EFFECTS OF INSTRUCTIONAL RESOURCES ON STUDENTS' ACADEMIC PERFORMANCE IN AGRICULTURAL SCIENCE IN SENIOR SECONDARY SCHOOLS IN KADUNA STATE, NIGERIA

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A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIAIN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN AGRICULTURAL EDUCATION

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APRIL, 2011

DECLARATION

I hereby declare that this dissertation titled"**Effects of Instructional Resources on Students' Academic Performance in Agricultural Science in Senior Secondary Schools in Kaduna State, Nigeria",** is a true record of my research work undertaken in the Department of Vocational and Technical Education under the supervision of Dr. C. Uguru and Dr. M. O. Ayorinde. It has not been presented in any previous application for a higher degree or published in any book. In the course of writing this dissertation, references were made to various sources of information which were duly acknowledged.

_____ _____

Audu AVONG Date

CERTIFICATION

This dissertationtitled **"EFFECTS OF INSTRUCTIONAL RESOURCES ON STUDENTS' ACADEMIC PERFORMANCE IN AGRICULTURAL SCIENCE IN KADUNA STATE, NIGERIA"** meets the regulations governing the award of Master of Science Degree in agricultural education of theAhmadu Bello University, Zaria and it is approved for its' contribution to knowledge and literacy presentation.

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DEDICATION

This thesis is dedicated to my dear wife Martina, daughter Zishio and my son Kuchiah.

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LIST OF ABBRIEVIATIONS

ANOVA- Analysis of Variance

ASAT- Agricultural Science Achievement Test

GSS- Government Secondary School

JSS- Junior Secondary School

LGA- Local Government Area

MOEST- Ministry of Education Science and Technology

NECO- National Examination Council

NPE- National Policy on Education

NTI- National Teachers Institute

WAEC- West African Examination Council

WASSCE-West African Senior Schools Certificate Examination

SATPA- Students' Achievement Test in Practical Agriculture

SEO School Examination Officers

SSCE- Senior School Certificate Examination

SS2- Senior Secondary Two

SSS- Senior Secondary School

OPERATIONAL DEFINITION OF TERMS

Academic Performance: Scores obtained by students from pre- test or post-test.

Apparatus: Laboratory equipment or tools that are needed for teaching agricultural science in secondary schools.

Improvise: To do or make something one has not prepared for because a sudden need has arisen such as charts and real objects.

Instructional Resources: These are materials that help teachers to teach with ease and attract the learners' interest.

Specimen: It is a replicate of the whole objects in question. This may be a part of an object or one of the groups or classes to represent the whole group.

Real objects: Materials locally available for teaching agricultural science.

ABSTRACT

This study was carried out to determine the effects of instructional resources on students' academic performance in agricultural science in senior secondary schools in Kaduna State, Nigeria. The desire to embark on the research study therefore, stemmed from the fact that inadequate andlack of use of instructional resources was seen as major factors behind the poor academic performance of students in Kaduna State. The objective for this study was thereforeto determine the effects of instructional resources on students' academic performance in agricultural science in senior secondary schools in Kaduna State, Nigeria.Four specific objectives, four research questions and four null hypotheses were formulated to guide the study. The population for the study comprised of 14,241 secondary school students in Kaduna state who offer agricultural science. Quasi experimental design was adopted for the study. Being an experimental design, the treatment was given to students of GSSManchok purposively selected. The students were used as intact classes made up of 45 male and 45 female students as experimental groups A and B. The control group C was constituted and taught using the traditional (lecture) method while the experimental groups A and B were taught using the charts and real objects respectively. The groups were givenpre testand post test accordingly. Instrument for data collection was Agricultural Science Achievement Test (ASAT). The period of data collection lasted for six weeks. Data collected were analyzed using frequency tables, percentages, means and standard deviation, while t-test statistics was used to test the null hypotheses at significant level of 0.05. The findings among others showed that the use of charts had more significant effect, but however show no significant difference between the performance of male and female students. This study concludes that, the use of instructional resources significantly affects students' academic performance in agricultural science which increased students' retention ability. Based on the findings it was recommended that: schools inspectors should ensure that teachers are encouraged to

improvise and use instructional resources in teaching agricultural science and othersimilar subjects.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Agricultural science is not a new subject in the Nigerian secondaryschool curriculum.Okeh (2006) reports that agricultural science was introduce as a secondary school subject in 1967, and since then, teaching of the subject in the schools has undergone a reform through the Nigerian Policy on Education (NPE). The aim of teaching agricultural science in secondary schools is to prepare youths to appreciate and take agriculture as a career (Okeh, 2010).The objectives of secondary school education in Nigeria as statedby Umar (2011) were to prepare individuals for useful living within the society and higher education. While Daluba (2013) asserts that the objectives of agricultural science in secondary schools can only be attained through effective teaching and motivation of students by agricultural science teachers through the use of instructional resources.

Teachers are expected to use different types of instructional resources(charts, film strips, survey equipment, models, farm tools, farm machinery, video, television, projectors, motion pictures etc.) to motivate learning. Charts are cheap and simple instructional resources which can be available in most secondary schools in Kaduna state where the needed real objects for teaching agricultural science may not be found.Ibe-Bassey, (2000) describes charts as flat visual materials which may represent diagrams or a combination of pictorial, graphic, numerical or verbal materials prepared to give a clear visual summary of vital processes, concepts or a set of relationships. They are used to present ideas and concepts which may be difficult to understand if presented using the verbal code only(Ibe-Bassey, 2000).According to Olaitan andAgusiobo(1994) the success in skill and knowledge acquisition in an instructional situation depends on the suitability, adequacy and effective utilization of available resources. Also, the relevance of instructional resources to the objective of the lesson and the ease of use

of the instructional resources are serious considerations in instructional resources utilization to better the learners' performance. Literature in methodology of teaching have explained and illustrated the effectiveness of instructional resources as tools for improving students' performance in the learning of difficult concepts (Ibe-Bassey, 1991; Etim, 1998; Awotua-Efebo, 2001;Ikot, 2008).

Ibrahim, (2010) found that instructional resources are successful in raising examination scores, improving students' attitudes and lowering the amount of time required to master certain materials. The author further reported that there is substantial evidence that instructional resources can enhance learning at all educational levels. Students learn better when most of their senses are involved through learning by doing or participatory learning (Olaitan and Mama, 2002).According to Nsa, Ikot andUdo (2013), acquisition of basic vocational knowledge, skills and attitudes to facilitate occupational efficiency requires skill oriented teaching and learning activities using effective instructional resources.A series of activities were suggested in Nigerian secondary school curriculum to ensure the development of psychomotor skills by students in agricultural science. It is also recommended in the curriculum that: each student should be guaranteed adequate equipment, farm space, regular supply of fertilizers and animal feed. In addition to having a farm, each school should keep at least two farm animals.

It is further stated in the senior secondary school curriculum that students' performance should be continuously assessed through various forms of tests and during field and laboratory class. This is necessary to ascertain the progress of students' academic performance. Academic performance refers to students' achievement in the topic taught based on the stated objectives. EdinyangandUbi (2012) define academic performance as the outcome of education which reveals the extent to which a student, teacher or institution has achieved the educational goals. Catherineand Brain (2013) also define students' academic performance

as students' achievement in the topic being taught based on the stated objectives.Gender differences in academic performance may arise as a result of gender stereotyping and prejudice, inter alia, in the way students are taught (Ezeudu, 2013). Gender asdefined by Adesope (2007) is a range of characteristics pertaining to and differentiating between masculinity and femininity.Ikot, (2008) opines that poor performance of students irrespective of their genderin agricultural science examinations may not be unconnected with non-utilization of suitableinstructional resources.

Many teachers go to classes to teach agricultural science as liberal arts without any material to assist the learners.Abdullahi(1992) concludes that this does not promote meaningful learning of agricultural science as it appeals only to the sense of hearing. Agricultural science is a doing subject, and for effective learning to take place many senses must be involved. Hearing alone easily leads to forgetting. Remember the Chinese proverbwhich says:I hear- I forget, I see- I remember andI do- I understand (Abdullahi, 1992).This study was therefore carried out to empirically determine the effects of instructional resources on students' academic performance in agricultural sciencein senior secondary schools in Kaduna State, Nigeria.

1.2 Statement of the Problem

Agricultural science is a vital subject for technological development in Nigeria. As such, its teaching and learning in secondary school students have become a source of concerns to all stakeholders. Agriculturebeing one of the key sectors of the Nigerian economy provides the basic needs of people particularly food. A high proportion of the Nigerian people (over 80%) depend on agriculture for their livelihood. According to Crowder, Lindley, and Doron (1999), agriculture constitutes the major economy of rural areas, and will remain for many years the major contributor to the economies of most developing countries. Nwanosike (2007) observes that properly managed agriculture can make tangible contributions in poverty

reduction. Therefore, the teaching of agricultural science in secondary schools is of paramount importance in the growth and development of the economy of Nigeria which is endowed with natural resources that need to be harnessed judiciously for economic growth and development.

Despite the job opportunities provided by agricultural sector in Nigeria, the level of is unemployment is in the increase. It is observed that many youths are leaving the rural areas to urban centers in search for jobs. This is contrary to the aim of teaching agricultural science in Nigerian secondary schools as stated by Okeh, ((2010); to prepare youths to appreciate and take agriculture as a career.Also, theresearcher who has been teaching for over 10 years and having visited some secondary schools observes poor provision to schools the equipment and facilities required for effective teaching of agricultural science. As a result, most teachers of agricultural science in the study area resorted to the traditional method ofteaching the subject.To make things worse, most teachers in secondary schools in Kaduna state do not fully make use of even the locally available instructional resources in teaching of agricultural science.This negligence of effective use of instructional facilities and materials in teaching and learning of agricultural science is common to both the trained and untrained teachers and affects students' academic performance in agricultural science in secondary schools in Kaduna State. This undoubtedly, is contrary to the improvement of agricultural science education, which is greatly needed at this period of our development with emphasis on practical oriented learning (Nwanosike, 2007).

The desire to embark on this research study therefore, stems from the fact that there is poor academic performance of secondary school students in agricultural science inKaduna State(Kaduna State MOE, 2014). This poor and general backwardness in agricultural science have been recorded for some years now by the examination bodies of Senior School Certificate Examination (SSCE)[West African Examination Council (WAEC) and National Examination Council(NECO)](Kaduna State MOE, 2014). Statistics obtained from three

senior secondary schools in Kaduna State indicated that there is progressive decline in the performance of students in agricultural science subject. Similarly, statistics obtained from examination offices of the three schools revealed that out of a total of 3,725 students that registered and sat for agricultural sciencein the WAEC2009-2013, only 1,131 students(30%) passed while 2,594 students representing 70% failed [School Examination Offices (SEO), 2014].

