# EFFECTIVENESS OF DEMONSTRATION AND DISCOVERY METHODS IN TEACHING AGRICULTURAL EDUCATION IN COLLEGES OF EDUCATION IN NORTH-WEST ZONE, NIGERIA

**BY**

**Gloria Oluchi OKEH**

**DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION,**
**FACULTY OF EDUCATION,**
**AHMADU BELLO UNIVERSITY,**
**ZARIA**

**MAY, 2019**

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**Gloria Oluchi OKEH**
**NCE, 2008 BSc. (Ed), 2011**
**P13EDVE8042**

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

**DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION,**
**FACULTY OF EDUCATION,**
**AHMADU BELLO UNIVERSITY,**
**ZARIA**

**MAY, 2019**

## DECLARATION

I OKEH, Gloria Oluchi hereby declare that this thesis titled "Effectiveness of Demonstration and Discovery Methods in Teaching Agricultural Education in Colleges of Education in north-West Zone of Nigeria" has been written by me in the Department of Vocational and Technical Education, Ahmadu Bello University, Zaria. The information derived from the literature has been duly acknowledged in the text and list of references provided. No part of this dissertation was previously presented for another degree or diplomas at this or any other institution.

---------- ----------

OKEH Gloria Oluchi Date

## CERTIFICATION

This dissertation titled "EFFECTIVENESS OF DEMONSTRATION AND DISCOVERY METHODS IN TEACHING AGRICULTURAL EDUCATION IN COLLEGES OF EDUCATION IN NORTH-WEST ZONE OF NIGERIA" by OKEH Gloria Oluchi has been read and meets the regulations governing the award of Masters of Science degree (M.Sc. Ed) in Agricultural Education of Ahmadu Bello University, Zaria and it is approved for its contributions to knowledge and literary presentation.

_____ _____

Dr. C.Uguru Date

Chairman, Supervisory Committee

_____ _____

Dr. H. A. Abdullahi Date

Member, Supervisory Committee

_____ _____

Dr. S. Ibrahim Date

Head, Department Vocational and
Technical Education

_____ _____

Prof. S. Z Abubakar Date

Dean, School of Postgraduate Studies

## DEDICATION

This research work is dedicated to my parents, Prof B.I Okeh and Late Lady N.N Okeh

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## ABBREVIATIONS USED

| Abbreviation | Meaning |
|---|---|
| 1. ANOVA | Analysis of Variance |
| 2. ANCOVA | Analysis of Covariance |
| 3. AEAT | Agricultural Education Achievement Test |
| 4. CATMA | Cognitive Achievement Test in Mathematics |
| 5. MANCOVA | Multivariate Analysis of Covariance |
| 6. NCE | Nigerian Certificate in Education |

## OPERATIONAL DEFINITION OF TERMS

For the purpose of this study, the following definitions were put forward.

I. **Academic performance**:- refers to the extent to which stated objectives have been achieved by the learner.

II. **Effectiveness**:- a change produced or result obtained due to present or absent of a certain thing.

III. **Demonstration method**:- the method of teaching that involved showing the learner how to carry out a certain task.

IV. **Discovery method**:- the method of teaching whereby the learner find out things by himself/herself.

V. **Teaching**:- the art of imparting knowledge into students by the teacher.

VI. **Teaching method**:- the technique adopted by a teacher when imparting knowledge unto the learner

## ABSTRACT

The study was carried out to determine the effectiveness of demonstration and discovery teaching methods in agricultural education in colleges of education in North-west zone Nigeria. Pre-test, post-test quasi experimental design was adopted for the study. The study had three (3) specific objectives three research questions and three null hypotheses. The entire 1010 NCE II Agricultural education students of the twelve (12) colleges of education in North-west zone formed population for the study. A total number of 312 NCE II Students from three colleges of education formed the sample for the study. The instrument used for data collection was a 40 – item multiple choice agricultural education achievement test (AEAT) which was administer to students before and after exposing them to demonstration and discovery method Scores obtained were analyzed using mean, standard deviation and t-test statistics. The findings showed that, both demonstration and discovery methods of teaching had significant effect on the academic performance of agricultural education students, however, demonstration was found to be more effective than the discovery method. It was concluded that demonstration method enhanced students' ability to handle agricultural manipulations. The researcher therefore recommended among other things that curriculum planners should emphasize the importance of using demonstration in teaching agricultural education in colleges of education in north-west zone Nigeria, and encourage their use in teaching and learning procedures.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background to the Study

Education is seen as an instrument for national development (FGN 2004). The future of any nation rest solemnly in the hands of its teachers because no education system can rise above the level of its teachers (Ayatse 2006). The quality of teachers reflects the behavior of the citizens of future tomorrow, hence there is need to give substantial attention to the mode of preparing Nigerian certificate in education (NCE) teachers. In order to achieve this, one should look seriously into the process and procedure of training teachers of colleges of education.

Agricultural science is one of the core subjects taught in both junior and senior secondary schools in Nigeria for its promising role in promoting self reliance through the provision of employment opportunities and production of staple foods for the populace together with supply of materials for the agro-allied industries. The teaching of agricultural science as a course in our schools and colleges has been made compulsory by the federal government of Nigeria to achieve the goal of education.

Colleges of education are among the tertiary institutions that are saddled with the responsibility of training teachers of agricultural science for primary and junior secondary schools in Nigeria, under the supervision of national commission for colleges of education (NCCE). Colleges of education are to train middle class teachers in various fields of studies (NCCE 2008).Agricultural education is one of such programmes that lead to the award of NCE. This programme emphasizes on the preparation of students for gainful employment in production agriculture and in business related to agriculture. However, the main aim of designing NCE agricultural education programme is to produce competent agricultural

education teachers who will be able to inculcate scientific as well as technical values in the learners.Agricultural education is perceived by an average Nigerian student, as a course that is dominated with practical and is majorly meant for students that are intellectually incapacitated (Adah 2011). The way and manner students perceived the course, arises from the fact that instructional approaches adopted by teachers in the classroom and on the field during teaching and learning process are not impressive (Adah, 2011).

Teaching methods according to Hassan (2002) are the approaches, ways and strategies that a teacher adopts in conducting his lesson to a successful end. Mamman (2002) also defines teaching methods as the ways of teaching which involve a series of teacher directed activities that result into pupils' learning. Teaching methods comprise of principles and strategies used for instruction (Daluba, 2013). Teaching methods are the tools of the teacher for reaching the set goals and objectives.Teaching method can be described as the way the teacher organizes teaching processes. It is a process of imparting knowledge ideas and skills into a person or group of persons. It also means a guideline for promoting, teaching and learning which involve various ways of manipulating instructional resources and communication to make the learner receive the teachers' message clearly. Teaching method can therefore be said to be the most fundamental aspect of education and it is a central issues in teaching. Every successful teacher must have ability to pass his knowledge to the learners in order to be regarded as an effective teacher.

Demonstration method refers to the type of teaching method in which the teacher is the principal actor while the learners watch with the intention to act later. Mubi (2002) views demonstration as the method of teaching through examples or experiment. It is a method that can be used to prove a fact through a combination of visual evidence and associated reasoning. Demonstration involves the teacher showing students how to do something. According

Adekunle(2000) demonstration method involves showing by reason or proof, explaining or making clear by use of examples or experiments. Demonstrations are very effective when students have a hard time connecting theories to actual practice or when students are unable to understand the application of theories (Ahmed, 2002). Demonstration method is important in teaching agricultural education because, it is the teaching method that allows the teacher to carryout out certain task step-by-step in the presence of the learners with the view of either showing them how to do it themselves or demonstrating a principle. According to Agatha (2002), demonstration is an effective instructional technique that enhances motivation of students by teachers of agriculture. Also Ebrahimi (2006) classified demonstration into two: method demonstration and result demonstration. Method demonstration involves showing students how to carry out a practice or how to use certain materials. Examples of method demonstrations include how to use a sprayer, different methods of planting, different methods of fertilizer application, seed treatment, and different methods of pest and disease control (Adekoya, 2011). Result demonstration is used to show the end product of a new practice and to show that, the new practice is visible. According to Adekoya (2011) result demonstration is very useful as it justifies the reason for performing certain task or embarking on a new principle. It shows the result of a certain practice. If properly carried out demonstration can generate a great deal of interest and enthusiasm for a practice as well as providing the skill subjects. However, many people may not be able to practice the skill demonstrated adequately due to shortage of time or facilities (Sequira, 2012). Demonstration method is not effective when the number of students is too large (Emaikwu, 2012)

According to Bruner (1961), discovery is in essence a matter of re-arranging or transforming evidence in such a way that one is enabled to go beyond the evidence and re-

assemble additional new knowledge. Bruner further stressed that the word discovery means finding out. It is therefore a process through which students find out facts or knowledge through the understanding of concepts. By the definition, discovery implies "induction". By it, students proceed from specific example (percepts) to concepts and from concepts to a generalization or principle. Mandrin and Preckel (2009) observed that three basic words are paramount in the discovery method. They are precepts, concepts and generalization. Discovery approach is one of the instructional strategies used in effective teaching of agricultural education. Smith (2001) reported that in discovery method of teaching, the learners find out by themselves the new knowledge. Discovery method is a method of inquiry-based instruction and is considered a constructivist based approach to education. Discovery learning takes place in problem solving situations where the learner draws on his own experience and prior knowledge. Demonstration and discovery methods of teaching are some of the methods that can be adopted for teaching practical Agriculture education. These methods also can impact knowledge of agricultural education at various levels of education. The need to ascertain the effectiveness of these methods arose because other teaching methods may not be suitable in all cases, with particular reference to agricultural education. This led the researcher to undertake this study to ascertain the effectiveness of the two methods on student's academic performance in colleges of education.

