materials: Realia.

Methodology: **Demonstration Method**

Previous Knowledge; Students use to play with magnets to understand that, its attractive or repulsive but they don't know that there is a law governing that.

Introduction: The teacher introduces his lesson by asking the students questions based on their previous knowledge i.e.

- i. What is Attraction
- ii. What is Repulsion?

Presentation: The teacher presents his lesson based on the fooling steps.

Step i. The teacher will discuss and physically show to the students the pole of attraction and repulsion.

Step ii. The teacher using realia demonstrates the like poles and the unlike pole.

Pupils Activity: The teacher will ask the students to take the realia and other materials to practically verify the law.

Evaluation: The teacher evaluates his lesson by asking question to know whether the students are following or not.

Conclusion: The teacher concludes his lesson by summarizing the entire lesson and asks the students to copy the lessons note

Lesson plan for control group is the same only that the experimental group undergoes through the use of pictures while the control group used lecture method only.

Lesson Plan III

Experimental Group

Subject: Basic Technology.

Class; J.S.S. III

Date; May 2016

Topic: : Preservation of wood:

Duration: 45 Minutes.

Behavioral Objectives: By the end of the lesson, students should be able to understand the process of wood preservation.

I. Identify areas that are defective in timber.

II. Mention some preservatives used.

Instructional materials: pictures

Previous knowledge: students have been seeing wood preservatives but they don't know how to apply it on the attacked timbers.

Introduction: The teacher introduces his lesson by asking the students questions based on their previous knowledge i.e.

I. what is defect in wood?

I. What do we do to prevent these defects?

II. Name only 2 types of wood preservatives you know

Presentation: The teacher presents his lesson based on the following steps;

Step I. The teacher presents to the class the picture of a timber that was attacked by insects

Step II. The teacher will continue to discuss why insect are attracted by the wood and the damage they causes.

Step III. The teacher with the aid of a picture presents some preservatives and possible ways of applying them on the timber.

Pupils Activity: The teacher will ask the student to take the pictures and paste it on the board for them to look at how woods are affected.

Evaluation: The teacher will evaluate his lesson by asking questions based on the lesson e.g.

I. Mention only 2 types of preservatives.

II. Mention only 2 types of insects that normally attack wood.

III. State only 1 reason why wood are attacked by insect.

Conclusion. The teacher concludes the lesson by giving the summary of the entire lesson and asks the students to copy the lesson note in their exercise books.

Lesson plan for control group is the same only that the experimental group undergoes through the use of pictures while the control group used lecture method only.

Lesson Plan IV

Experimental Group

Subject: Basic Technology.

Class: J.S.S.III

Date: May, 2016

Topic: Types of Metals

Behavioral Objectives: By the end of the lesson, the students should be able to draw and differentiate between ferrous and non-ferrous metals

Instructional Materials: Pictures and realia

Methodology: Demonstration Method.

Previous knowledge: Students know about metal but they cannot classify them as ferrous and non-ferrous metals.

Introduction: The teacher introduces his lesson by asking the student some questions based on their previous knowledge i.e.

i) what is ferrous metals?

ii) Define non-ferrous metals with relevant examples

Presentation: The teacher presents his lesson based on the following steps:

Step I. The teacher presents to the students the real or pictures of the two types of metals

Step II. The teacher will continue to discuss about the classifications with relevant example.

Step III. The teacher with the aid of pictures and realia presents to the students the two types of metals.

Pupils Activity: The teacher will ask the students to take round the types of metals for their understanding.

Evaluation: The teacher evaluates his lesson by asking questions based on the lesson.

Students will be asked to come out to the board and identify the types of metals i.e ferrous and non-ferrous metals.

Conclusion: The teacher concludes his lesson by summarizing the entire lesson and asks the students to copy the lesson notes in their exercise books.

Lesson plan for control group is the same only that the experimental group undergoes through the use of pictures while the control group used lecture method only.

Lesson Plan V

Experimental Group

Subject: Basic Technology

Class: J.S.S.III

Date: May,2016

Topic: Common Hand tools

Behavioral Objectives: By the end of the lesson, the students should be able to identify some of the common handtools and their uses.