It is in this note that, anything that saves students' poor performance is worth researchable.This will also likely encourage more students' enrollment, improve and renewed interest in agricultural science. This is more so, considering that thepoor usage of instructional resources in teaching agricultural science has contributed to the students' development of negative attitude to both the subjects and the teachers (Nwanosike, 2007). More so, most of the secondary schools cannot meet up with the practical requirements for teaching and learning agricultural science.These led to this research study to find out the effects instructional resources on students'academic performance in agricultural sciencein senior secondary schools in Kaduna State.

1.3 Objectives of the Study

The major objective of this study was to determine the effects of instructional resources on students' academic performance in agricultural science in senior secondary schools in Kaduna State, Nigeria. The specific objectives wereto;

1. determine the effects of use of charts on students'academic performance in agricultural science.
2. determine the effects of use of real objects onstudents' academic performance in agricultural science.
3. determine theeffects of use ofcharts on male and female students'academic performancein agricultural science.

4. determine the effects of use of real objects on male and female students' academic performance in agricultural science.

1.4 Research Questions

The following four (4) research questions were answered in the study;

1. What is the effect of use of charts on students' academic performance in agricultural science?
2. What is the effect of use of real objects on students' academic performance in agricultural science?
3. What is the effect of use of charts onmale and female students' academic performanceinagricultural science?
4. What is the effect of use of real objectson male and female students' academic performance in agricultural science?

1.5 ResearchHypotheses

The following Null (Ho)hypotheses were tested;

1. There is no significant effect of use of charts on students' academic performance in agricultural science.
2. There is no significant effect of use of real objects on students' academic performance in agricultural science.
3. There is no significant effect of use of charts onmale and female students' academic performance inagricultural science.
4. There is no significant effect of use of real objects on male and female students' academic performance in agricultural science.

1.6 Significance of the Study

This study which aimed at determining the effects of instructional resources on students' academic performance in agricultural science in senior secondary schools would be of significance to agricultural science students, agricultural science teachers and curriculum planners.

The findings of this work would be beneficial to the students from the general motive that, when the most appropriate instructional resources are identified and used by agricultural science teachers, students' academic performancewould be improved and enlist the interest ofstudents in agricultural science.

The study will benefit agricultural science teachers as the result is expected to identify the instructional resources most appropriate for the field. This would help to improve the effectiveness of agricultural science teachers in carrying out their task.

The result of this study would also be beneficial to curriculum planners by creating awareness on the importance of using appropriate instructional resources for effective teaching and learning, so that, such consideration can be made when designing the curriculum and relevant facilities indicated.

1.7 Basic Assumptions of the study

The researcher made the following assumptionsthat:

i. the use of instructional resources would improve students' academic performance in agricultural science
ii. male and female students taught agricultural science using instructional resources would perform differently from those taught without instructional resources
iii. the use of instructional resources in teaching agricultural science would have no gender biasness.

1.8 Delimitation of the Study

This research study was delimited to the effects of instructional resources on students' academic performance in agricultural science. It is delimited to use of charts and real objectstypes of instructional resources. This is because they are cheap, simple and locally available in most schools. The study was also delimited to senior secondary schools that offer agricultural science in Kaduna State. It wasfurther delimited to SS11 students that offer agricultural science. This is because SS11 students had the background knowledge of agricultural science from their first year in the school and have taken series of internal examinations and were about preparing for external examinationsof WAEC and NECO. It was also delimited to the topic 'crop production' being one of the topics taught at SS11 level which covered topics on diseases, soiland ecology.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This Chapterdiscussedthe review of Related Literature under the following sub-headings:

2.1 Theoretical Framework

2.2 Concept of Agricultural Science

2.2.1 Agricultural Science in Secondary Schools

2.2.2 Value of Practical Work to the Teacher of Agricultural Science

2.3 Concept of Academic Performance

2.4 Gender and Academic Performance

2.5Concept ofInstructional Resources

2.5.1 Types of Instructional Resources

2.5.2 Improvising Equipment

2.5.3 Community Resources

2.6Empirical Studies

2.1 Theoretical framework

Prosser's first theory and Constructivist theory of learning were adopted forthis study.Prosser's first theory of work environment stated that "vocational education will be efficient in proportion as the environment in which the learner is trained is a replica of the environment in which he/she must subsequently work" (Prosser, 1949). This theory posits that

the type, characteristics or nature of instructional resources or equipment used for a vocational or preparatory programme should be the same with those the graduate of the programme is expected to use when employed after successful completion of the programme. It implies that the quality of training receives by the learner has direct effects on his/her future performances.Agricultural science being a vocational subject, students should be taught using the same type of equipment and resources obtainable in the career to enable them acquire the skills necessary to take up occupations in agriculture (Okeh, 2010).

The constructivist theory on the other hand postulates that "students create their own maps and theories of the world". The proponents of this theory view learning as a process in which students actively construct their own knowledge of the situation at hand based on the existing previous knowledge. According to this theory, students engage their minds very actively in constructing meaning out of their interactions with the environment. They make their own connection between experiences and the words other people are teaching them to use, and then create their own network of relationships and patterns of thinking (Bichi, 2008).

The constructivists' view of learning has attracted the attention of many researchers world-wide and among them are Nigerian researchers. Researchers like Nsa, Ikot andUdo, (2013),Bichi (2008) and,Sesen andTarhan, (2010) conclude that constructivist learning strategy has:

(i) an advantage of increasing students' self confidence in relation to science;

(ii) generated a more active participation in science activities and

(iii) led not only to greater understanding but also greater interest in the subject.

In the light of the advantages of learning within the constructivist framework, the researcher found constructivist theory to be more related to this research on the "effects of instructional resources on students' academic in agricultural science in senior secondary

schools to empirically confirm or otherwise the proportion of the theory to the teaching and learning of agricultural science in senior secondary schools in Kaduna state, Nigeria.

2.2 Concept of Agricultural Science

Agricultural science teaching is toprovide students with needed competence and knowledge to become agricultural educators and equip them with necessary skills to be self-reliant. Agricultural education is an aspect of vocational and technical education which encompasses many study areas like agricultural economics, agronomy, soil science, animal science, crop protection, agricultural extension, agricultural engineering and rural Sociology. One of the major purposes of agricultural education is to apply the knowledge and skills learned in several different disciplines of agricultural education (Williams and David, 2000). Agricultural education goes beyond knowledge and skills development in that students are able to develop an understanding of the significance of agriculture in a global society, and the Nigeria society in particular through the application of scientific principles, business principlesand problem solving strategies. These can be achieved through interdependency and relationship between the agricultural industry and other significant businesses interwoven with the entire economic and social structure of the community, state, nation, and world.

The study of agricultural education focuses on the needs of individuals and groups fordeveloping individually satisfying and socially responsible knowledge, skills, and occupational values. According to William (2004), agricultural education is the type of education that is employed in training the learner in the improved agricultural production processes, as well as in the techniques for the teaching of agriculture. Agricultural education therefore inculcates skills, values, attitudes and related knowledge in production, processing, and marketing of agricultural and related products. In teaching agricultural science, students are expected to undertake both short and long-term practical activities and projects such as

cultivation of crops, vegetables and fruits, arising of livestock for schools and community consumption (Egun, 2009).

2.2.1 Agricultural Science in Secondary Schools

The teaching of agricultural science at the secondary level in Nigeria today is done at two levels: (i) at the junior secondary school (JSS) and (ii) at the senior secondary school (SSS). The junior secondary school agricultural science is taught in the first three years of secondary education with practical agriculture recommended as one of the core values of the curriculum. The national curriculum for junior secondary schools outlined the objectives of agricultural education in secondary schools in Nigeria which were to:

(i) stimulate students interest in agriculture.

(ii) enable students to acquire basic knowledge of agriculture

(iii) develop basic agricultural skills in students

(iv) enable students to integrate knowledge with skills in agriculture

(v) expose students to opportunities in the field of agriculture

(vi) prepare students for further studies in agriculture

(vii) prepare students for occupations in agriculture (William, S2004).

2.2.2Value of Practical Work to the Teacher of Agricultural Science

The Agricultural science teacher can only teach if he/she is convinced that the subject has some importance for the students. Some agricultural science teachers look on the practical side of agricultural science as an extra, and rather a tiresome extra, because it usually requires more preparation than the purely oral lesson. The value of practical work in agricultural science is obvious and is at once recognized. in agricultural science, it is not necessary to spend so large a proportion of time on practical work, but once the agricultural science teacher understands its value, he/she will not be tempted to omit it (Ikot, 2008).

2.3Concept of Academic Performance

In educational institutions, success is measured by academic performance or how well a student meets the standards set out by an educational institution. Although education is not the only road to success in the world of work, much effort is made to identify, evaluate, track and encourage the progress of students in schools (Guga, 2007). Parents care about their child's academic performance because, they believe good academic results will provide more career choices and job security. Generally, performance is an accomplishment of a given task measured against preset known standards.EdinyangandUbi (2012) opine that, academic performance is an outcome of education which reveals the extent to which a student, teacher or institution have achieved their educational goals. Students' academic performance in this regard can be said to be students' achievement in the topic being taught based on the stated objectives (Catherine and Brian, 2013). Academic performance is concerned with the quality and quantity of learning attained in a subject or group of subjects after a long period of instruction (Akubuilo, 2004 andAdeyemi, 2008).

2.4 Gender and Academic Performance

Gender according toEgun&Tibi (2007) is the range of characteristics pertaining to and differentiating between masculinity and femininity roles. Gender has remained a burning issue and has remained relevant in education because, it has been linked to achievement and participation in certain professions (Okeh, 2006). Gender is a major factor that influences career choice and subject interest of students. Robert, Sarmistha and Peter (2013) maintained that gender differences in academic performance may arise for a number of reasons. They may reflect differences in the types of subjects' students study or gender differences in individuals-specific attributes that are correlated with attainment, such as family background age and

marital status. The differences may alsoarise due to the types and quality of the institutions the students attend.

Gender differences in academic attainment could also be due to psychological and biological factors (Robert,Sarmistha and Peter 2013). Other differences due to gender in academic performance may be as a result of gender stereotyping and prejudice by a male dominated profession and which are manifested, inter alia, in the way students are assessed (Ezeudu and Obi 2013). An understanding of the nature and determinants of gender difference in academic performance is imperative. This is because, gender differences in academic performance has an effect on the labour market outcomes. Gender differences in labour market outcomes also reflect differences between men and women in the earnings-related attitudes they bring to the labour market, including differences in educational achievement (Ukwungwu, 2002).

2.5 Concept ofInstructional Resources

The use of instructional resources is not new to teaching and learning. Early scientists were able to make numerous important and fundamental discoveries, as well as teach science effectively because they were able to provide and improvisethe equipment and other needed instructionalresources (Oladejo, Olosunde, Ojebisi andIsola 2011). Instructional resources according to Ibrahim, (2010) emerged as a discipline in the 1920s, when the film technology was growing rapidly. A visual instruction movement arose and encouraged the use of visual materials to make abstract ideas more concrete to students. As sound technology improved, the movement became known as audio-visual instruction. Adamu, (2008) reports that educators at that time viewed audio-visuals as only aids to teaching. He further reports that, it was not until World War II, when the armed services used audio-visual resources to train large number of persons in short period of time with the devices as primary sources of instruction.