Academic performance is an important parameter in measuring success in students. Students' academic performance refers to students' achievement in the topic taught based on the stated objectives. Edinyang and Ubi(2012) defined academic performance as the outcome of education which reveals the extent to which a student, teacher or institution has achieved educational goals. Academic performance or achievement is commonly measured by examinations or continous assessment (Abdulhamid,2013). According to denga (2012) learning

is said to occur if there is a positive change in behavior or performance which is a result of experience and practice and which makes individuals face later situations differently. Hence, an individual is assumed to have learnt techniques and skills if there is a remarkable change in his academic performance during and after the course of his programme (Camilus, 2011). Academic performance is an outcome of interest to both researchers and professionals within the field of education. An important question that is raised by educators, parents and often society is how high academic performance in students can be promoted and what factors or context has an influence on academic performance throughout a child's development.

There are several micro and macro context that have impact on students' academic performance and one of the context that have been studied is the classroom context. Kounin and Gump (2005) reported that the classroom context (such as method of teaching) has distinctive forces or "signals" different to other contexts which pull events and participation along with them. Considering these relationship between the variables, the researcher examined the "effectiveness of demonstration and discovery method of teaching agricultural education in colleges of education in north-west zone, Nigeria.

## 1.2 Statement of the Problem

Agricultural education is a practical course that requires to be taught practically by making teaching situation as real as possible. Teaching and learning of agriculture have been affected by the negative view of many, that it is a course/field for never-do-wells, or drop-outs. Agricultural education is a vocational course which is geared towards acquisition of agriculture related skills, knowledge and competency required for both paid and self employment. As a course which involves both classrooms and field experience, the need to choose and use the most suitable teaching methods cannot be over-stressed. What students learn is greatly

influenced by how they are taught. Instructors teaching agricultural education curricula have implemented a wide variety of teaching methods which fit different niches within the agricultural classroom (Abdulhamid, 2013). Some methods of teaching are completely out of touch with background and local environments of the learners. According to Abdulhamid (2013), organizing for effective teaching in agricultural education is centered on certain factors such as what to teach, when to teach and how to teach. The teacher does not only teach the most relevant, meaningful and useful materials for specific students, he must also recognize and adopt a good and well-researched method of teaching that guarantees better understanding and also stimulates and motivates the students.

It is now being recognized that there are better ways to learn than through the traditional methods (Wood and Gentile, 2003). Educators are beginning to show an increased awareness of the importance of the way students learn. Many of our standard methods of conveying knowledge have been shown to be relatively ineffective in the student ability to master and retain important concepts as learning through some of these methods is passive rather than active. These methods (lecture, discussion) do not tend to foster critical thinking creative adoption and collaborative problem-solving (Wood and Gentile, 2003).

Among the methods used in teaching agricultural education in colleges of education, demonstration and discovery methods of teaching were chosen because they are the most common methods adopted in teaching at this level. It was observed that demonstration and guided discovery methods of teaching agricultural education can be suitable for acquiring competency required by agricultural education students for them to fit into the labour market. Hence, It is the belief of the researcher that effective methods of teaching will go a long way in ensuring pragmatic teaching and learning. Therefore, this study set out to investigate whether

demonstration and discovery methods could lead to a better academic performance of agricultural education students in colleges of education.

## 1.3 Objectives of the Study

The broad objective of the study is to ascertain the effectiveness of demonstration and discovery methods in teaching Agricultural education in colleges of education in North-west zone of Nigeria. The specific objectives of the study were to:

1 determine the academic performance of agricultural education students taught using demonstration method in colleges of education in north-west zone Nigeria;
2 ascertain the academic performance of agricultural education students taught using discovery method in colleges of education in north-west zone, Nigeria; and
3 determine the difference in the academic performance of agricultural education students taught using demonstration and discovery methods of teaching in colleges of education in north-west zone, Nigeria.

## 1.4 Research Questions

The following research questions were raised to guide this study

1. What is the academic performance of agric education students taught with demonstration method in colleges of education in north-west zone, Nigeria?
2. What is the academic performance of agric education students taught with discovery method in colleges of education in north-west zone, Nigeria?
3. What is the difference in the performance of agric education students taught with demonstration and discovery method of teaching in colleges of education in north-west zone, Nigeria?

## 1.5 Null Hypotheses

In line with each of the research questions, the following null hypotheses were formulated to be tested at 5% level of significance.

1. Demonstration method has no significant effects on the academic performance of agricultural education students of colleges of education in north-west zone, Nigeria;
2. Discovery method has no significant effects on the academic performance of agricultural education students in colleges of education in north-west zone, Nigeria; and
3. There is no significant difference between the academic performance of agricultural education students taught using demonstration method and those taught using discovery method in colleges of education in north-west zone, Nigeria.

## 1.6 Significance of the Study

The findings of the study would be useful to curriculum developers and planners in education sector especially the national commission for colleges of education for the task of reviewing agricultural education programme. Emphasis should be laid on the teaching methods that will lead to acquisition of desirable skills in this course.

The result of this study would also be useful to teachers of agricultural education in colleges of education. It will help themconcentrate their efforts in using teaching methods that will bring out the best in their students and improve their effectiveness in carrying out their task. Consequently, the study result is expected to identify and recommend teaching methods most appropriate for the field.

This study would also benefit students of agricultural education in colleges of education since their time will be effectively utilized in acquiring the much desired competency required

of them to be gainfully employed or self reliant. Since the general motive that, the use of inappropriate teaching methods contributes to poor performance of students in agricultural education. For this reason, when the most appropriate teaching methods are identified and implemented by agricultural education teachers, will go a long way to improve students' performance agricultural sciences.

This study would also be useful to the society in general; thus, includes the government and the immediate community. The study is in line with the federal government effort to enhance teaching of science syllabus in the country. In this respect, the government will be aware of the importance of using appropriate teaching method to achieve this goal. The work will also create awareness to the government on the importance of providing adequate relevant facilities and equipments needed for effective teaching and learning using appropriate method.

The study will also benefit colleges of education as a guide on the use of methods of teaching suitable at this level of education that will ensure the production of quality students and teachers in agriculture. The findings and recommendation of this study would also contribute to existing literature in this area of agricultural education.

## 1.7 Basic Assumption of the Study

The following assumptions were made in this study:

1. Demonstration and discovery teaching methods areinstructional methods rarely used in colleges of education for teaching agricultural education.
2. Demonstration and discovery methods cannot be attested aseffective methods for learning agricultural education in colleges of education.

3. Demonstration and discovery teaching methods are not likely used to promote agricultural skill acquisition and competency in agricultural education in colleges of educations and in other levels.

## 1.8 Delimitation of the Study

This study was delimited to the use of demonstration and discovery methods for teaching agricultural education to test student's learning to real life context of what is taught theoretically in class. This study was delimited to NCE II students of agricultural education in colleges of education in North-west zone, Nigeria. This study was also delimited to livestock management(breeds identification, classification, systems of keeping ruminant and non-ruminants) being part oftopics in the minimum standard for NCE II students of agricultural education.

# CHAPTER TWO

# REVIEW OF RELATED LITERATURE

This chapter highlights the related previous research works on teaching methods, Agricultural science and student's academic performance. The chapter is presented under the following headings:

2.1 Theoretical Framework

2.2 Concept of Teaching

2.3 Teaching Methods

2.4 Demonstration Method in Teaching Agricultural Science

2.5 Discovery Method in Teaching Agricultural Science

2.6 Academic Performance

2.7 Empirical Studies

2.8 Summary of Literature Review

## 2.1 Theoretical Framework

The theoretical framework for this study is based on classroom teaching model developed by Mitzel (1960) and expanded by the theoretical works of Dunkin and Biddle (1974). The model contains four classes of variables: presage, context, process, and product. According to Mitzel (1960) presage is teacher characteristics such as intelligence, level of experience, and success. Mitzel (1960) model recognizes the presage variables as fundamental in understanding classroom problems and challenges using the experience of the teacher. Mitzel (1960) stressed that, product relates to specific characteristics of the learner. The product variables are those associated with the effects of instruction while process involves the interaction between student

and teacher. The context variables address the student characteristics and the classroom environment. Mitzel (1960) maintained that the experience of the classroom teacher tends to affect classroom environment (context, interaction between the teacher and the students (process) and the effects of the instruction (product). The behaviors and strategies of the teacher lead to observable changes in the student behavior (process) and in turn, immediate student growth and long term student effects (product). Product is learning on the part of the student which includes previous behaviour, change in behaviour and behaviour potential (Biddle and Ellena, 1964). Furthermore, proctor (1964) concludes by revealing the teaching learning process as being bi-directional. The end product of interest in an educational phenomenon is product. Wendy et al., (2006) explains that product is identified as being the foundation for the paradigm as well. Among Nigerian authors that adopted this model are Christian et al., (2007) and Peter et al., (2014) who all observed that, the academic achievement of the learners is greatly influenced by the experience and the methodology of the teacher.