Instructional Materials: Pictures and Realia

Methodology: Demonstration Method:

Previous Knowledge: Students have known some of the hand tools but they don't know their places of application or uses.

Introduction: The teacher introduces his lesson by asking questions to arouse the students previous knowledge.

Presentation: The teacher presents his lesson based on the following steps:

Step I: The teacher presents his lesson by showing the real and pictures of the common hand tools and their uses.

Step II: The teacher will continue to discuss more about the hand tools and their uses.

Pupils Activity: The teacher will ask the students to come and identify the common hand tools displayed on the desk and their uses.

Evaluation: The teacher evaluates his lesson by asking questions based on the topic

Conclusion: Teachers concludes his lesson by summarizing the entire lesson and ask the students to copy the lesson notes in their exercise books.

Lesson plan for control group is the same only that the experimental group undergoes

through the use of pictures and realia while the control group used lecture method only.

Appendix A

Basic Technology Performance Test.

Instructions.

Please read the following instructions carefully before you answer the questions.

1. Write the name of your school, class and means of identification provided (Control and experimental)
2. Read each question carefully before you answer it.
3. Shade only one letter for each answer in the objective questions.
- 4 If you change your mind on any answer, completely erase the shading.

Names of school.....

Class.....

Gender.

Male.....Female.....

Identification:

CONTROL.....

EXPERIMENTAL.....

Attempt the following questions.

1. Magnetic materials are those materials that can;

- (a) be attracted by a magnet

(b) Change their color periodically

(c) Break at any time

(d) Be used for rubber production.

The following are magnetic materials except.

(a) Iron

(b) Cobalt

(C) Nickel

(d) Brass

3. The first law of magnetism states that;

(a) Like pole repels while unlike pole attracts

(b) North and south poles are equal

(c) Magnets are insulated materials

(d) South and east are neutral

4. Which of the following is not characterized as a conductor of electricity?

a) Copper

(b) Ceramic

(c) Iron

(d) Aluminum.

5. Which of the following causes accident in a workshop?

(a) Using the right tool

(b) Cleanliness

(c) Fatigue

(d) Following the workshop instructions

6. Which of the following is a conductor of electricity?

(a) Metals

(b) Air

(C) plastic

(d) Ceramics

7. The process of removing moisture from a wood is called.

(a) Conversion

(b) Timbering

(c) Seasoning

(d) Felling.

8. Identify the figure below.

9. Identify the tool below.

10. Identify the tool below.

11. The three common parts of soldering iron are except.

(a) Shank

(b) Handle

(c) Bit

(d) Teeth.

12. Soldering lead is an alloy of;

(a) Brass and copper

(b) Lead and tin

(c) Rubber and plastic

(d) Metal and ceramic

13. Which of the following is a raw material for metals?

(a) Wood

(b) Iron ore

(c) Latex

(d) Resin

14. Which of this grade of pencils is used for construction of lines?

(a) 2b

(b) HB

(c) H

(d) Crayon

15. Which type of maintenance is carried out before a machine breaks

(a) Overhauling

(b) Preventive

(c) Corrective

(d) Servicing

16. Which type of maintenance is carried out to a machine when it breaks down?

(a) Corrective

(b) Servicing

(c) Predictive

(d) Preventive.

17. The following are all types of maintenance except;

(a) Corrective

(b) Preventive

(c) Predictive

(d) Detective

18. Which of the following is considered as electrical heating appliance?

a) Firewood

(b) Boiling ring

(c) Matches

(d) Charcoal

19. The following are used as electrical heating appliances except

- (a) Electric iron
- (b) Electric heater
- (c) Soldering iron
- (d) Electric fan

20. Which of the following a tiers protect one from a sole injury.

- (a) Goggle
- (b) Aprons
- (c) Hand gloves
- (d) Hard sole shoes

21. A workshop is a place where

- (a) we produce things
- (b) We design
- (c) We construct
- (d) We destroy

22. Which of the following is not a safety rule?

- (a) Switch off machine after use
- (b) Operate all machines for work
- (c) Do not allow people into workshop without permission

(d) Use protective devices always

23. Safety can be defined as

(a) Action taken to prevent accident

(b) Healing and praying

(c) Taking a patient to the hospital

(d) Call for a doctor

24. What is the immediate assistance offered to a person who sustains injury in a workshop?

(a) First aid

(b) Press up

(c) Call for a doctor

(d) Invite his parent.