In the 1950s and ‘60s, development in communication theory and systems concepts led to studies of the educational process, its elements, and their inter-relationships. Among these elements are the teacher, the teaching methods, the information conveyed, the materials used, the students and the students’ responses. Consequently,Brown, Lewis and Harcleroad (2007) reported that the field of audio-visual shifted its emphasis from devices and materials to the examination of teaching-learning process. The field was now known as audio-visual communication and educational technology, and audio-visual resources were viewed as an integral part of the educational system.

Instructional resources according toOshadumi, (2003) are educational resources and devices that assist the teacher to teach the facts, skills, attitudes and knowledge to learners.Hence they are materials developed oracquired to assist or facilitate teachers in transmitting, organized knowledge skills and attitudes to the learners within an instructional situation (Nwachukwu, 2006).Uyagu (2009) sees instructional resources as all the materials that facilitate the acquisition of skills and knowledge by the learners. Instructional resources are materials that assist the teacher to enhance the teaching and learning process (Umar, 2011).Ticton as cited in Ibrahim (2010) state that instructional resources refer to systematic way of designing, carrying out and evaluating the total process of learning and teaching in terms of specific objectives based on research in learning and communication, and employing a combination of human and non-human resources to bring about more effective instructions.Matthew andOnyegebu (2013) posited that instructional resources are those materials which are helpful to the teachers and students and which maximize learning in various areas.

From the above it can be seen that instructional resources mean anything the teacher use to attain the underlying objectives in the classroom. Therefore, instructional resources for teaching agricultural science can be identified to include to include charts, filmstrips,

chalkboard, agricultural science textbooks, models, specimen, pictures, survey equipment, simple farm tools, farm machinery and implements, cages for small animals (rabbit and poultry), feeding trough, samples of different soils, tapes, video, television, projectors, motion pictures and resource persons.These resources can be presented by the teacher in the form of charts and real objects.

2.5.1 Types of Instructional Resources

The instructional resources exist in different forms. They are categorized into print materials e.g. textbooks, visuals,real objects and charts while audio-visuals includes; tapes, television; static/display includes chalkboard, flannel board, magnetic board(NTI, 2007). Charts are two dimensional objects which have flat visualmaterials that represent diagrams or acombination of pictorial, graphic, numerical or verbalmaterials prepared to give a clear visual summary of vitalprocesses, concepts or a set of relationships (Ibe-Bassey, 1991). Charts are used to present ideas and concepts which may be difficult to understand if presented using the verbal code only.

According toEtim (2006), Instructional resources are classified into visuals, audio, audio-visuals, software, hardware, electronics, two-dimensional and three dimensional resources

1. The visual resources are those teaching resources that can be clearly seen with our eyes vividly. Examples of visual aids are: chalkboard, agricultural science textbooks, charts, model, specimen, practical farm or school gardens, survey equipment, simple farm tools, farm machinery and implement, cages for small animals (rabbit and poultry), feeding troughs, samples of different soils etc.
2. Audio resources such as tape recorders, cassettes, radios, teleconferencing, language laboratory, teacher's voice etc. they appeal to the sense of hearing.

3. Audio-visual resources are those that we can hear and see, by producing sound thatis expressed in thought. They appeal to our sense of hearing and sight. Audio visual resources include: tapes, video, television, projectors and motion pictures..
4. Materials/software which include graph, printed materials, slide film, overhead transparency, tapes, cassettes and motion pictures.
5. Equipment/hardware; example includes blackboard, tape recorders, projectors and video recorders. They are used in presenting materials, static or display as chalkboard flannel graph' magnetic boards are also used in presenting materials or lectures.
6. Electronics: these comprise of computer, multimedia among others. These teaching and learning materials make teaching and learning process easier and concrete.
7. Two dimensional instructional resources include flat pictures, graphs, chart, diagrams, posters, comics, cartoons, slides and films.Theymaybeeither opaque or transparent.
8. Three dimensional instructional resources include models, mock up objects, specimens, laboratories etc. They are non-projected materials characteristically, theyhave length, breadth, and height,and hence they are called three dimensional.

Yusuf (1998) reports that one can classify learning materials in several ways; Forinstance, one can distinguish between auditory, visual and reading materials. However, for the purpose of classification, learning materials for teaching agricultural science can be classified as follows:

(i) Printed and reference materials: Textbooks, newspapers,magazines, government documents, teachers' guide, duplicated materials, journals, hand book, bulletins, pictures, work books, pamphlets, leaflets.

(ii) Graphic materials: Graphs, charts, diagrams, maps, globes.

(iii) Display materials: Chalkboard, bulletin boards, flat pictures, magnet boards and flannel board.

(iv) Projected materials: television, video tape, overhead projector, slides and slide projector and transparencies.

(v) Audio and other visual materials: radio, model, computer, tape recording etc.

(vi) Community resources: zoos, agricultural extension service centres, market place, parks, and industrial establishments.

Among the most continuously useful visual aids for the teaching purposes are those the agricultural science teacher makes for himself. Osokoya, (2007) reports that agricultural science teachers should make models, charts and diagrams to assist them when teaching the subject. Moreover, the students should be encouraged to help, and to make such aids as a hobby especially in science club, handicraft groups like basket making, local cage making and so on. Specimens are real things. As general rules, living specimens are better thandead ones. Obtaining specimens takes time, if then, the agricultural science teacher makes poor use of them,and his /her time will have been largely wasted. If rightly used, specimensshould not only add interest to the lesson, they should also help the agricultural science students to understand and to remember the subject (Imogie, 1989). For instance in studying agricultural implements like simple farm tools, there are variations in the type of shape of tools used in the farm in different communities. These variations are broughtabout by variations in the rate of development of agriculture, the soil type and the planting operation for which the tool is used. The following are the most common farm tools used in Nigeria; the hoe, cutlass, an axe, the sickle, the file, and the mattock.

Agricultural science teachers on the other hand should see, handle and observe for themselves as much as possible during practical lessons. Nearly all agricultural science lessons require illustrative materials of some kind. The agricultural science teacher must first know where to find the material and get the greatest value from it. When studying plants, that is, partsof a maize plant, it is often possible to give a specimen to each student. Quite often, if the

teacher cannot give a specimen to every student, he or she should give one between every two or three students (Abass, Bimbo andOjo 2012).

Frequently, especially when studying parts of a sprayer (knapsack sprayer), the agricultural Science teacher can bring one as an example. Also, a rabbit in a cage or chicken cage, or a butterfly or bees in a jar (glass jar) can be used in presenting lesson in an agricultural science class. Perhaps, the most valuable use of the single specimen is for out-of-lesson observation (Abass, Bimbo andOjo 2012).

Chalkboard is another commonest of all visual aids, and is, infact, such a common place of classroom teaching that, it is rarely used as effectively as it might be. The agricultural science teacher should never be without a supply of colour chalks. Withtheir aid parts of a diagram needing emphasis can be brought into prominence. According toOmoruyi, Orhue, Akerebo andAghimien (1999) a diagram of the parts of the chicken (fowl) and so on becomes clearer and more memorable if the intestines, pancreases, liver, crop, gall bladder, gizzard, proventriculus and colons are shown in different colours with correspondingly coloured labels. It takes no more time to draw a plant and its roots using green and brown chalks for leaves and roots, but the result is more impressive than a drawing in white chalk. A diagram of a ranging pole is made much plainer if they are of different colours.

According to Oladipo (2001) while studying surveying and planning of farmstead, the objectives is to enable the students to be able to explain the importance of farm surveying and planning and recognize survey equipment. Ranging pole is one of the common farm surveying equipment and tools which is used in marking stations and also in making straight lines. The ranging pole is made of wood or metal. It is about 1.8 meters or 6 feet in height. The pole is usually painted black, bright red and white to it to be seen from afar. It has pointed steel end for penetrating the soil. A diagram of a ranging pole is made much plainer if they are of different colours.

Charts are other forms of instructional resources used to present ideas and concepts which may be difficult to understand if presented using the verbal code only. Walter (1998) noted that the use of instructional charts in teaching improves the students' reading skill and stimulates creativity in the learners. Charts present an abstract rendition of reality because what is presented is shown as effective in the cognitive domain of learning. According to Omoruyi, Orhue, Akerobo, andAghimien, (1999) charts and graphs are useful for the immediate illustration of agricultural science lessons and should be hung by the side of the chalkboard rather than over it. For example, when studying various stages of maize seed (*Zea mays*)germination and the life cycle of a grasshopper (*Zonocerusvariegatus*).

Another form of chart for instruction is the use of a histogram in a diagrammatically presentation of a grouped frequency distribution or any relevant group data. In other words, it is customary to represent a frequency distribution or any appropriate group data diagrammatically in the form of a histogram. It is probably the most important type of statistical diagram. According to Akande andAzike (2006) graphs are used to present an argument pictorially, that is, to appeal to reason through the eye. They indicate tendencies far more quickly and more convenient than two or more pages of figures.

They further indicated that graphs are in such common use and so readilydisplay variations in values, that students should be encouraged to employ graphical methods whenever possible. Regular variations are shown particularly clearly by means of graphs. Bar graphs, circle graphs and line graphs are used to summarize detailed information. They provide a quick simple way to compare quantitative information. A circle graph is used to the best advantage to show the relationship both of the parts to a whole and of the parts of each other. It is an excellent way of showing the distribution of values.

Maps and atlases are other important instructional materials for the teaching and learning of agricultural science. They are good companions when teaching such topics as the

various farm and animal products, forest resources management and natural vegetation and so on. According to Anyawu andAnyanwu (1987) they are the most common instructional materials that teachers use to disseminate knowledge. Textbooks for example add variety of values, but are too costly for an average Nigerian student to afford. Some ways by which to ameliorate this problem is for a group of teachers to write jointly and for the school authority to ensure that copies of relevant textbooks are put into the school library to enable agricultural science students who cannot afford to buy these textbooks to get access to read them. In studying fishing equipment, fishing methods vary with the various types of equipment for use in fishing. In fishing, special types of nets, hooks and lines are used. The fishing equipment includes:

i. Nets

ii. Traps

Nets include the following types: set net, drag nets, cast nets, trawl net and hand net. The traps used in fishing vary. They include the baskets, the hook and line, the spears and the fish poison.

Pictures are photographic representations of objects,people, places, events, things or concepts. Pictures inthis context are still or motionless objects. They may be illustrations in textbooks, periodicals, catalogues,magazines, study prints and so on. Pictures are used tocommunicate abstract ideas in a more realistic way (IbeBassey, 1991; Etim, 2006).A good picture should have good composition, a clearmessage, good contrast and sharpness with effectivecolours (Etim, 1998). Learners can learn from goodquality pictures with or without the help of teachers.According to Okechukwu (1997), students taught withinstructional pictures performed better than theircounterparts taught without pictures.