The study is also based on Bruner's (1961), in Obeka, (2010) theory of learning by discovery and Ludwig Von Bertalanffy, (1956) in Dahiru,Shamim,Lukwago, (2014) theory of Academic performance. This is because it revolves around these processes (teaching methods) and product (academic performance) variables as it focuses on the instructional methods of the teacher(process) and the understanding and confidence of students at the end the course (product). Bruner (1961) introduce the concept of learning by discovery. The theory stresses cognitive effectiveness; because of this, some referred to Bruners (1961) theory of learning as Bruner's theory of cognitive development and discovery. Bruner believed that learning by discovery begins when science teachers purposefully create problems and present them to students by introducing some inconsistencies among source of information which are given in

the process of instruction. According to him, presenting such contradictory situations to students/learners lead to intellectual discomfort that will stimulate and motivate the learners to figure out a solution by engaging in mental processes which involves observation, hypothesizing, measuring, stating problem, data collection, classifying, inferring, etc. Bruner in other perspectives noted that learners construct new ideas or concepts based upon existing knowledge because learning is an active process.

Bruner's theory also emphasized on the significance of categorization in learning, "To perceive is to categorize, to conceptualize is to categorize, to learn is to categorize while interpreting information and experience by similarities and differences is a key concept, he further stressed that any science subject could be taught at senior secondary school stage of development in a way that fits the child's cognitive abilities. A teacher should therefore coordinate his teaching methodologies with expository, experimental, discussion, demonstration, discovery and problem-solving methods in sciences. This theory further justified that when teaching methodologies are vividly adhered to; learning will become easy and permanent, and may result in good academic performance and retention in learners.

Teaching methods and academic performance are considered as some of the avenues through which agricultural science can be taught for better academic performance, and retention of students learning through formal classroom, teaching, practical work and field trips that may lead to discovery of new ideas, (Michael,2010)

This study revolves around the processes (teaching methods) and product (academic performance) variables as it focuses on the instructional methods of the teacher (process) and the understanding and confidence of students at the end of the course (product).

## 2.2 Concept of Teaching

Teaching is a unique profession, rational, human activity in which one creatively and imaginatively uses him and knowledge to promote learning and welfare of others. The definitions of teaching therefore are many and varied and all depend on the context the word is used (Abimbola, 2004). Teaching is described as polymorphous, which means; it takes on several forms and involves several activities that are currently characterized as teaching (Adekunle, 2000).

Teaching remains a recurring concept central to education despite the various schools of thoughts on what education should be and the purpose of the educational system. Even when teaching was viewed from the perspective of classroom teaching, learning situation, activities involved are too many (Agatha, 2002). According to Jada (2002), teaching is a systematic activity deliberately engaged in by somebody to facilitate the learning of the intended worthwhile knowledge, skills, and values by another person and getting the necessary feedback.

According to Buba (2002) defined teaching as an attempt to help someone acquire or change attitude, knowledge, ideas, skills or appreciation. It is the manipulation of the variables of instruction to produce intended changes in learner's behavior. Teaching is a complex multifaceted activity often requiring the instructors to juggle multiple tasks and goals simultaneously and flexibly. The range of professional duties performed by teachers is wide and extensive. At the heart of a teacher's role is the provision of learning for all pupils. Teaching should encompass both instruction in procedures, and process to guide students to the information they need and challenging them to engage in thinking about concepts they construct in their mind. All of these are needed in order to teach students to become functional thinkers.

## 2.3 Teaching Methods in Agricultural education

Teaching methods are strategies seen as various format employed by the teacher to pass his instruction so as to bring about positive changes that are relatively permanent in nature in the learners. Teaching method was defined by Harron, (1973) as the basic mode of study employed by an investigator, or the theoretical approach used by a teacher in selecting and implementing a curriculum. Makama, (2005) defined it as an orderly procedure in which teachers use to direct learners in the development of knowledge, skills, attitudes and habit. Universal Basic Education Board (UBEB), (2008) considered teaching methods as guidelines or processes for promoting teaching and learning. It is the approach used by the teacher to stimulate the interest of learners in the instruction. Yusuf, (2010) opined that they are various approaches used by the teacher in ensuring that the learner acquired the knowledge or skills pre-determined by the teacher.

Teaching methods deal with the way or procedure in which information is presented to students. They are seen as processes of directing and controlling the experiences of learners, stimulating and guiding them, organizing experiences for the learners, helping such individual or group of individuals to discover and develop potentialities for the happiness and social welfare of the learners (Farrant, 1986 in UBEB, 2008). Teaching method comprise the principles and methodologies used for instruction. Teaching methods referred to the general principles, pedagogy and management strategies used for classroom instruction. The choice of teaching method by the teacher depends on what fits the teacher, his educational philosophy, classroom demography, subject area and school mission statement. Teaching methods are best articulated by answering the questions, what is the purpose of education? And what are the best ways of achieving this purpose (Maniman 2002, and Boice, 2000). Hassan, (2002) defined teaching

methods as the approaches, ways and strategies which the teacher adopts in conducting his lesson to a successful end.

Teaching methods can be seen as ways of teaching that involved a series of teacher directed activities which result into pupils' learning (Myra, 2005). Myra also added that, teaching methods are the various means and ways of communicating with learners in order to inculcate ideas, skills and values that are built within the educational aims and objectives. According to Edinyang (2012), teaching methods are framework on which what learners need to learn are conveyed to them by the teacher. How the teacher makes the teaching environment facilitative and manipulative for learning to take place is referred to as teaching method (Abdulhamid, 2013). These include the procedures through which goals are reached or through which results are achieved. It also involves strategies, techniques and tactics of teaching as well as choice of what is to be presented and the order through which such presentations will be made. Daluba (2013) stressed that, teaching methods are procedural when they deal with setout pattern of teacher behaviour that recur during the teaching process, and can be applied to various subject matters, various teacher characteristics and relevant to all forms of learning. Teaching methods are organizational when they deal with a variety of arrangements that are based on the number of learners to be taught in the class.

Teaching methods according to Agbulu(2013) comprises the principles and methods used for instruction in teaching and learning for better performance and retention in the learners. Baba (2001) stressed that the most commonly used teaching methods in agricultural science are demonstration method, problem solving method, lecture method, project method, discovery method, discussion method, field trip method and many others. Akinyemi and folashade, (2010) emphasized that two or more teaching methods are applicable in teaching vocational subjects.

Ajoma (2009), opined that agricultural science teaching method is the professional technique teachers adopt in their instructional exercises to enable them impact relevant knowledge and skills to their students. In summary, teaching methods are the approaches the teacher applies to conduct his lesson to a successful end. Teaching methods are the strategies used by the teacher to help students to learn the desired course content and be able to develop achievable goal in the future.

### 2.3.1 Importance of Teaching Methods

Quality education is an important strategy in our nation's education. Teachers, especially secondary school teachers are the main force of quality education. Thus secondary school teachers have to alter their teaching notion and teaching methods, establish new teaching ideology, play their role and fulfill their task

Teaching methods are the tools of the teacher for reaching the set goals and objectives. Teaching methods play a central role in teaching and learning process. According to Hassan (2002), in pursuance of the objectives of teaching and to effectively carryout designed curriculum activities at the senior secondary schools, the teacher should be able to identify and use teaching methods most appropriate for the achievement of lesson objectives. Since teachers are generally regarded as knowledgeable, their problem usually lies in their ability to communicate or pass information that can easily be understood by the learners using appropriate instructional method (Mubi 2002). Edinyang (2012) maintained that, the achievement or failure of students in the class aside other variables strongly depends on the teachers teaching methods. Emaikwu (2012) also affirms that, the teaching method in any teaching and learning situation is very important because, the way a teacher presents subject matter to learners may make them to like or dislike the subject. Misem 2011 (as cited in Emaikwu 2012) affirms that, teaching method

affects the response of students and determines whether they are interested, motivated and involved in a lesson in such a way as to engage in a good learning. What constitutes good teaching and learning of school subjects is the use of appropriate methods of teaching. The importance of teaching methods in classroom instruction cannot be overemphasized, as they serve as the only instruments that bridge the gap between teaching and learning.

### 2.3.2 Factors Determining the Choice of Teaching Method

Research evidence shows that one of the challenges confronting secondary school teachers is basically on the choice of teaching method. Some teachers consider the selection of method as an area where they have exclusive monopoly (Omotere, 2011). This perception is wrong as their selection of teaching method would affect student's performance. According to Omotere (2011), the followings are some of the factors that determining the choice of teaching method by the teacher.

i. Ability of the teacher: - The method must be right to the teacher. Every teacher is a unique personality with distinct behaviour and professional capability. Some teachers may function well in certain conditions while some may flop significantly under similar condition. Some teachers are intrinsically motivated while some are extrinsically motivated (Sequeira, 2012).
ii. Subject matter: - The method to be used should reconcile with the content to be taught, this is important because, if the two are not in agreement, little or no success will be achieved.
iii. Available resources: - These include the instructional materials and other facilities needed for effective presentation of the lesson using appropriate teaching method. According to Emaikwu (2012), the decision of a teacher to use a particular method may be influenced by the resources available to him. Teachers are sometimes constrained by the availability of

materials and equipments needed to use a particular teaching method especially in a situation where improvisation is not possible

iv. Time allocated: - Time allocated for the subject on the school time table must be considered in the selected of teaching methods. Raymond (2012) reported that, a teacher who has limited time may want to favour lecture method. Demonstration method for instance is time consuming and may be avoided a by teacher whose time is very limited.

v. Objectives of the teacher: -The choice of teaching method may also be influenced by the teacher's objectives. Edinang (2012) maintained that, what the teacher intends to achieve at the end of the lesson should be in line with method of teaching.