25. All the following are safety rules except

(a) Use the right tool for the right job

(b) Always wear protective cloth in the workshop

(c) Switch off machines after use

(d) Carry tools in your pocket.

26. The following are electrical hand tools except

(a) Hammer

(b) Screw driver

(c) Plier

(d) Jackplane.

27. All the following are mechanical hand tools except

(a) Spanner (b) engine oil (c) screwdriver (d) hammer.

28. If a circuit is connected in parallel none are common except

(a) Resistance

(b) Voltage

(c) Conductor

(d) Current.

29. If a circuit is connected in series only one is common throughout which is ;

(a) semiconductor

(b) Resistance

(C) Current

(d) Voltage

30. An electric circuit is an arrangement of conductors for the purpose of carrying;

(a) Wire

(b) Current

(c) Resistor

(d) Voltage

31. The two types of electrical circuits we use are

- (a) Current and resistor
- (b) Voltage and current
- (c) Wire and bulb
- (d) Series and parallel

32. One of the three important things to consider before a tree is felled is called

- (a) Kiln
- (b) Preservation
- (c) Conservation
- (d) Age of the timber

33. Tree grows in two directions.

- (a) High and low
- (b) Front and back (c) vertical and horizontal (d) root and leaves

34. All the following are not defect of wood except

- (a) Charring
- (b) Tarring
- (c) Painting
- (d) Knot

35. Defects in wood can be classified into two

- (a) Natural and artificial
- (b) Horizontal and vertical
- (c) Kiln and seasoning
- (d) Conservation and control

36. The description of two types of manufactured boards is

- (a) Veneer and rotary
- (b) Wood and timber
- (c) Timber and Formica
- (d) Plywood

37. Why do we have to preserve our wood?

- (a) in order to make money
- (b) To prevent the wood from fungi and insect attack
- (c) In order to compete with other woods
- (d) In order to remove moisture

38. One of the different methods of applying wood preservatives is;

- (a) Logging
- (b) Painting
- (C) Decorations
- (d) Conservation

39. The causes of wood defects is as a result of;

- (a) Carelessness
- (b) Insect and fungi attack
- (c) Inter spacing
- (d) Moisture content

40. A soldering iron is a major useful hand tool in

- (a) Auto mechanic
- (b) Electrical/ electronic
- (c) Metal work
- (d) Technical drawing

41. The following are technical drawing instruments except

- (a) T square
- (b) Pencil
- (c) Eraser
- (d) Chisel

42. To bisect a line one should open his compass to ;

- (a) More than half
- (b) A quarter
- (c) Less than half

(d) More than a quarter

43. A protractor is an instrument we use to measure

(a) Angle

(b) Degree

(c) Straight line

(d) Curve lines

44. Technical Drawing instruments are called

(a) Set squares

(b) Drawing colors

(C) Drawing manuals

(d) Drawing pins

45. The tip of soldering iron is made up of

(a) An alloy

(b) Wire

(c) Alluminium

(d) Metal

46. Chips of metal can be used to detect a pole of a

(a) Battery

(b) Magnet

(c) Ceramic

(d) Insulator

47. Conversion of timber is the process of cutting and sawing of timber into

(a) Large size

(b) Political size

(c) Economic size

(d) Commercial size.

48. The trunk or stem of a tree is cut into transportable size called

(a) Timber

(b) Log

(c) Hardwood

(d) Sapwood

49. the most popular method of conversion of timber is

(a) Plain down

(b) Quarter sawn

(c) Air seasoning

(d) Half sawn

50. A soldering lead is an alloy of

(a) Bronze and metal

(b) Lead and tin

(c) Aluminum and Zink

(d) Metals.