A filmstrip is a roll of 35 mm transparent film containing aseries of related still pictures showing one concept at atime. A filmstrip can either be of a single or double

frameformat (Ikot, 2008).Filmstrip can be used to teach skills, show relationshipsin order to convey knowledge, to affect attitude throughindividual and independent study groups or other tutorialgroups viewing (IbeBassey, 1991). In a study todetermine the effects of instructional materials utilizationon performance of junior secondary students' inpractical agriculture, Ikot (2008) found thatthere was significant difference between the performanceof students taught practical agriculture with filmstrip and those taughtwithout filmstrip.

2.5.2 Improvising Equipment

According to Agun (1982) an agricultural science teacher should not support the statement that, it is impossible to teach agricultural science without most of theequipment (instructional materials). Stringent economies may have to be made, the delivery of apparatus and chemicals may be long delayed, or apparatus may be temporarily unobtainable. The poor agricultural science teacher complains, blames lack of equipment for the dullness of his/her lessons, and allows his/her students to revert to the dull monotony of note-taking and passive learning of the textbook. The good agricultural science teacher, however, finds in the same circumstances a challenge to his ingenuity. With an alert mind he/she adapts his/her lessons to the materials available. With patience, simplified versions of more complicated apparatus can be made. In fact, "the simpler the apparatus, the better is the students able to appreciate the method used and the facts to be illustrated" (Ikot, 2008).

2.5.3 Community Resources

The most commonly used for effective teaching of agricultural science in this category includes field trips or excursion-visit. These community resources comprises of people, place, things and materials which are used in educating students. Instructional programs which include, community resources are enriched and learning becomes more relevant and meaningful to students. They provide excellent opportunities for improving communication between the school and the people in the community, and good public relation are established

(Agun, 1982). Resource places according to Umar (2011) require a movement out of the class or school premises to make visits. This is meant to supply additional information on learning experiences to that acquired in the classroom environment. Examples of these places are fish ponds, dams and irrigation schemes, market places, parks, industrial establishments, game reserves, agricultural sites or agricultural extension service centres etc. Such visits are educationally motivated with distinct instructional goals. This may also require the use of resource persons at such sites to take up explanations of their functions for their existence especially when studying farm machinery and implements.

According to Omoruiyi, Orhue, Akerobo andAghimien (1999) the objectives of farm machinery and implements are to enable the students to be able to:

(i) recognize the different types of farm machinery,

(ii) list the functions of the different types of farm machinery,

(iii) name the major parts of tractor coupled implements and theirfunctions. Tractor coupled implements are agricultural implements used in carrying out farm operations which are operated by tractors. Among the examples of tractors coupled implements are ridger and trailer. The three point linkage and the drawbar along with other points of linkage provide the points of attachment to the tractor.

2.6 Empirical Studies

The researcher compared the past related studies by the researchers in the field and the present research work.

Oshadumi, (2003) carried out a research study titled: "Impact of Instructional Materials on Students' Academic Achievement in Agricultural Science at Secondary Schools in Okene LGA, Kogi State". Four (4) specific objectives and four (4) null hypotheses were stated. The target population was seventeen (17) secondary schools out of which ten (10) secondary schools were selected as the samples byrandomization. The instrument used in

collecting the data was a questionnaire. Data were analyzed using correlation coefficient test statistics at 1% level of significance. All the four (4) null hypotheses were rejected. The result showed that 70% of the respondents made use of the instructional materials effectively which had positive impact on the students' academic achievement in agricultural science in Okene LGA.

The present research study is similar to the past research study in the title "Effects of Instructional Resources on Students' Academic Performancein Agricultural Science in Senior SecondarySchools". The present research study is also similar with the past study in the number of specific objectives, research questions and null hypotheses. The present research differs with the past study in population of the study,sample size and procedure for data collection. Also, the present research used quasi-experimental research design compared to the descriptive survey research design used in the past study. Agricultural science achievement test (ASAT) was used as a tool in collecting data for the present study while the past research study used questionnaire. Four (4) null hypotheses in the present research study were testedusing t-test statistics while the past studyused correlation coefficient test statistics. The present research study was carried out in Kaduna State, while the past research study was conducted in KogiState.

Uyagu (2009) carried out a research study on "Effects of Instructional Materials' Usage and Teachers' Quality on Students' Academic Performance in Science in Senior Secondary Schools in Zaria LGA in Kaduna State". Three specific objectives three (3) null hypotheses, and three (3) research questions were formulated to guide the study. The target population was 15,430 senior secondary school students from twenty-four (24) secondary schools in Zaria LGA and 1,033 teachers. A sample of 80 students and nine (9) teachers was used. A questionnaire was used for data collection.A t-test statistic was used in testing the null hypotheses at 0.05 level of significance. The findings revealed that students performed better

when appropriate and improvised materials were made available and utilized in teaching science, it also further indicated that teachers possessing good qualifications enhanced students' performance in science. The researcher recommended the use of instructional resources for secondary schools.

The present research study is similar to the past research study in title. The present research study is also similar with the past in the statistical tool adopted. The present research differs with the past study in the number of specific objectives, number of research questions, number of null hypotheses, population for the study, sample size and instrument for data collection. Also, the present research used quasi-experimental research design compared to the descriptive survey research design used in the past study. The past research was conducted in the year 2009 while the present research study was conducted in year 2017. The past research study contributed to the present research work in formulating the objectives, research questions, null hypotheses and data analysis procedure.

Oladejo, Olosunde, Ojebisi, andIsola (2011) carried out a study to examine the Effects of Using Standardized and improvised Instructional Materials on Academic Achievement of Secondary School Physics Students in Oyo State, Nigeria. The research design adopted was quasi-experimental pretest–posttest non-randomized control group. Purposive sampling was used to obtain a sample of three co-educational secondary schools. Each school provided one S.S. III class for the study. Two instruments were used in the study, i.e Physics Achievement Test (PAT) to measure students' achievement and Teachers Instructional Guide (TIG) to train the teachers in the experimental groups. Three hypotheses were formulated and tested at 0.05 level of significance. Data were analysed using ANOVA and ANCOVA. Findings revealed that there was significant difference in the achievement of students taught using standard instructional materials, those taught with improvised instructional material and those in the conventional instruction.

The present research study is similar in the title, “Effects of Instructional Resources on Students’ AcademicPerformancein Agricultural Science in Senior Secondary Schools”. Similarities also occur in the designs and sampling procedures between the past and the ongoing research study. Four (4) null hypotheses were tested in the present research study using t-test statistics at 5% (0.05) level of significance, while the past research study tested three null hypotheses using ANOVA and ANCOVA. The data for the present research was collected through ASAT, while the past research used physics achievement test (PAT) as instrument for data collection. The present research was conducted on Agricultural Science Students, the past research focused on physics students. The present research study will be conducted in senior Secondary Schools in Kaduna State, while the past research study was conducted in Oyo State.

A study carried out byUmaru(2011)examined the “Availability, Adequacy and Relevancy of Instructional Materials on Students’ Academic Performance in Agricultural Science”. This study made use of survey research design. Thirty (30) government and private secondary schools were used. It had the population of 8,142 agricultural science students and 73 agricultural science teachers. A sample of 206 students was randomly selected with 30 agricultural science teachers. The instrument used for the collection of data was a questionnaire designed by the researcher for the teachers and students of agricultural science. The data collected for the pilot study were used to calculate the reliability coefficient using split-half method and also pearson product moment correlation coefficient (r), which gave 0.87. Four objectives, research questions and null hypotheses (Ho) were formulated for the study. Contingency chi-square statistical tool was used in testing the hypotheses at 0.05 level of significance. One of the findings showed that good and relevant textbooks were the available instructional materials used to influence students’ academic performance in agricultural science. The researcher recommended that agricultural science teachers should

endeavour to use and try to improvise instructional materials for effective teaching of agricultural science in secondary schools.

The present research study is related in the title; “Effects of Instructional Resourceson Students’ Academic Performancein Agricultural Science in Senior Secondary Schools in Kaduna State, Nigeria”. They are also similar in the number of objectives, research questions and null hypotheses. The present research differs from the past research study in population, sample and sampling procedure, research design statistical tool used and procedure for data analysis.

Matthew andOnyegegbu (2013) conducted a research tittled“Effects of the Use ofInstructionalMaterials on Students’ Cognitive Achievement in Agricultural Science in Secondary Schools of Orumba Southlocal governmentarea”. Quasi experimentaldesign was used with the population of 256 JSII students in 5 junior secondary schoolsinthe local government area using a sample of 50 students.An agricultural achievement test(AAT) of reliability 0.82 wasused for the study. Data collected were analyzed using mean, standard deviation andz-teststatistics. The findings revealedthatstudentstaught with instructional materials performed better than those taught without instructional materials. Also there was no significant difference in the mean achievement scores ofmale and female students. The null hypothesis testedat0.05level of significance indicated that there was significant difference between the achievement scoresof those taught withinstructionalmaterials and those taught without instructional materials.

The present research study titled; “Effects of Instructional Resourceson Students’ Academic Performancein Agricultural Science in Senior Secondary Schools in Kaduna State, Nigeria” is related to the past research study. The population for the present research study is two hundred and sixty (260) secondary schools compared with three hundred and fifteen (315) secondary schools for the past research study. One (1) secondary schoolwere selected as the

sample for the present research study compared with two hundred and twenty (220)secondary schools selected as the sample for the past research study. Proportionate random and convenience sampling techniques were used in selecting the trainees and supervisors respectively, while the present study used ASAT, the past research used questionnaire for data collection. The present research study is located in Kaduna State, while thepastresearch study wascarried out in Edo State.

Nsa, Ikot andUdo (2013) conducted a research to determine the Effects of Instructional Material Utilization on the Performance ofJunior High School Students in Practical Agriculture in IkotAbasi Local Government Area. The study used a quasi-experimental design with a pre/post-test non-randomized control group arrangement with a population of 200junior High School Students. The whole population was used as the sample. In order to guide the study, four specific objectives and four null hypotheses were formulated and tested at 0.05 level of significance. Students' achievement test in practical agriculture (SATPA) was developed to gather data for the study. Data were analyzed and null hypotheses were tested using t-test and analysis of covariance (ANCOVA). The findings of the research indicated that there was a significant difference between the performance of students taught with instructional chart and those without. There was also significant difference between the performance of students taught with instructional pictures and those taught without, among other findings.

The present research study titled; "Effects of Instructional Resourceson Students' Academic Performancein Agricultural Science in Senior Secondary Schools in Kaduna State, Nigeria" is similar to the past study. The present study is also similar to the past research in number of research objectives, number of research hypotheses, number of research design and instrument used. Thepresent research studyis different from the present research in population for the study, sample and sampling technique. The past research did not use research questions

which the current research intends to use. The past research will help the researcher in stating the specific objectives and research hypotheses. Also the current research adopted the same design and instrument for data collection as the past research did.