**2.4 Demonstration Method in Teaching Agricultural Education**

The demonstration method is a process used to introduce some specific skills in the course of instruction. This is a method of teaching whereby sight rather than hearing is the major means of communication even though the two are often combined (Olaitan and Agusiobo 1981). The teacher here is able to do some activities while the learners watch. It could involve setting up some apparatus or equipments or showing off a skill. As the name implies, demonstration method is a method of teaching through which, various scientific procedures, processes and phenomenon are shown to the students. Demonstration method refers to the type of teaching method in which the teacher is the principal actor while the students watch with the intention to act later. Here the teacher does whatever the learners are expected to do at the end of the lesson by showing them how to do it and explaining the step-by-step process to them (Ameh, Daniel and Akus, 2006) Demonstration involves showing by reason or proof, explaining or making clear by use of examples or experiments. According to Bulger (2002), demonstration means 'to clearly show'. In teaching through demonstration, students are set up to potentially conceptualize

class materials more effectively as shown in a study which specifically focuses on chemistry demonstrations presented by teachers (Broadbear,2003). Mundi (2006), described it as a display or an exhibition usually done by the teacher while students watch with keen interest. He further added that it involves showing how something works or the steps involved in the process.

Demonstrations often occur when students have a hard time connecting theories to actual practice or when students are unable to understand application of theories. Teachers not only demonstrate specific learning concepts within the classroom, they can also participate in demonstration classrooms to help improve their teaching strategies which may or may not be demonstrative in nature. Although the literature is limited, studies show that, the effects of demonstration on classroom teachers include a change of perspective in relating to students, reflection in the teachers' own classroom strategies and more personal responsibility for students' learning. According to Mamudu (2009), demonstration strategy involves the teacher showing learners how to do something such as how to use a sprayer, different planting methods and fertilizer application He added that, demonstration method allows the teacher to show the result that can be obtained by experimenting with plants, animals and other materials.

Adekoya (2011) explained that, demonstration method is used to show learners how something works. He also added that, demonstrations are useful because, they provide concrete reference for objects or events in agriculture. Nowak, Walt and Walther (2004) (as cited in Abdulhamid 2013) articulated this position and present evidence that demonstration method is generally effective in teaching sciences, mathematics and mechanics as well as subject areas within vocational and technical education. Demonstration method is important in teaching agricultural science because, it is the teaching method that allows the teacher to carryout out certain task step-by-step in the presence of the learners with the view of either showing them

how to do it themselves or demonstrating a principle. According to Grady (2013), demonstration is an effective instructional technique that enhances motivation of students by teachers of agriculture. It helps to motivate students when carried out by skilled teachers and it is good in showing the appropriate way of doing things. Demonstration method usually involves the use of almost all the sense organ in the processes of carrying out demonstration. It usually requires time, skill and some expenses for its effective organization. However its effectiveness may be hampered by large class, insufficient apparatus to go round the students and lack of adequate preparations on the side of the teacher. According to Olaitan (1981) demonstration is of two major forms: method demonstration and result demonstration.

### 2.4.1 Method Demonstration

This method of teaching is used to teach a skill, it teaches how the event or phenomenon is carried out. It involves showing students how to carry out a practice or how to use certain materials. In this form of demonstration, students are taught a particular skill, including the techniques and procedures involved in carrying out such skill. The teacher demonstrates the skill in the present of the learners and then the learners will be asked to perform the same tasks. The aim of method demonstration is to teach students how to carry out certain task effectively and independently. Examples of method demonstrations include how to use a sprayer, different methods of planting, different methods of fertilizer application, seed treatment, and different methods of pest and disease control (Adekoya, 2011).

### 2.4.2 Result Demonstration

The essence of result demonstration is to show the end product of a new practice and to show that, the new practice is visible. According to Mills (1990) result demonstration is very

useful as it justifies the reason for performing certain tasks or embarking on a new principle. It shows the result of a certain practice (Lambros, 2002). Result demonstration teaches the outcome of doing something in a certain way. It is used to convince learners that, the new practice is viable and profitable. For instance, after teaching students how to apply fertilizer using a particular method (method demonstration) observing the change in crop yield or increase in crop growth as a result of the fertilizer applied is a result demonstration. Result demonstration is showing the outcomes of method demonstration.

### 2.4.3 Procedure for Effective Demonstration

In using demonstration method the teacher shows how to operate, manipulate equipment or an object while the class observes. According to Busari (2004), effective demonstration method can be achieved by doing the following:

- Organize the demonstration to make it visible to all students.
- Attempt to carry out the demonstration before the lesson begins.
- Avoid having too much demonstration in a lesson as not to confuse the students.
- Be systematic, that is performing the demonstration in a scientific manner.
- Attempt to time each demonstration and space it to enable the students grab the message, and time available for everyone the class.

The techniques for imparting skills using demonstration are presented in steps rather than activities (Ebrahimi, 2010). Before, during and after, the demonstrator must be skilled, the place must be quiet, allow some questions and must be knowledgeable. He must make sure that the materials to be used are available. Preparation of questions to help students focus, analysis of trends, pattern must not be interrupted by unnecessary noise. State the reason for precaution so that students will understand the need for compliance and training yourself to be patient is a

must. Taking notes are allowed. Hatim (2011) opined that, while observing, the observers must be motivated and the demonstrator must be flexible about on-the-spot revisions. Short test or oral evaluation should be conducted at the end of the demonstration.

### 2.4.4 Advantages of Demonstration Method

According to Sequeira (2012), demonstration method has the following advantages. It is possible to instruct a reasonable number of learners in basic skill of agriculture. At one time, people can see, hear, discuss and participate in the demonstration. Demonstration results in much more complete learning than passively listening to a talk even if illustrations are used to support it. If properly carried out demonstration can generate a great deal of interest and enthusiasm for a practice as well as providing the skill subjects. In demonstration method, students carry out their work according to their abilities, their own time and in the atmosphere of civics room. Students can work independently at their own choice period. There is the room for finding out things themselves and self education is a real education and self knowledge is a real knowledge. It develops desire for learning thus they become real discoverers of knowledge. Students are trained in planning their work independently. It brings changes in the students' attitudes to learning.

Achounye (2002) identified the following as some advantages of demonstration method as:

- It bridges the gap between the theory and practice.
- It controls he rate of breakages and accidents as students watch the teacher do it before attempting to do the same.
- It is learning by doing method and so enables the teacher to teach manipulative and operational skills.

- It could be a time and material saving device because many students can observe one demonstration at the same time.

Uhumuavbi and Mamudu(2009) found that demonstration strategy of teaching is sensitive to gender. They reported that exposing students to demonstration strategy yielded a better performance for male students than their female counterparts. It is therefore necessary to verify such claims. In this study, gender is one of the moderating variables because it is important to find out if the treatments are truly sensitive to gender.

### 2.4.5 Disadvantages of Demonstration Method

Both method and result demonstration have some disadvantages. The disadvantages of demonstration method in teaching agricultural science include: If there are too many participants, some of them may be unable to hear and see clearly what is being demonstrated and may adopt wrong techniques (James 1996). Many people may not be able to practice the skill demonstrated adequately due to shortage of time or facilities (Adekoya, 2011). According to Sequira (2012) demonstration method is not effective when the number of students is too large. Since the teacher performs the task in his own pace, many students cannot comprehend the concept being clarified. This method, students may a times fail to observe the skill because, they observed it from distance. It is difficult to evidence the students understanding. This is so more especially since it addresses psychomotor more than cognitive domain. If attention is not given to verbal explanation of the underlying principles, it may make learning more difficult.

### 2.4.6 Roles of Learners in Demonstration method

The roles of students in demonstration method according to Makama, 2005, are;

- Observes the demonstration step-by-step as presented by the teacher
- Helps in putting on the demonstration

- Co-demonstrates with the teacher
- Challenges information presented by the teacher to stimulate learning
- Organizes facts, perception, proceeding and skill presented in the course of demonstration
- Assimilates facts, procedure or process and skill presented by the teacher in a sequence that it will bring about the desirable changes that was the target of the teacher

### 2.4.7 Roles of teachers in Demonstration Method

The role of teachers in demonstration method according to Makama, (2005) includes;

- Perform the skill to be learned
- Interpret the materials or activity being demonstrated
- Sets the standard for the performance
- Challenges students through questions
- Assists students to perform the activity
- Communicates ideas, principle facts and knowledge required by the students to understand and adopt the skill
- Organizes information, sequence of operation or materials for presentation.