Omofonmwan andChukwuedo (2013)carried outastudyon the Availability and Adequacy of Provision of Resources for Skills Acquisition in Maintenance and Repairs of Digital Electronics for the National Open Apprenticeship Scheme in Edo State. The study was guided by four purposes, from which four research questions were raised. The descriptive survey research design was employed for the study. The population of the study was three hundred and twelve(312) trainees, trainers and supervisors. A sample size of 220 was used, which consisted of trainees, trainers and supervisors of the scheme. Aquestionnaire was used for data collection. Simple percentage, mean and standard deviations were employed for data analysis. The findings showed that there were human resources for the scheme but tools and equipment were not sufficient as required, and were not provided at all by government in some cases.

The present research study titled; "Effects of Instructional Resources on Students' Academic Performancein Agricultural Science in Senior Secondary Schools in Kaduna State, Nigeria" is related to the past study. The population for the present research study was two hundred and sixty (260) secondary schools compared with three hundred and fifteen(312) secondary schools used for the past research study. One (1) secondary school waspurposively selected as the sample for the present research study while two hundred and twenty (220)secondary schools were selected as the sample for the past research study. While the present used purposive sampling, the past study used Proportionate random and convenience sampling techniques in selecting the trainees and supervisors respectively. The present study used agricultural science achievement test (ASAT), while the past research used questionnaire for data collection. The present research study was carried out in Kaduna State, while

thepastresearch study was carried out in Edo State. The past research helped the researcher in stating the objectives, research questions and research hypotheses in the present research.

Summary of Reviewed Literature

In the review,Prosser's first theory and Constructivism theory of learning propounded by Piaget, (1967) were discussed. However, the study adopted theconstructivists idea who argued that students are not passive observers but active constructors of knowledge. They read, watched television, listened to older students', parents' and teachers' discussions, which made them to begin to reason on some happenings in their environment, not necessarily to explain it, but certainly to use it to their advantage. If these traits in students can be properly nurtured and directed towards learning, the students will be more meaningful and fruitful in their taught.

The types of instructional resources were identified in the literature which included printed and referenced resources, graphic materials, projected resources, audio, audio-visual and community resources.

Seven empirical research studies were reviewed but they did not cover entirely the effects of instructional resources on students' academic performance in Agricultural Science in senior secondary schools in Kaduna State, Nigeria, the gap fill by this research.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter presents the methods and procedures to be used under the following sub-headings:-

3.1Research Design

3.2 Population of the Study

3.3 Sample Size and Sampling Procedure

3.4 Instrument for Data Collection

3.4.1 Validity of the Instrument

3.4.2 Pilot Study

3.4.3 Reliability of the Instrument

3.5 Procedure for Data Collection

3.6 Procedure for Data Analysis

3.1 Research Design

Quasi-experimental research designwasused for this study. The design allows non randomization of treatments which provides some degree of control for possible extraneous or confounding variables such as teacher-students' factor and school principals' factor which might affect the internal or external validity or both.Three groups of students (two experimental groups and one control group) were involved. Experimental groups were exposedto the use of instructional resourceswhile the control group was exposed to lecture method.

The design ofthis study is represented thus:

C—0_1—X_0— 0_2

E—0_1—X_1—0_2

E—0_1—X_2—0_2

Where: C = control group

E = Experimental group

X_0= Lecture method

X_1=Use of Charts

X_2=Use of Real objects

0_1= Pretest measurement

0_2= Posttest measurement

3.2 Population of the Study

The population of this study was 14,241 SSII students offering agricultural science in the285 government senior secondary schools in the twelve (12) Educational Zones in Kaduna State. This comprised of 7,947 male and 6,294 female students. SSII students were usedfor this study because of their background knowledge of agricultural science of five years.

Table 1: Population of the Study

S/No	Educational Divisions	No. of Schools	No. of M Students	No. of F Students	Total
1.	SabonTasha34	995	700	1695	
2.	BirninGwari	10305	195	500	
3.	Giwa	14	360	340	700
4.	Zaria	23	650	470	1120
5.	Zonkwa	35	887	866	1753
6.	Anchau	18	500	400	900
7.	Godogodo	22	555	543	1098
8.	Kaduna	21	630	419	1049
9.	Kafanchan	30	820	708	1528
10.	Kachia	34	910	807	1717
11.	Lere	22	650	450	1100
12.	Rigachikun	22	685	496	1081
Total		**285**	**7,947**	**6,294**	**14,241**

Source: Kaduna State Ministry of Education, Science and Technology (2015)

3.3 Sample Sizeand Sampling Procedure

Government Secondary School (GSS)Manchok was purposively selected. This is because the school has a large number of students and teachers for agricultural science. And it is one of the oldest secondary schools in the study area. Ninety (90) students (45 males and 45 females) agricultural science in the schools were assigned groups A, B and C (where A and B were experimental groups while C was a control group) of 30 students each as intact classes in line with Tuckman (1975) who recommended a minimum of 30 subjects in the central limit theorem as viable for experimental research.In assigning the groups (A, B and C) the researcher wrote; ‘A’ on 15 pieces of papers, ‘B’ on 15 pieces of papers and ‘C’ on 15 pieces of papers mixed up in a container where the 45 male students were asked to pick one each. Those that picked A, B or C automatically belonged to that group. Same procedure was repeated in assigning the 45 female students into the groups.

Table 2:Sample for the study

Name of School	No. of Males	No. of Females	TotalRemarks
GSS Manchok15	15	30	Group A
151530	Group B		
15	15	30	Group C
Total	**45**	**45**	**90**

3.4 Instrument for Data Collection

The instrument for data collection wasagricultural science achievement Test (ASAT). The instrument consisted of section 'A' and 'B'. Section 'A' contained the bio-data of the respondents while section 'B' contained twenty (20) multiple choice items adopted from WAEC past question papers on the topic crop production. Each itemhad options A-D. (appendix v).

3.4.1 Validity of the Instrument

The instrument was given to the researcher's supervisors and three other senior lecturers in the department of vocational and technical education faculty of education for vetting. The corrections and suggestions were incorporated in the final copy of the instrument.

3.4.2 Pilot Study

Pilot study was conducted at GSSKagoro in Kaduna State. A total of twenty (20) SSII students offering agricultural science were involved in the pilot study. These students were involved because they had similar characteristics with the target population. Thishelped the researcher to check the difficulties of the instrument and made all necessary adjustments before using it on the real population on whom the actual research study was carried out. Kerlinger andHoward (2000) defined pilot study as the feasibility of the entire package in a given area to ensure that it measures what it is supposed to measure.

3.4.3 Reliability of the Instrument

The data obtained from the pilot study were used to establish the reliability of the instrument using test and re-test method. Spearman's rank correlationwas used to determine the reliability coefficient of the instrument. The computation gave the reliability coefficient of 0.81 in line withNworgu (2006) who stated that the average value of the reliability coefficient should be around 0.80.Therefore, the instrument was said to be reliable.

3.5 Procedure for Data Collection

The researcher presented a letter of introduction collected from thedepartment of vocational and technical educationAhmadu Bello University, Zaria to the Principal GSS Manchok. Within the first week the researcher obtained permission from the school authority and organizeda seminar for the agricultural science teachers which helped to provide some degree of control for possible extraneous or confounding variables such as teachers' factors, students' factors and others.The treatments lasted for six (6) weeks. Atthe end of the first week, the researcher administered a pre-test to both groups using ASAT (appendix iv) where the scores (appendix vi) served as the basis for comparing students' initial performance in agricultural science.

The experimental groups A and Bwere taught agricultural science using charts and real objects respectively while the control group C was taught without the use of instructional resources.The treatmentsstarted in the second week where the researcher used the lesson plans (appendix i, ii and iii) as guide. At the end of the sixth (6^{th}) week, both the experimental and control thegroups were post-tested. The scripts were collected,marked using the marking scheme (appendix v) and recorded. The scores were used for data analysis.

3.6 Procedure for Data Analysis

The researcher used frequency tables and percentages in analyzing the bio data of the respondents, while simple descriptive statistics (mean and standard deviation) were used to

answer all the four (4) research questions. All the four (4) null hypotheses were tested using an independent t-test statistics at 5% level of significance (p=0.05).

Decision rule; When t- calculated is greater or equal to t-tabulated (t-cal> t-critical), the null hypothesis of no significant difference was rejected, but when t-calculated is less than t-tabulated(t-cal<t-critical) the null hypothesis of no significant difference was retained (Ozioma, 2011; Edinyang&Ubi, 2012 &Daluba, 2013).

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

In this chapter the data collected from the field study were analyzed and discussed under the following sub-headings:

4.1 Analysis of Demographic Data

4.2 Answers to Research Questions

4.3 Testing of Null Hypotheses

4.4 Discussion of Major Findings

4.1 Analysis of Demographic Data.

Table 3 Distribution of respondents by age

Age	Frequency	Percentage
12-16	10	11.11
17-21	65	72.22
22-and above	15	16.67
Total	**90**	**100.00**

Source: Field work, 2016

Table 3 indicatesthat most of the respondents(72.22%) were within the age range of 17-21years, 16.67% respondents were 22years and above while 11.11% were within the age range of 12-16 years. This shows that most of the students (respondents) were within the schooling age.

4.2 Answers to Research Questions

Research Question One:*What is the effect of use of charts on students'academic Performance in agricultural science*

Table 4:Mean and standard deviation of effects of use of charts on students' academic performance in agricultural science

Group	N	Mean	SD
Experimental Group A	30	58.83	14.05
Control Group C	30	34.33	09.62
Total	**60**		

The result presented in Table 4 shows that experimental group 'A' comprising of students taught agricultural science using charts had a mean performance score of 58.83 with a standard deviation (SD) of 14.05. while the control group which comprised of students taught without charts had a mean performance score of 34.33 with 09.62 as standard deviation. This implies that the students taught agricultural science using charts had higher academic performance than those taught without charts.

Research Question Two: *What is the effect of use of real objects on students'academic performance in agricultural science*

Table 5:Mean and standard deviation of effects of use of real objects on students' academic performance in agricultural science

Group	N	Mean	SD	
Experimental Group B	30	61.50	13.73	
Control Group	30	34.33		09.62
Total	**60**			

Table 5 reveals that experimental group B which comprised of students taught agricultural science using real object had a mean score of 61.50 and a standard deviation of 13.73 while the control group C (students taught without real objects) obtained a mean score of 34.33 and a standard deviation of 9.62. This indicates that students taught agricultural science using real objects performed better than those taught without real objects.

Research QuestionThree: *What is the effect of use of chart on male and female students' academic performance inagricultural science?*

Table 6: Mean and standard deviation of use of charts on male and female students' academic performance in agricultural science

Group	**Variable**	**N**	**Mean**	**SD**
Experimental Group A	Male	15	61.33	13.95
	Female	15	56.33	14.16
Total		**30**		

Result presented in Table 6 showed that the male students taught agricultural science using charts obtained a mean score of 61.33 and standard deviation of 13.95, while the female students taught agricultural science with charts got a mean performance score of 56.33 and a standard deviation of 14.14. It indicated that the males performed better than the females.