### 2.4.8 Qualities of Demonstration method

Using demonstration methods, teachers should ensure learners observe correct procedures the first time they are trying a new task. The most effective learning results when trainees use a skill immediately after they are taught, hence teachers should teach the students to practice the skill thereafter. It is also essential to teach learners the safety precaution just before teaching the point in the demonstration where it is applicable. Teacher should state the reason for the precaution so that the trainee will understand the need for compliance.

It is also essential that all participants must be well prepared before the instruction. As a teacher, using demonstration requires being patient; this is because the learners are not all operating at the same levels. There are slow learners and fast learners in the class, then carrying everybody along makes demonstration method one of the regularly adopted methods in teaching skill. It involves taking every task step by step using exact physical procedure if possible. It is also essential to plan the demonstration so as to ensure that steps are in proper sequence and to include all steps. It is also essential to ensure all learners are carried along. In case they did not understand a certain step, it becomes imperative that the teacher must repeat the step. Meanwhile it is always good to summarize the lesson on completion to emphasize steps and main points so as to remind and reinforce the learners.

According to Aliyu, (2000) demonstration method should be short and preferably taken step by step or in series of closely related tasks. Students should be given easy access to see demonstration being carried out. He further stated that tasks that are complex should be broken into bits and should be performed slowly and if need be should be repeated. Emphasis on correct form should precede emphasis on speed and accuracy. The procedure should be made meaningful and interesting to the students so as to encourage them to repeat the task if possible, outside the class.

### 2.5 Discovery Method in Teaching Agricultural Education

According to Burner, (1961) is in essence a matter of rearranging or transforming evidence in such a way that one is enabled to go beyond the evidence and re-assemble additional new knowledge. Bruner (1960) further stressed that the word discovery means finding out. It is therefore a process through which students find out facts or knowledge through the understanding of concepts. By the definition, discovery implies “induction”. By it, students

proceed from specific example (percepts) to concepts and from concepts to a generalization or principle. Mandarin, and Preckel, (2009) stated that there three basic words that are paramount in discovery method; they are precepts, concept and generalization. However, concepts formation is the dominant activity in the method because it is the difference between the method and inquiry method, discovery and inquiry methods are interrelated.Mandrin, (2009), therefore discovery learning is an inquiry-based approach in which students are given a question to answer, a problem to solve or a set of observations to explain, and then work in a largely self-directed manner to complete their assigned task and draw appropriate inferences from the outcomes. Mfon, Effiong and Udo,(2011) further buttressed that discovering the desired factual and conceptual knowledge in the process is the purest form of this method where teachers set the problems and provide feedback on the student's effort but do not direct or guide those efforts. This method is rarely used in higher education, among other reasons because instructors who hear about it fear, probably with good cause that they would only be able to cover a small fraction of their prescribed content if students were required to discover everything for themselves. The only way to counter this fear would be to present solid evidence that discovery learning produces improved learning outcomes without requiring a major sacrifice of content.

Maikano,(2010) buttressed that discovery approach is a method which offers learners the opportunity to discover scientific facts, concepts and principles for themselves rather than being told. It allows learners the opportunity to discover and learn science. Discovery approach is one of the instructional strategies used in effective teaching of agricultural science. (Smith, Wardlow and Johnson,2001, Hornby,2002, Lee, 2002) reported that in discovery method of teaching, the learners find out by themselves the new knowledge and understanding they need; they discover new ways of doing things , they develop skills of their own. The learners are watched carefully

by the instructors or teachers to see whether they are active in their own learning or not. They offer their work to the teacher after they conclude for evaluation. Mandrin et-al (2009) said, we do not need to tell or show our students/ learners everything; they can find out for themselves, even the non-literate learners, and they must be given the opportunity to experiment themselves. In discovery method, learners find out by themselves the new knowledge and understanding they need, they discover new ways of doing things, the develop skills of their own. The learners, watch their instructors carefully, they are active in their own learning. They offer their work to the teacher for evaluation. They try things out, cautiously at first and then with growing confidence. Such methods will enable the learners to become independent, to continue their learning out of the class and eventually to continue learning on their own when the experiment session is over, (Mirasi, Osodo and Kibirige 2013).

The role of the teacher here is different; they may set the task to be done and, direct the discovery process. They may need to assess it - not in a negative sense ("this is wrong") but in a positive sense ("this is a good effort but now let's see if we can do/make it better" etc). The job of the teacher is to encourage the student learners, to help them to learn, not to make them feel that they are failures. With this progress, the teacher must build up their (students) confidence, so that learning becomes permanent and retentive.

### 2.5.1 Enhanced Discovery Learning

McCarthy, (2005) describes enhanced discovery learning as a process that involves preparing the learner for the discovery learning task by providing the necessary knowledge needed to successfully complete the said task. In this approach, the teacher not only provides the necessary knowledge required to complete the task, but also provides assistance during the task. This preparation of the learner and assistance may require some direct instructions. "For

example, before asking the students to consider how best to stretch the hamstring muscle in cold weather, the teacher might present a series of lesson that clarify basic facts about muscles and their reaction to changes in temperature" (McCarthy,2005). Another aspect of enhanced discovery learning is allowing the learner to generate ideas about a topic along the way and then having students explain their thinking, (McCarthy,2005). He further emphasized that a teacher who ask the students to generate their own strategy for solving a problem may be provided with examples on how to solve similar problems ahead of the discovery task.

### 2.5.2 Roles of Teachers in Discovery Method

The role of teachers in teaching with discovery method according to Aliyu (2000), Makama (2005) UBEB (2008) and Mfon (2011) are as follows:

(i) Teacher should explain the task to the students and guide them especially if the problem emanated from the teachers' source. Even when the problem to be solved emanated from the students, it is still the duty of the teacher to describe and explain how to go about it to them.

(i) Teachers should also point out the different methods or stages that are to be used in solving the problems during the discovery exercise.

(ii) He should be an assistance to the learner for showing them direction to follow in order to lead them to a logical conclusion

(iii) He supervises the learners as they solve the problems in discovering new things

(iv) It is also the duty of teacher to provide a very good conducive environment for the learners to carry out their study effectively.

(v) Teacher provides all learning equipment and ensure that they are in good condition and available for teaching and learning.

(vi) Teacher helps the students to collect and weigh evidence(s) on the basis of the result obtained.

(vii) Teacher guides the learners in drawing conclusion and making generalization.

(viii) He should also provide additional problems of a similar nature to test the conclusion reached by the learner.

### 2.5.3 Roles of Learners in Discovery Method

On the roles of learners in discovery method of teaching Aliyu (2000), Makama (2005), UBEB (2008) and Mfon (2011) suggested that; learners should be engaged in the following:

(i) Listening to the teachers guide and explanation of the problem clearly in their mind as well as restating the problem in their own words

(ii) They are to formulate the objectives of the problems themselves in their own words

(iii) They can formulate the objectives of the task as to guide their work

(iv) After learning, the teacher describes the plans that will be used in solving the problems identified and the steps to be followed in order not to deviate from the planned problems

(v) They solve the problems themselves as directed and guided by the teacher

(vi) Then learners observe results, collect data and weigh the evidence.

(vii) Recording their observations or results so as to enable them draw inference (s) from the observation and none generalizing their results and the information they have already learned.

### 2.5.4 Criticism of Pure Discovery Learning

Several groups of educators have found evidence that pure discovery learning is less effective as an instructional strategy for novices, than more direct forms of instructions (Tuovinen and Sweller 1999). While discovery learning is very popular, it is often used inappropriately, to teach novices (Kirschner*et al.,* 2006). People can "learn by doing." A debate in the instructional community now questions the effectiveness of this model of instruction Kirschner*et al.,* (2006), suggested that students are more likely to remember concepts if they discover them on their own. This is as opposed to those they were taught directly. However, Kirschner*et-al.,* (2006) report there is little empirical evidence to support discovery learning. They further suggested that fifty years of empirical data does not support those using these unguided methods of instruction.

Debates about instructional strategies (like direct instruction and discovery learning) are driven by research and empirical studies that can be found in the literature. Mayer (2004) proposes that interest in discovery learning has waxed and waned since the 1960s. In each case the empirical literature has shown that the use of pure discovery methods is not suggested, yet time and time again researchers have renamed their instructional methods only to be discredited again. Mayer asked the question "Should There Be a Three-Strike Rule against Pure Discovery Learning?" While discovery for one's self may be an engaging form of learning, it may also be frustrating. Mayer's critique is not the only one; other well known authors have begun to question the efficacy of this form of instruction (Kirschner*et al* 2006; Tuovinen and Sweller 1999).

The main idea behind these critiques is that learners need guidance (Kirschner*et al* 2006), later as they gain confidence and become competent then they may learn though discovery.

Therefore, the effectiveness of the two methods (expository and discovery) would be measured based on experimental basis so as to ascertain and discover the most appropriate method that would suit the teaching/learning of senior secondary school students for better academic performance and retention in Kaduna state.

### 2.5.5 Effects of Discovery Learning on the Cognitive Load

Research has been conducted over years by Mayer, (2001) andKirschner, Sweller, and Clark (2006) to prove the unfavourable effects of discovery learning, specifically with beginning learners. Cognitive load theory suggests that the free exploration of a highly complex environment may generate a heavy working memory load that is detrimental to learning (Kirschner, et-al., 2006). Beginning learners do not have the necessary skills to integrate the new information with information they have learned in the past. A better alternative to discovery learning is guided instruction. Guided instruction produces immediate recall of facts longer and develops problem solving skills.

## 2.6 Effectiveness of Agricultural Education Teaching Methods

Aliyu, (2000) asserts that agricultural science teacher's effectiveness in relation to student's achievement in acquiring a particular knowledge or performance is largely measured by students and this could only be achieved through good teaching methodology. For a teaching to be good, it could be determined by how the teacher establishes classroom climate, the though levels the teacher solicits and displays the logical operation he/she employs, the pedagogical moves the teacher uses; and many other aspects of the teaching act. Agricultural science teaching effectiveness depends upon the interaction between the instructor's subject – matter knowledge and teaching (pedagogical) ability (Bulger, Morh and Walls 2002). This indicates that

it is impossible to be an effective agricultural science teacher without being competent in both subject matter knowledge and teaching methods' ability. Consequently, subject-matter knowledge remains a necessary prerequisite for effective agricultural science teaching but not the sole determinant, that is, both subjects –matter knowledge and knowledge of the methodology which leads to effective teaching.

Furthermore, according to Nageswari, et al., (2004) students learn more when they are involved actually in learning than when they are passive recipients of instruction. Berk, (2005) further said that measuring agricultural science teaching effectiveness is important because the evidence produced is used for major decisions about the future in the students' academic performance. Therefore, agricultural science teaching method effectiveness is the extent to which the teaching activity fulfils its intended purposes functions and goals. They further stressed that there are two forms of decisions which are: formative and summative. The formative decision uses the evidence to and shape the quality of teaching and the summative decision is that which uses the evidence to "sum up" overall performance or status to decide about annual merit, pay and promotion terms. The formative involves decision to improve teaching while summative consists of personal decision, (Jahangiri, Mucciolo, Choi and Spielman 2008).

Janhangiri*et-al* (2008) said teaching invariably involves interaction with students; therefore, a huge emphasis should be given to students' evaluation, rating, feedback and academic performance in testing for the effectiveness of the teaching methods in agricultural science. However, effective method of teaching agricultural science takes into account the fact that students learn in different ways. The more involved they are with each other and the learning process, the better they learn.

### 2.6.1 Agricultural Education Teaching Style

The style adopted by an agricultural educator in the process of imparting knowledge to a student depends on his/her performance. Felder (2004) opines that agricultural science teaching styles are a combination of teaching methods and techniques that a teacher performs in his/her teaching. Some focus on principles and other on applications, some emphasize memory and others understanding. This implies that teaching styles vary from one teacher to another. Berk (2005) derived twelve strategies to measure effective teaching of agricultural science which may include: student rating, peer rating, teaching evaluation, videos, student interviews, alumni rating, employer ratings, administrator ratings, teaching scholarship, teaching award, learning outcome measurement and teaching portfolios. Mishra (2007) justifies that studies of agricultural science teaching and learning methodology have led to classification of teaching styles into three general categories: discipline centered, instructors-centered and students – centered.

Agricultural science teaching styles and effective teaching has become so clear that is very crucial to the realization of the objectives of the teaching and learning process. The issue of effective teaching is a concern to a lot of authors and they have come up with a number of ideas about it.

### 2.6.2 Characteristics of a Good Agricultural Education Teacher

Mishra, (2007) have identified some characteristics of a good agricultural science teaching that may be observed by the students includes: teachers' enthusiasm and passion for the subject, rapport between a teacher and the students or group of students during decision in and out of classroom, intellectual challenges from a teacher, clarity and organization in presenting analytical and conceptual understanding of ideas and a teacher scholarship and so on.

### 2.6.3 Who is an Agricultural education Teacher?

NTI, (2000) said an Agricultural Science teacher is the third tripod on which learning rests including any practical and experimental endeavour in teaching and learning of agricultural activities in both the classroom and school farm. A modern agricultural education teacher is a teacher that creates the necessary conditions that will make learning meaningful and pleasurable. He also helps the learner to develop the capacity to inquire into things and search for new ideas and approaches to the problems of life. Similarly, Ayatse (2006) said, an agricultural education teacher is the mediator in learning and teaching and can be carried out by a single individual who takes care of a group of learners (individual teaching) or by more than one teacher that specialize in different fields.

## 2.7 Students' Academic Performance

All students are required to maintain a satisfactory academic record and meet the obligations of the course in which they are enrolled. Failure to do so will be dealt with as the school and its designated boards shall determine. In educational institutions, success is measured by academic performance or how well a student meets standards set out by local government and the institution itself. Although education is not the only road to success in the working world, much effort is made to identify, evaluate, track and encourage the progress of students in schools (Oludipe*et al.,* 2009). Parents care about their child's academic performance because, they believe good academic results will provide more career choices and job security.

Generally, performance refers to an accomplishment of a given task measured against preset known standards of accuracy, completeness, and speed. Edinyang (2012) defined academic performance as the outcome of education which reveals the extent to which a student,

teacher or institution has achieved educational goals. Students' academic performance refers to students' achievement in the topic being taught based on the stated objectives (Catherine, 2013). (Avoseh 1985 in Dahiru, Shamin, Lukwago 2014) noted that academic performance is how well an individual has done his cognitive tasks. The author explains further that it is the general ability of students concerning their offered subjects compared to a specified standard called Pass Marks'. To him, this pass mark is relative and can be arbitrarily defined as 40% or 50%.

According to Aremuand Adika, (2001) it is referred to as the criterion of excellence. The term as well means the attainment of success of a student in his school work among his classmates**.** 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.

Academic performance is how well a student is accomplishing his or her tasks and studies, but there are quite a number of facts that determine the level and quality of student academic performance in teaching and learning agricultural science. (Epunem 1999) viewed academic performance as a process where a student's success in school is measured to determine how they stand up with others in the same areas. Epunem further stressed that poor performance is caused by some factors such as low motivation, psychological problems, poor diet, and insufficient skills. Tomporouski, *et al.* (2008) are of the opinion that academic performance is the outcome of education, the extent to which students, teachers or institutions has achieved their educational goals. They further stressed that academic performance is commonly measured by examinations or continuous assessment, but there is no general agreement on how it is best tested or which aspects are the most important procedural knowledge such as skills or declarative knowledge such as facts. Vonstumni*et al.* (2011) opines that individual differences influencing academic performance, individual intelligence and the personality of student influence their academic

performance. They further emphasized that students with higher mental ability grab faster than those with low mental ability in the classroom when academic performance are being measured.Therefore, Academic performance refers to the learning outcomes of an individual with the knowledge skills and ideas acquired and retained through their course of study within and outside the classroom situation.

Some factors affecting students' academic performance according to NTI (2000), Usman 2000, Ayatse (2006), Magnuson and Katherine (2007), James (2007), Bossart, Doumen, Buyse and Verschueren (2011) and Harrison (2011) justified the following as some of the various factors that may affect the academic performance of students viz:

(i) Family structure: This is one of the factors that affect the academic performance of students in secondary schools, it affects them in a lot of ways such as lack of appropriate role model especially for males Magnuson, *et-al*, (2007) said "the nature of parent – child relationships in families may cause emotional and behavioural problems for the child" and (Bossart*et al.,* 2011) also said that "the influence of family structure has been found to be only weakly associated with educational attainment". Parents have less time to spend with their children in supervising their school work and maintaining appropriate levels of discipline and there are increased responsibilities to children such as children roles in domestic duties which impede the time available for school work and these are mostly common with extended family.

(ii) Types of school: The type of school a child attends is very important in influencing educational outcomes. A research in the "US" has found that socio – economic status influences educational attainment Magnuson *et al.* (2007) said "students from

independent private schools are also more likely to achieve higher end of school scores." Studies have shown and found out that students that attend private schools are academically sound than students from public schools because they have good qualified teachers, good infrastructures and conducive environment in the school, although these factors are indirectly linked to the effect of socio – economic status on the academic performance of the students.

(iii) Truancy: This is related to poor educational performances, it is a high level of unexplained absence among students, and truancy can be seen both as an educational outcome and as casual factors in explaining educational performance and indiscipline in students to his colleagues prefects and the teachers in the school (Bossart*et al.,* 2011). Usman (2000) and Harrison (2011) justifies that truancy has been found to be associated with students from middle and high socio - economic status due to nonchalant attitude on the part of the parents towards the academic performances of their children.

(iv) Background of the learner: students come to school from different backgrounds. Some come from come from poor while others from rich family. There are also those whose parents are illiterate while others have parents who are educated. In the same manner, children have parents who are civil servants or who work in non-governmental establishments and we also have those whose parents are self employed. Whichever category that the child belongs to, he brings with him to formal schooling a way of functioning which carries the imprint of his upbringing at home, (NTI 2000, Ayatse 2006)

(v) Social position of parents: NTI (2000) and James (2007) stress that there are 3 levels of parent's socio – economic status they are the high class level, middle class level and low class level. They further stressed that "social background remains one of the major sources of educational inequality" in other words educational success depends very strongly on the socio – economic status of one's parents. The social position of parents affects the academic performances of students in the sense that students from high and middle class level take education for granted and they are not serious with their academic because they felt that their parents are rich and wealthy so they don't need to work hard while students from low class level work hard to have good academic performance so that they will have high standards of living in the future.