Research QuestionFour: *What is the effect of use of real objects onmale and female students' academicperformance in agricultural science?*

Table 7: Mean and standard deviation of use of real objects onmale and female students' academic performance inagriculturalscience

Group	**Variable**	**N**	**Mean**	**SD**
Experimental Group A	Male	15	64.67	14.88
	Female	15	58.33	12.47
Total		**30**		

Table 7 shows that the male students taught agricultural science using real objects had a mean score of 64.67 with a standard deviation of 14.88, while the female students on the other hand got a mean performance score of 58.33 and a standard deviation of 12.47. This implies that the male students taught agricultural science using real objects performed academically better than the female students.

Based on the mean score which provided answers to research questions 1-4, studentstaught agricultural science using charts and real objects performed better than those taught without charts and real objects.

4.3.Test of Null Hypotheses

Scores obtained from the post-test administered to the students (see appendix vii) were analyzed at 0.05 level of significance and the results were interpreted. t-test statistics was used to test the four null hypotheses.

Null Hypothesis 1: *There is no significant effect of use of charts on students' academic performance in agricultural science***.**

Table 8: t-test for effect of use of charts on students' academic performancein agricultural science.

Group	**N**	**Mean**	**SD**	**df t-cal**	**P-Value**
Experimental Group A	30	58.83	14.05		
58	7.88		0.05		
Control Group C	30	34.33	09.62		
Total	**60**				

Tabled 8 shows that the calculated t-test score was 7.88, which was greater than the t-critical value 2.021 at 0.05 level of significant. This indicated that the use of charts had

significant effect on students' academic performance in agricultural science. As a result, null hypothesis one of no significant effect wasrejected.

Null Hypothesis 2: *There is no significant effect of use of real objects on students' academic performance in agricultural science.*

Table 9:t-test for effect of use of real objects on students'academic performance in agricultural science

Group	**N**	**Mean**	**SD**	**df**	**t-cal**	**P-Value**
Experimental Group B	30	61.50	13.73			
	58	8.87	0.05			
Control Group	30	34.33	09.62			
Total	**60**					

Source; Field work 2016

From Table 9 the calculated t-value was 8.87 and it was greater than the t-critical value 2.021 at 0.05 level of significant. This means that the use of real objects had significant effect on students' academic performance in agricultural science. Therefore, null hypothesis two was rejected.

Null Hypothesis 3: *There is no significant effect of use of charts onmale and female students' academic performance in agricultural science.*

Table 10: t-test for effect of use of charts on male and female students' academic performance in agricultural science

Group	**Variable**	**N**	**Mean**	**SDDF**	**t-cal**	**P-Value**
Experimental Group A	Male	15	61.33	13.95		
28 1.364	0.05					
	Female	15	56.33	14.16		
Total		**30**				

The calculated t-valuewas 1.364 while the critical t-value was 2.048 at 0.05 level of significant (Table 11). It shows that the calculated t-value was less than critical t-value.Therefore, the null hypothesis three of no significant effect of use of charts on male and female students' academic performance in agricultural science was retained.

Null Hypothesis 4: *There is no significant effect of use of real objects on male and female students' academic performance in agricultural science.*

Table 11: t-test for effect of use of real objects onmale and female students' academic performance in agricultural science

Group	Variable	N	Mean	SD	DF	t-cal	P-Value
Experimental Group A	Male	15	64.67	14.88			
28	1.264	0.05					
	Female	15	58.33	12.47			
Total		**30**					

Table 11 showed that the calculated t-value was 1.264, which as less than the t-critical value 2.048 at 0.05 level of significant. This implies that there was no significant difference in the academic performance of male and female students taught agricultural science using real objects because the calculated t-value was less than t-critical value. As result, null hypothesis fourwas retained.

4.4 Discussion of Major Findings.

Table 5 and 8 provided the required information to answer research question 1 and test for research hypothesis 1 respectively. The study results showed that students taught agricultural science using charts had higher mean performance score (58.83) than the students taught agricultural science without the use of charts with the mean performance of 34.33. To

support this, the t-test result showed a significant effect of use of charts on students' academic performance in agricultural science. This is in line with the findings ofAwotua-Efebo, (2001) andIkot, (2008) who observed effectiveness of instructional resources as tools for improving students' performance in the learning of difficult concepts.

In research question 2 the findings indicated that there were mean performances of 61.50 and 34.33 between the students taught Agriculturalscience using real object and thosetaughtwithout real objects. A further test of null hypothesis 2 indicated a significant difference in the performances of the two groups. This means that the use of real objects in teaching agricultural science will improved students' performance. This agrees with the findings of Oladejo, Olosunde, Ojebisi, andIsola, (2011) who revealed that there was significant difference in the achievement of students taught Physics using standard instructional materials and those in the conventional instruction

In research question 3 it revealed that there were mean performances of 61.33 and 56.33 for male and female studentstaughtagriculturalscience using charts. This shows that the mean performance of male studentstaught using charts was slightly higher than that of the females taught using charts. But a further test of null hypothesis 3 revealed that there was no significant difference between the performances of males and females because the calculatedt-value 1.364 was less than the critical t-value 2.048. The slight difference in the mean performance in favour of the males may be an expression of treatment infectiveness not as a result of gender difference interplay on students' performance. This is supported by the findings of Matthew andOnyegegbu (2013) who observed that there was no significant difference in the mean achievement scores of male and female students taught agricultural sciencewith instructional materials.

In research question 4 the result also showed that there were mean performances of 64.67 and 58.33 for males and femalesstudents respectively. The result showed that the male

students had a higher mean performance. But when the result was further subjected to t-test statistics there was no significant difference in the performance of the two groups. This implies that gender differencehas no effect on the performance of male and female students taught agricultural science using real objects. The experimental group'sdifference in students' mean academic performance in ASAT posttest was a factor of treatment given and not of gender difference in group composition.Matthew andOnyegegbu (2013) found that there was no significant difference in the mean achievement scores of male and female students taught agricultural sciencewith instructional materials.

Summary of Major findings

This study hasthe followings as the major findings:

1. The use of charts had significant effects on students' academic performance in agricultural science.
2. Theuse of real objects had significant effect on students' academic performance in agricultural science.
3. The use of charts had no significant difference on male and female students' academic performance in agricultural science.
4. The use of real objects had no significant difference on male and female students' academic performance in agricultural science.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter was presented under the following sub-headings:

5.1 Summary

5.2 Contribution to Knowledge

5.3 Conclusion

5.4 Recommendation

5.5 Suggestion for Further Studies

5.1 Summary

This study was conducted to determine the effects of instructional resources on students' academic performance in agricultural science in senior secondary schools inKaduna State, Nigeria. To achieve this, four specific objectives, Four research questions and four null hypotheses were raised.

The study used quasi-experimental design with a study population of 14,241 SSII students offering agricultural science who comprised of both males and females. GSS Manchok was purposively sampled for the study where 90 students of equal number of males and females were used as intact classes of group A, B and C. Each group was madeup of 30 students (15 males and 15 females).

Agricultural science achievement test (ASAT) was used to collect data from the respondents. The data collection phase lasted for 6 weeks. Both pretest and posttest scores were recorded after which the posttest was statistically analyzed. The 4 null hypotheses were tested using t-test statistics at 0.05 level of significant. Null hypotheses 1 and 2 were rejected while null hypotheses 3 and 4 were retained.

The findings indicated that:

1. The use of charts had significant effect on student's academic performance in Agricultural Science.
2. The use of real objects had significant effect on students' academic performance in Agricultural Science.
3. The use of charts had no significant effect on male and female students' academic performance in Agricultural Science.
4. The use of real objects had no significant effect on male and female students' academic performance in Agricultural Science.

5.2 Contribution to knowledge

Based on the findings, the following contributions were made:

1. Charts and real objects significantly increased students'retention abilities in agricultural science
2. The use of charts and real objects did not gender biaswith regard to students' retention abilities in agricultural science.

5.3Conclusion

Based on the findings obtained in the study it was concluded thatinstructional resources have significant effects on students' academic performance in agricultural science.

5.4 Recommendations

Based on the findings the researcher recommended that:

1. Teachers should use instructionalresources in teaching agriculturalscience in senior secondary schools in Kaduna, State.
2. School Inspectors should emphasize and ensure that teachers use instructionalresources in teaching agriculturalscience and other science subject.

3. Kaduna State Ministry of Education Science and Technology should train and retrain teachers on how to use instructional resources in teaching by organizingseminars and workshops.

5.5 Suggestions for FurtherStudies

Further studies could be carried outon:

1. Effects of improvised resources on students' academic performance in agricultural science in Kaduna State, Nigeria.
2. Effects of instructional resources on students' academic performances in agricultural science in senior private secondary schools in Kaduna State, Nigeria.

REFERENCES

Abass, B. T, Bimbo A. & Ojo A. O (2012). Effects of animated agricultural science instructional package on attitude and performance of junior secondary school students in South-West Nigeria.*MediterrJournal of Social Science,* 3(1), pp.425-435.

Abdullahi,A. (1992).*Science Teaching in Nigeria.* Ilorin: Atoto press Ltd.

Abdullahi M.A. (1998) Importance of instructional materials in teaching of social studies.*Ilorin Journal of Humanities*Kwara, 2(1), pp.187-191

Adamu, I. (2008). *Information and communication technology for enhancement of educational development in northern Nigeria*. IBB University, Lapai.

Adedoja, G. O. (2007). Integrating information communication technology into business education. *Book Reading in Business Education,*1(1),pp. 151-153

Adeyanju, J. L. (2002). Using information and communication technology (ICT) to improve the training and productivity of the graphic artist.*Nigerian Journal of Educational Media and Technology,* 10(1), pp. 266-270

Adeyemi, E. (2000). *A survey of instructional problems in teaching of agricultural science in selected secondary schools in Kwara State*. Unpublished M.Ed thesis, UNAD – Nigeria.

Adeyemi, T.O. (2008).Predicting students' performance in senior secondary schools certificate examination from performance in JSCE in Ondo State, Nigeria.*Humanity and Social Sciences Journal,* 3(1), pp.26-36.

Agun, I. (1982). The place of instructional materials in curriculum development.*Journal of Education and Development,* 2(2),pp.503-510.

Akanbi, K. (1999). *Improving teaching of business subject at the senior secondary school level. A paper presented at a conference of the Nigerian*. Association of Professional Educators. Ogun State University, Nigeria 5th-8th October.

Akande, S.A. &Azike, J.A. (2006). *Fundamental Principles of Economics*: Ibadan. Evans Brothers Nigeria Pub. Ltd.

Akubuilo, D.U. (2004). The effects of problem solving instructional strategy on students' achievement and retention in biology with respect to location in Enugu State. *Journal of STAN,* 39 (1&2), pp.30 –38.

Anyanwu, A.C. &Anyanwu B.O. (1987). *Junior secondary school agriculture*: Africana-Fep Publishers Limited.

Awotua-Efebo E. B. (2001). *Effective teaching: Principles and Practice*, Port Harcourt, Para graphics.

Balogun, T.A. (1986). Improvisation of science teachingequipment. *Journalof science teachers association of Nigeria*,3(2), pp.50-52.

Barde, A. I. (1996). Use of Audio-Visual Aids in Teaching Nigerian Languages in *Tambari,* 3 (1), pp 187-195.

Bichi, S.S. (2008). Resources for Science, Technology & Mathematics Education in Nigeria in 21st century. *Journal of Educational Research & Development.* ABU, Zaria, 3(1), pp. 68-174.

Blankenship, D.M. (1989). Utilization of instructional materials in the teaching of agricultural science. *Hebrew University of Jerusalem Journal*, Faculty of Agricultural Sciences Education, 58(4), pp.179-1985.

Brown, J. W., Lewis R. B. &Harcleroad F. F. (2007). *An introduction to instructional technology, Media Methods.* New York. Mc-Graw Hill Publishers Inc. USA.

Catherine, W.& Brian, E.M. (2013). Socio-Scientific Issues-based instruction: An investigation of agricultural science students' content knowledge, Based on Student Variables. *Journal of Agricultural Education,* 54(3), pp.140-156.

Crowder, V., Lindley, W., Bruening, T., &Doron, N. (1999). Agricultural education for sustainable rural development: challenges for developing countries in 21st century Rome. Sustainable development dimension. FAO. Htt//www.fao.org/sd/exdirect/exan. Retrieved 25/11/2013 7:45pm

Dalhatu, A. (2009) Relevance of instructional materials to teaching of islamic studies" A.B.U Zaria. *Journal of Educational Development*, 4(3), pp. 188-192

Daluba, N.E.(2013). Effect of demonstration method of teaching on students' achievement in agricultural science. *World Journal of Education*, 3(6), pp. 130-138.

Edinyang, S.D. &Ubi, I.E. (2012). Relative effectiveness of inquiry and expository methods of teaching social studies on academic performance of secondary students in AkwaIbomState.*British Journal of Art and Social Sciences,* 8(1), pp. 95-101.

Egun,A.C&Tibi E.U (2002). The gender gap in vocational education: Increasing Girls access in the 21st Century in the Midwestern States of Nigeria. *WestAfrican Journal of Development inEducation,* 6(2), pp.25 –28.

Egun,A.C.(2009).Focusing agricultural education for better productivity
in Nigeria in the 21st Century. *International Journal of Education Science*, 1(2), pp. 87-90.

Etim P. J. (1998). Instructional modules development for improving agricultural science education in nigerian secondary schools. *African Journal Education and Information Management,* 1(1), pp165-168

Etim P. J. (2006). Issues in educational technology. *European Journal of Humanities and Social Sciences*, 2 (1), pp. 311-318.

Fakomogbon, M.A. (2008). Instructional media technology and services for special learners. *Nigerian Journal of Educational Media and Technology*,1 (2), pp.34-41

FRN, (2004) National Policy on Education, Abuja. Federal Government Press.

Guga, A. (2007).The quality of teachers in school manage by Kaduna State science and technology school management board. Implication for training. *Journal of Educational Research and Development.* ABU Zaria, 2(1), pp.340-345.

Ibe-Bassey G.S (1991). The selection and use of instructional materials. Implications for teachers' effectiveness. *Journal of Educational Media and Technology*, 3(1), pp.66-86.

Ibrahim, S. (2010).The relevance of instructional materials in teaching and learning business subjects. *A journal of Vocational and Technical* ABU Zaria, 5(1), pp.231-234

Ikot A.S. (2008). *Effects of instructional materials utilization on performance of junior secondary students in practical agriculture inIkot-Abasilocal government area.* Unpublished M.Sc. (ed) Thesis. University of Uyo, Uyo.

Imogie, O. (1989). Will N10.00 Do? An example of how lack of fund kill improvisation of educational materials in secondary schools in Nigeria. *Journal of Educational Media Technology*, 2(2), pp.137-155.

Isola, O.M. (2010).*Effects of standardized and improvised instructional materials on students' academic achievements in secondary school physics*. University of Ibadan, Ibadan.

Kindler, J. (1993). *Importance of instructional resources in education.*

Kaduna State Nigeria, (2014). Ministry of education science and technology, Kaduna.

Mathew, C. N. and Onyejegbu C. (2013) Effects of use of instructional materials on students' cognitive achievement in agricultural science. *Journal of Educational and Social Research.*3 (5), pp. 103-107.

NTI, (2007). "Manual for re-training of primary school teachers. Basic Science and technology". National Teachers Institute Kaduna.scialert.net/full text/%3Fdoi%3Dsjsr... retrieved 18/2/2015.

Nsa, S. O., Ikot A. S. &Udo M. F (2013) Instructional materials utilization and students' performance in practical agriculture" University of Uyo, Nigeria. *Journal of Educational Research and Review.*1(4), pp. 49

Nwachukwu C. E. (2006). *Designing appropriate methodology in vocational and technical education for Nigeria,* Nsukka, University, Trust Publishers.

Nwanosike M. R. O. (2007) Functional agricultural education: a panacea to sustainable economy in Nigeria. *Journal of Educational Research and Development* ABU Zaria 2(1), pp241-246

Nworgu, B.G. (2006*) Educational research: basic issues and methodology* (2nd edition), Nsukka University Trust Publishers.

Okeh B.I (2010).Vocational education in agriculture for youths and adult farmers. *A journal of Vocational and Technical* ABU Zaria, 5(1), pp122-128

Okeh B.I. (2006).Relationship between gender and academic performance in agricultural science among nce students of college of educationWakaBiuBorno State. *Journal of Education Research and Development* ABU Zaria. 1(2), 312-317

Oladejo, M. A., Olosunde, G. R.., Ojebisi, A. O. &Isola, O. M. (2011*)* Instructional materials and students' academic achievement in physics: some policy implications. European Journal of Humanities and Social sciences, 2(1), pp 56-61

Oladipo, F.O. (2001*). Introduction to Agricultural Journalism and audio-visual methods.* Ilorin: KWCOED, Ilorin.

Olaitan S. O. &Aguisiobo O. N. (1994).*Teaching of clothing and Textile*. New York. John Wiley and Sons Publishers.

Olaitan S. O. & Mama R. O. (2002). Principles and Practice of School Farm Management. 2nd ed. Owerri. Cape Publishers.

Omofonmwan, G. O and Chukwuedo S.O. (2013), "Availability and adequacy of provision of resources for skills acquisition in maintenance and repairs of digital electronics for the National Open Apprenticeship Scheme" International Journal of Vocational andTechnicalEducation5(6)http://www.academicjournals.org/IJVTE retrieved 18/12/2014

Omoruyi, S.A. Orhue, U.X., Akerobo, A.A. &Aghimien, C.I. (1999). *Prescribed Agricultural Science for Senior Secondary Schools, Lagos:* Longman Education Publishers.

Oshadumi, J.A. (2003). *Impact of Instructional Materials on Students' Academic Achievement in Agricultural Science at Secondary Schools in Okene LGA, KogiState.* Unpublished M.Sc. (ED) thesis, University of Ado Ekiti, (UNAD), Nigeria.

Osokoya I.O. (2007). Effects of video-taped instruction on secondary school students' achievement in history. *International Journal of Africa*. 6(1), pp.27-34.

Ozioma, C. A (2011). Influential Factors Affecting the Attitudes of Students toward vocational/technical subjects in secondary schools in South-East Nigeria. *Journal of Educational and Social Research*,1(2),pp49-56

Piaget J. (967*). The Psychology of Intelligence.* New York; Routledge

Ticton, S. G. (2006). *Improving Learning: An Evaluation of Instructional Technology*. New York. Bowlers Publishers Inc. USA.

Tuckman, B. W. (1975). Measuring Educational Outcomes; Fundamentals of Testing. www.amazon.com/../B0011UEI. retrieved 19/3/2015

Sesen, A. B. &Tarhan L. (2010). Promoting Active Learning in High School Chemistry: Learning Achievement and Attitudes. Procedia-Social and Behavioral Sciences, 2(2). www.sciencedirect.com/science/artic... Retrieved 18/02/2015 3:28pm.

Umar, K. I. (2011) *Influence of instructional materials on the academic performance of students in agricultural science in secondary schools inKwaraState.* Unpublished M.Ed. Thesis, A.B.U. Zaria –Nigeria.

Uyagu, B.G. (2009)*Effects of Instructional Materials Usage and Teachers' Quality on Students Performance in Science in Senior Secondary Schools in Zaria LGA of Kaduna State.* Unpublished M.Ed. Thesis, A.B.U. Zaria –Nigeria.

Williams, David L. (2000). Focusing agricultural education research, strategies for the discipline. *Journal of Agricultural Education*, 32 (1), pp.7–12.

William, E. (2004). Fundamental Principles of Agricultural Education, (2nd. ed.) (pp. 1673). Nsukka: Dramond Publishers Limited.

Yunusa, K. (1997). *Identification of Resources in Schools*.Tambari 4(3), pp 77-83

Yusuf, T.M. (1998). Trends in students' enrolment and performance in the senior school certificate examinations in agricultural science in Kwara State. *Journal of Science Education*1(2), pp. 170-185.

APPENDIX 1

LESSON PLAN FOR EXPERIMENTAL GROUP A.

School – G.S.S (snr) Manchok

Class – SSII

Average Age – 16 years and above

No. in Class – 20

Subject – Agricultural Science

Main-Topic – Crop Production

Sub-Topic – Crop Diseases

Method – Demonstration and Field Trip

Time – 11:00am-11:40am

Duration – 40 minutes

Previous Knowledge: The students might have observed abnormalities in crops but do not know that they are symptoms of crop diseases.

General objectives: To teach the students all the activities involved in crop production.

Behavioural Objectives: At the end of the lesson, students should be able to:

i. definecrop diseases.
ii. discuss the effects of diseases on crop production
iii. mention some diseases of major crops

Instructional Resources:Charts showing spraying equipment, diseased plants,common chemicals (pesticides and insecticides),and distribution of crops in Nigeria etc.

Introduction: The teacher asks students to explain what disease is and also explainthe importance of the lesson to the students.

Presentation: step i

Teacher guides the students to define crop diseases thus; crop disease is a deviation from the normal growth and development of crops which affects the quantity and quality of crop.

Step ii

Teacher guides the students tolists and discuss some effects of diseases on crops production as follows:-

i. Decrease in crop yield
ii. Poor quality crops yield
iii. Total loss of crops
iv. Stunted growth in plant
v. Add to the cost of production

Step iii

The teacher guides the students to name some common crop diseases as follows;

Fungal diseases

i. Rice blast
ii. Maize smut
iii. Black pod of cocoa
iv. Coffee leaf rust

Viral diseases

i. Maize streak
ii. Yam mosaic
iii. Cotton leaf curl
iv. Groundnut rosette

Bacterial diseases

i. Cassava bacterial blight (CBB)
ii. Cotton black arm

Nematode diseases

i. Tomato root knot

Step iv

The teacher displays and guides students on the charts showing some diseased plants

Evaluation: Teacher asks students the following questions;

i. What is crop disease?
ii. List and discuss any three (3) effects of diseases on crop production
iii. Name the diseases that affect maize, groundnut, yam and tomato

Summary: Teacher briefly goes over the lesson. He identifies and corrects students' difficulties.