(vi) Environment: Onu (2007) emphasizes that, the environment in which students live or are brought up also influence their academic performance, it should be noted however that some students from low social – economic background may be higher academic achievers while others from high social – economic background may be low achievers because some of them abuse the opportunities. It is believed that what a child eats, how and where he lives greatly affect his physical development, a child's success or failure to a considerable extent may depend on the type of environment he/she lives.

(vii) Obeka (2009) asserted that educational background of parents: influence and affect the academic performance of students in other words students whose parents have high educational standards perform very well because their parents were more concern and conscious about their children academic performance since they have gone through these process, they also encourage and motivate them to work very hard so that they can emulate them and even have higher educational standard than them. They also create

time to check their books and provide additional help to them through extra moral lessons while students from low or non – educational background might not know the effect of it, in some instances those with low educational background might encourage their children in that they misused their opportunity during their own time and will not want that to happen to their children.

(viii) Influence of peer group: students exercise a great deal of influence on themselves. The influence is felt both inside and outside the classroom. One known fact about children is that they desire to conform to behaviours that are defined by particular groups. The desire often takes the form of wishing to take part in class activities so that children can win the approval of their parents and teachers. They may also work towards impressing their classmates so that they can win approval for their behaviour within and outside the classroom which may give birth to anti-social behaviour like smoking cigarettes, drinking alcohol, fornications, homosexuality, lesbianism, criminal activities( stealing, cheating, pick pocketing to mention but few, (NTI 2000, Ayatse 2006, and Obeka 2009)

Age of the learner: Swiss psychologist, Piaget and others interested in learning have said a lot concerning the age of learning. They said learning proceeds in stages, which oftentimes coincides with the level of maturity and development of the individual learner. For instance, it has been shown that before the age of six, children learn mainly through play and engaging in the kinds of activities which encourages exploration of the environment. The younger a child is, the more difficult it is for him to solve a problem which involves words alone. Therefore, age of the learner influence the academic performance of the learner in different stages of learning, (NTI 2000 and Ayatse 2006)

### 2.7.1 Relationship between Teaching Methods and Students' Academic Performance

Engagement in meaningful learning is a universal theme, advanced in literature on students' academic performance. Students academic gain and learning performance is affected by numerous factors, including gender, age, teaching faculty, students schooling, father/guardian economic status, residential area of students medium of instruction in schools daily study hours and accommodation as day or boarding students. There is a strong relationship between the teaching methods and student academic performance in secondary schools. According to Oghenevwede (2009), among the factors that affect students' achievement of stated objectives is the inappropriate and uninspiring teaching approaches adopted by the teacher. Emaikwu (2012) stressed that, the fall in standard of performance at post primary level is in controversially attributable to pedagogical approaches adopted by the teacher in school. . In a related study, Sequeira (2012) reported that, children learning outcome and educational performance are strongly affected by the methodology adopted by the teacher. Abdulhamid (2013) maintained that, what students learn is greatly influenced by how they are taught.

## 2.8 Empirical Studies

Studies on teaching methods and students' academic performance have now received a major attention in educational researches. Researches that contributed to the study of teaching methods and students academic performance include:

James and Edward (1996) conducted a study on "effects of teaching approach on problem solving ability of agricultural education students with varying learning styles". The work presented empirical evidence on the relationship between teaching method and students' academic performance. As a guide to the researcher, two (2) specific objectives, two (2) research questions and two (2) null hypotheses were stated. The study was conducted using quasi-

experimental design. The researcher used all the 1996 Illinois secondary agricultural education students. A sample of 16 classes and 258 students taught by six (6) teachers were selected using random sampling technique. Data were analyzed using multivariate analyses of covariance (MANCOVA). The researcher concluded that, the problem solving approach is more effective than the subject matter approach in increasing the problem solving ability of students. The research work is similar to the present research in the aspect of population, research design and sampling techniques, but differs in data analysis procedure because the past researcher used MANCOVA while descriptive statistics (mean and standard deviation) and t-test were used for data analysis by the current researcher. The research work contributed immensely to the present research study as it guided the researcher on literature reviewed.

Mamudu and Uhumuavbi, (2010) also conducted a research on "relative effects of programmed instruction and demonstration methods on students' academic performance in science". The work investigated the effects of two teaching methods (programmed instruction and demonstration) on students' academic performance. Three (3) specific objectives, three (3) research questions and three (3) null hypotheses were formulated to guide the researcher. The research design used was quasi-experimental research design. The population of the study consisted of all the senior secondary school students offering Agricultural Science in Esan Local Government Area of Edo State. The total number of 5,352 SSII students was used. Sample for the study consisted of 100 students, 50 male and 50 female. Samples were selected using random sampling techniques. Data were analyzed using t-test statistics at 0.05 level of significance. Result indicated that, the level of academic performance of students exposed to programmed instruction strategy is significantly higher than academic achievement of students exposed to demonstration learning strategy. The work is similar to the present research in design, data

analysis, but differs from the current research in the number of specific objectives, number of research questions and number of null hypotheses. The research work helped the researcher in the method of data collection and analysis.

Oghenevwede, (2010) also conducted a research study on "effects of discovery and inquiry approaches in teaching and learning of biology on secondary school students' performance". The researcher compared the effects of discovery and inquiry approaches on students' performance in biology in senior secondary schools. Four (4) null hypotheses were formulated to guide the research. The study design was quasi experimental design. All senior secondary school two (SS II) students offering agricultural science in the 284 secondary schools in Central Senatorial District of Delta State formed the population for the study. A sample of 150 SS II students was selected using random sampling technique. The researcher used 50-item achievement test instrument for the study. Data were analyzed using analysis of covariance (ANCOVA) at 0.05 level of significance. The researcher found among other things that, the discovery method is more effective and superior to inquiry method in improving students' performance. The researcher also concluded that, there was no significant interaction effect between instructional method and sex on achievement. This study is similar to the ongoing research work with regards to design, but differs from the present research in population, sampling and data analysis as t-test will be used in the current research instead of ANCOVA.

Adekoya and Olatoye, (2011) conducted study on "effects of demonstration, peer-tutoring and lecture teaching strategies on senior school students' achievement in an aspect of agricultural science". The researcher compared the effects of three teaching methods (demonstration, peer-tutoring and lecture methods) on student' achievement in an aspect of agricultural science. Seven (7) null hypotheses were formulated to guide the research. The

design used was 3x2x2 pre-test, post-test experimental design. All the 2011 senior secondary school two (SSII) agricultural science students in Ijebu-Ode Local Government Area of Ogun State formed the population of the study. A sample of 52 students was selected from each school using random sampling. Teaching manual on pasture and range and self-concept questionnaire was used as the instrument for the study. Data were analyzed using analysis of covariance (ANCOVA) at 0.05 level of significance. The researcher concluded that, demonstration strategy brought about the most significant changes in the achievement of students as against peer-tutoring and lecture methods. The study is similar to the ongoing research in the data collection but different in data analysis techniques. The past researcher used ANCOVA, while t-test was used in the current study. However, the study failed to compare the performance of male and female students under each method which the current research intends to do.

Emaikwu, (2012) also conducted a research on "assessing the relative effectiveness of three teaching methods in the measurement of students' achievement in mathematics". The researcher compared lecture, activity and discussion methods on students' achievement. Two (2) research questions and two (2) null hypotheses were formulated to guide the research. Quasi experimental design was used for the research. The population of the study comprised of the 2011/2012 students in SS3 studying mathematics in all the secondary schools in Ogbadibo Local Government area of Benue State. The researcher used a sample of 150 students from 3 schools drawn using purposive sampling technique. Multiple choice tests consisting of 30-item cognitive achievement test in mathematics (CATM) was used as instrument. The t-test statistics and analysis of variance (ANOVA) were used for data analysis. The researcher found that, mean score of students was higher in activity method, than in other methods. The researcher therefore concluded that, activity method is more effective in teaching mathematics than discussion and

lecture methods. This work is similar to the current work in design, sampling and data analysis, but different in population because the current research population is NCE II students of agricultural education department in colleges of education sampled

Edinyang, (2012) conducted a research on "relative effectiveness of inquiry and expository methods of teaching social Studies on academic performance of Secondary school students in AkwaIbom State". The researcher investigated the relative effectiveness of inquiry and expository methods on students' academic performance in social studies in secondary schools in AkwaIbom State. Four (4) specific objectives, four (4) research questions and four (4) null hypotheses were formulated to guide the research. The design used was quasi-experimental design. A population of 15,200 JSS II students offering social studies in AkwaIbom was used for the study. A sample of 300 JSS II students was selected using random sampling technique. Data were analysis using t-test statistics. The researcher found that, students performed better in inquiry method than in expository approach. The researcher concluded that, learning of social studies is more effective with inquiry method. This work is similar to the present research in design, instrument for data collection, and procedure for data analysis but differs from the present research in population and sampling.