Assignment: Using a table, list any ten (10) crop diseases indicating:

i. The disease
ii. The causal organism
iii. Cropaffected
iv. Symptoms
v. Effects on the crop

APPENDIX II

LESSON PLAN FOREXPERIMENTAL GROUP B.

School – G.S.S (snr) Manchok

Class – SSII

Average Age – 16 years and above

No. in Class – 20

Subject – Agricultural Science

Main-Topic – Crop Production

Sub-Topic – Crop Diseases

Method – Demonstration and Field Trip

Time – 11:00am-11:40am

Duration – 40 minutes

Previous Knowledge: The students might have observed abnormalities in crops but do not know that they are symptoms of crop diseases.

General objectives: To teach the students all the activities involved in crop production.

Behavioural Objectives: At the end of the lesson, students should be able to:

i. define crop diseases.
ii. discuss some effects of diseases on crop production
iii. mention some diseases of major crops

Instructional Resources: Crop farm, spraying equipment, samples of diseased crops,common chemicals, seeds, seedlings etc

Introduction: The teacher asks students to explain what disease is and also explainsthe importance of the lesson to the students.

Presentation: step i

Teacher guides the students to define crop diseases thus; crop disease is a deviation from the normal growth of crops which affects the quantity and quality of crop yield.

Step ii

The teacher guides students to lists and discuss some effects of diseases on crops production as follows:-

i. Decrease in crop yield
ii. Poor quality crops yield
iii. Total loss of crops
iv. Stunted growth in plant
v. Add to the cost of production

Step iii

The teacher guides the students to name some common crop diseases as follows;

Fungal diseases

i. Rice blast
ii. Maize smut
iii. Black pod of cocoa
iv. Coffee leaf rust

Viral diseases

i. Maize streak
ii. Yam mosaic
iii. Cotton leaf curl
iv. Groundnut rosette

Bacterial diseases

i. Cassava bacterial blight (CBB)
ii. Cotton black arm

Nematode diseases

i. Tomato root knot

Step iv

The teacher displays preserved diseased plant organs as instructional resources to guide the students

Evaluation: Teacher asks the students the following questions;

i. What is crop disease?

ii. List and discussany three (3) effects of diseases on crop production

iii.Name the diseases that affect maize, groundnut, yam and tomato

Summary: The teacher briefly goes over the lesson. He identifies and corrects students' weaknesses.

Assignment: Using a table, list any ten (10) diseases indicating:

i. The disease

ii. The causal organism
iii. Cropaffected
iv. Symptoms
v. Effects on the crop

APPENDIX III

LESSON PLAN FOR CONTROL GROUP

School – G.S.S (snr) Manchok

Class – SSII

Average Age – 16 years and above

No. in Class – 20

Subject – Agricultural Science

Main-Topic – Crop Production

Sub-Topic – Crop Diseases

Method – Lecture

Time – 11:00am-11:40am

Duration – 40 minutes

Previous Knowledge: The students might have observed abnormalities in crops but do not know that they are symptoms of crop diseases.

General objectives: To teach the students all the activities involved in crop production.

Behavioural Objectives: At the end of the lesson, students should be able to:

i. define and crop diseases
ii. list and discuss the effects of diseases on crop production
iii. mention some diseases of major crops

Instructional Resources: Nil

Introduction: The teacher asks the students to explain what disease is and also explains the importance of the lesson to the students.

Presentation: step i

The teacher guides the students to define and explain crop disease,thus; crop disease is a deviation from the normal growth of crops which affects the quantity and quality of crop yield.

Step ii

The teacher lists some of the effects of diseases on crops production as follows:-

iDecrease in crop yield

ii Poor quality crops yield

iii Total loss of crops

iv. Stunted growth in plant
v. Add to cost of production

Step iii

The teacher guides the students to name some common crop diseases as follows;

Fungal diseases

i. Rice blast
ii. Maize smut
iii. Blackpod of cocoa
iv. Coffee leaf rust

Viral diseases

i. Maize streak

ii.Yam mosaic

iii.Cotton leaf curl

iv. Groundnut rosette

Bacterial diseases

i. Cassava bacterial blight (CBB)
ii. Cotton blackarm

Nematode diseases

i. Tomato root knot

Evaluation: Teacher asks the students the following questions;

i. What is crop disease?

ii.List any three (3) effects of diseases on crop production

ii. Name the diseases that affectmaize, yams, groundnut and tomato.

Summary: The teacher briefly goes over the lesson. He identifies and corrects students' weaknesses.

Assignment: Using a table, list any ten (10) diseases indicating:

i. The disease
ii. The causal organism
iii. Crop affected
iv. Symptoms
v. Effects on the crop

APPENDIXIV

PRE-TEST POST-TEST

INSTRUCTION; Answer All Questions in Section 'A' and 'B'.

Section 'A' Bio Data of the Students.

Tick appropriately

Sex

Male [ ]

Female [ ]

Age (in years)

15 – 18 [ ]

19 – 22 [ ]

23 – 26 [ ]

Section A

1. Which of the following group of crops will perform better in savanna zone of West Africa?
   A. Cotton, millet and groundnut
   B. Cotton, coffee andcocoa
   C. Tabacco, sorghum and banana
   D. Sorghum, millet and oil palm.

2 The plant nutrient essential for formation of tubers is.

A. Molybdenum

B. Phosphorus

C. Potassium

D. Sodium.

3. Which of the following sequence of pre-planting operations is correct?

A. Bush clearing, farm layout, burning and stumping.

B. Stumping, bush clearing, farm layout and burning.

C. Burning, farm layout, bush clearing and stumping.

D. Bush clearing, burning, stumping and farm layout.

1. Which of the following agronomic practices is not applicable to rice production?

A. Threshing

B. Transplanting

C. Stacking

D. Pudding

5. Mosaic diseases affect

A. Cotton and cocoa

B. Groundnut and cocoa

C. Cassava and tobacco

D. Mango and orang

6. Which of the following is a symptom of black-pod of cocoa?

A. Diseased leaves fall prematurely.

B. Characteristics swellings appear on young stems and roots.

C. A small brown spot first appears on the pod.

D. Veins of diseased leaves become red in colour.

7. Which of the following insect groups readily attacks dry grains?

A. Boring insects

B. Biting insects

C. Sucking insects

D. Piercing insects

1. Rosette disease of groundnut is transmitted by

A. An eelworm.

B. A grasshopper.

C. A whitefly.

D. Aphids

2. The use of fungal pathogens to control dodder weeds is a

A. Physical method.

B. Mechanical method.

C. Biological method.

D. Cultural method.

3. Hybrid vigour in crop improvement is brought about through

A. Introduction.

B. Mass selection.

C. Inbreeding.

D. Cross breeding

11. Which of the following processes in plants are directly affected by high temperature?

I Water absorption

II Photosynthesis

III Respiration

IV Photoperiodic

A. I and II only.

B. I, II and III only

C. I and IV only

D. II, III and IV only

12. Layering is advantageous because

A. Offspring perform better than their parents.

B. Pollination agents about to ensure its success

C. Possible failure of fertilization is avoided

D. Variability ability in propagates

13. Drying of harvested crops is necessary because it

A. Shortens the length of seed dormancy

B. Reduces moisture content and stores better

C. Cannot be sold to consumers when it is wet

D. Decreases the viability of the crops

14. Which of the following factors will not influence the yield of crops?

A. Soil depth and structure.

B. Soil slop and texture

C. Atmosphere and soil temperature

D. Wind direction and speed

15. Delayed harvesting of maize may result in

A. Improvement in the quantity of grains.

B. High incidence of pest infestation

C. Low seed viability

D. Yellow colouration of grains

16. If the seed rate for guinea corn is 5.6kg per hectare, what will be the amount of seeds required for planting 35 hectares of farm land?

A. 40.6kg

B. 78.4kg

C. 196.0kg

D. 784.0kg

17. Tomato plants are primarily staked to;

A. Prevent birds from feeding on the fruits.

B. Accelerate fruits maturity

C. Raise fruits from the ground

D. Increase crop growth

18. An erect tropical perennial grass, which grows to 3 - 6 metres high and has broad hairy leaves is the

A. Elephant grass.

B. Giant star grass

C. Spear grass

D. Gamba grass

19. Golden brown lesions on peeled yam tuber indicate infection by

A. Bactria

B. Virus

C. Fungi

D. Nematode

20. The eradication of mealy bugs is an effective control of

A. Corn smut.

B. Swollen shoot of cocoa.

C. Groundnut rosette.

D. Rice blast.

APPENDIX V

MARKING SCHEME

Each Correct Answer Carries Two Marks.

1. A Cotton, coffee and cocoa.
2. AMolybdenum
3. B Bush clearing, burning and farm layout.
4. A Threshing
5. ACotton and cocoa
6. C Small brown spot first appears on the pod
7. ABoring insects
8. C Whitefly
9. D Cultural method
10. C Inbreeding
11. B I, II and III only
12. CPossible failure of fertilization is avoided
13. B Reduces moisture content and stores better
14. D Wind direction and speed
15. B High incidence of pest infestation
16. B 78.4kg
17. C Raise fruits from the ground
18. A Elephant grass
19. A Bacteria
20. C Swollen shoot of cocoa

APPENDIX VI

RESULT OF PRE—TEST AND POST—TEST OF ALL GROUPS

	GROUP A		GROUP B		GROUP C	
S/No	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
1.	40	60	30	70	30	30
2.	30	60	30	50	30	35
3.	20	50	30	60	30	25
4.	20	55	25	65	25	35
5.	20	40	20	80	20	40
6.	20	70	20	50	20	20
7.	20	70	20	65	20	30
8.	15	80	20	80	15	30
9.	15	50	20	50	15	40
10.	15	60	15	60	10	35
11.	15	50	15	90	15	35
12.	10	90	10	55	10	35
13.	10	45	10	65	10	45
14.	05	60	05	40	00	50
15.	00	80	00	90	00	40
16.	35	70	35	35	30	40
17.	30	45	30	50	30	40
18.	30	40	30	55	25	30
19.	25	70	25	55	25	55
20.	20	60	25	60	20	30
21.	20	50	25	50	20	40
22.	20	30	25	60	20	25
23.	20	60	20	70	20	30
24.	20	50	20	50	15	45
25.	15	45	20	40	15	35
26.	15	45	20	80	15	30
27.	15	60	20	70	10	35
28.	15	65	15	60	05	20
29.	10	70	15	65	05	20
30.	05	85	05	75	05	35
Total	**1765**		**1845**		**1030**	

$\bar{X}$ =58.83 $\bar{X}$ =16.50 $\bar{X}$ =34.33