Daluba, (2013) also conducted a research on "effect of demonstration method of teaching on students' achievement in agricultural Science". The researcher investigated the effects of demonstration method on students' achievement in agricultural science in Kogi State. To guide the researcher, two research questions and two null hypotheses were formulated for the study. The researcher used quasi experimental design. The population of the study was 18, 225 students of 195 secondary schools in Kogi State. A sample of 480 SS II students were selected using random sampling techniques. A, 30-items Agricultural Science Achievement Test (ASAT) was

used as instrument. Data were analyzed using analysis of covariance (ANCOVA) at 0.05 level of significance. The researcher found that, students performed better in demonstration method than in conventional lecture method. The researcher also concluded that, demonstrated method is effective in teaching agricultural science in secondary schools. The researcher also concluded that, demonstrated method is effective in teaching agricultural science in secondary schools. This work is similar to the current research in the design but different in the population, sampling and data analysis techniques as t-test will be used instead of ANCOVA.

Abdulhamid, (2013) conducted a research study on "effects of teaching methods on secondary school students agricultural science performance in Bauchi. The researcher investigated the effects of demonstration and discussion methods secondary school students' performance. To guide the researcher, three (3) research questions and three (3) null hypotheses were formulated. Quasi experimental design was used by the researcher. The population for the study consisted of two secondary schools in Bauchi metropolis. One class from each school was selected by the researcher randomly as sample for the study. A 20- item multiple choice achievement test was used for the study. Data was analyzed using descriptive statistics and t-test statistics at 0.05 level of significance. The researcher found that, demonstration method is more effective than discussion method on students' performance. He therefore concluded that, demonstration method is effective for teaching agricultural science. This research study is similar to the ongoing research wok in research design and data analysis procedure but differs in the sampling, instrument used for data collection. The past researcher used a 20-item multiple choice test while the current researcher used a 40-item multiple choice test for data collection.

## 2.9 Summary of Reviewed Literature

Teaching is the range of professional duties performed by teachers is wide and extensive. At the heart of a teacher's role is the provision of learning for all pupils. Teaching is a complex multifaceted activity often requiring the instructors to juggle multiple tasks and goals simultaneously and flexibly**.** It is a systematic activity deliberately engaged in by somebody to facilitate the learning of a worthwhile knowledge, skills and values by another person and getting the necessary feedback. Teaching methods referred to the general principles, pedagogy and management strategies used for classroom instruction. The choice of teaching method by the teacher depends on what fits the teacher, his educational philosophy, classroom demography, subject area and school mission statement. Teaching methods are the strategies used by the teacher to help students to learn the desired course content and be able to develop achievable goal in the future. Teaching methods are the various means and ways of communicating with the learners in order to inculcate ideas, skills and values that are built within the educational aims and objectives. Academic performance is the outcome of education which reveals the extent to which a student, teacher or institution have achieved their educational goals. Various research works have been conducted regarding teaching methods and their relationship with students' academic performance. These researches were directed to providing the opportunity for classroom teachers to improve their work by employing suitable teaching strategies for each subject. Meeting the goal of effective teaching and better students' understanding and performance and fulfilling the objectives of the curriculum requires careful selection and application of appropriate teaching method.

Having gone through the literature review and previous research works on teaching methods, agricultural science and students' academic performance, the current research intends

to bridge the gap in the area of gender and academic performance with regards to the teaching methods used (demonstration and discovery) which most researchers did not consider.

# CHAPTER THREE

# RESEARCH METHODOLOGY

This chapter describes the methodology used in conducting the study and it is described under the following sub-headings;

3.1 Research Design

3.2 Population of the Study

3.3 Sample and Sampling Techniques

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

The research design adopted for this study was quasi-experimental design using pre test and post test. This design was suitable for this research as it allowed the researcher to collect relevant data on students' academic performance in the two teaching methods (Demonstration and Discovery Methods). this design has been recommended by some researchers who carried out research work on the effect of teaching methods on students' academic performance. Researchers such as James (1996), Mamuda (2009), Oghenevwede (2010), Adekoya (2011), Dluba and Abdulhamid (2013) recommended the use of quasi-experiment to compare students' academic performance under different teaching methods. To apply this design, the researcher gave the students a pretest to determine their equivalence in all relevant aspect of the topic to be taught before exposing

them to the treatment variables (Demonstration and Discovery methods) after which a post-test was given.

### 3.2 Population of the Study

The population for this study comprised of all the1010 NCE IIAgricultural Education students in all the 12 colleges of education in the North-West Zone. There are twelve colleges of education in the northwest geopolitical zone of Nigeria, out of which 5 are federal colleges while the remaining 7 are state owned colleges. The breakdown of population according to the institutions is presented as follows:

**Table 1: Population of the study according to Institution**

| Institution | Male | Female | Total |
|---|---|---|---|
| FCE Zaria | 114 | 20 | 134 |
| KSCOE Gidanwaya | 86 | 20 | 106 |
| FCE(T ) Gusau | * | 89 | 89 |
| COE Maru | 48 | 06 | 54 |
| FCE Kano | 96 | 16 | 112 |
| Saadatu Rumi COE | 82 | 18 | 100 |
| FCE (T) Bichi | 114 | 09 | 123 |
| SSCOE Sokoto | 38 | 11 | 49 |
| AdamuAugieArugungu COE | 32 | 08 | 40 |
| FCE Katsina | 64 | 08 | 72 |
| COE Dutsin ma | 22 | 04 | 26 |
| COE Gumel | 104 | 01 | 105 |
| **Total** | 800 | 210 | 1010 |

### 3.3 Sample Size and Sampling Procedure

Three (3) Colleges of Education (Two Federal and one State colleges) were selected purposely. Federal College of Education, Zaria Federal college of education, Katsina and Kaduna State College of Education GidanWaya ,Kafanchan. NCE 11 Agricultural Education students from each of the colleges were involved in the study. This is in line with Abdulhamid (2013) who stated that, in experimental and quasi-experimental research, any number of sample can be used.

An intact class was used. The distribution of students according to their institutions and gender is presented in Table 2 below.

**Table 2: Sample for the Study**

| Institution | Method | Male | Female | Total |
|---|---|---|---|---|
| FCE Zaria | Demonstration | 114 | 20 | 134 |
| KSCOE G/Waya | Discovery | 86 | 20 | 106 |
| FCE Katsina | Control | 64 | 8 | 72 |
| Total | | 264 | 48 | 312 |

### 3.4 Instrument for Data Collection

The instrument for data collection was a 30-item Agricultural Education Achievement Test (AEAT) which was developed by the researcher. This is in line with the recommendation ofEdiyang (2012), Abdullamid and Daluba (2013) who all adopted same instrument in their studies. The test questions were drawn from livestock management(ruminant and non ruminant). Each of the items had 4 options lettered A-D. The instrument was pilot tested and was adjusted before administration.

#### 3.4.1 Validity of the Instrument

In order to ensure the face validity of the instrument that was used for the study, the researcher presented the instrument to four experts in the agricultural education section in the Department of Vocational and Technical Education, Ahmadu Bello University, Zaria. The adequacy and relevancy of the test items were judged by the experts. The experts were asked to answer the test items and indicate the correct options. Their various answers were compared and taken note of.

### 3.4.2 Pilot Test

The instrument was pilot tested with (30) respondents from Federal College of Education, Pankshin, Plateau State who are not part of the main study. The choice of Plateau State was made for two reasons that; proximity to the researcher's state of residence, and to ensure that the subject of the pilot study was not involved in the main study. This helped the researcher to check the difficulties of the instrument and made necessary adjustment before using it on the population for which the actual research was carried out.

### 3.4.3 Reliability of the Instrument

The reliability of the instrument was determined by subjecting the scores of the test and retest to statistical analysis, the score were analysed using Chronbach'sAlapha. The reliability coefficient calculated for the instrument was 0.81. According to Korb (2012) a reliability coefficient of 0.51 is adequate for an instrument to be reliable. Hence, a reliability coefficient of 0.81 for the study was reliable.

## 3.5 Procedure for Data Collection

Data collection phase lasted for four (4) weeks from 14$^{th}$ may, 2018 to 14$^{th}$ June, 2018. Three (3) groups were formed for the experiment, namely group A, NCE II students of agricultural education department of federal college of education, Zaria (Demonstration method), group B, NCE II students of agricultural education department from Kaduna state college of education, Gidan-waya (discovery method) and group C, NCE II students of agricultural education department from federal college of education, Katsina formed the control group (lecture method). On the first day, (14$^{th}$ may, 2018), the researcher sought the permission of the head of department after presenting her introduction letter and then introduced herself to the

students for 30 minutes. On the next day (15 may, 2018), the researcher administered the pre-test for the treatment group (A). On the following day, (16th may, 2018). Two lesson plans were designed on the topic(classification of sheep and goat and sheep and goat management systems) the researcher introduced students to the treatment variable (demonstration method). Group A were taught a lesson on scientific classification of sheep and goat using demonstration method. The lesson lasted for 2 hours (9am – 11 am). A day interval was given, after which and another lesson was presented on the topic(sheep and goat management systems) using demonstration method still. Two days were allowed for revision after which a post test was administered (on 23th may, 2018).

After a week, the researcher visited COE Gidanwaya, on the first day the researcher presented her introduction letter to the head of department of agricultural education department and with his permission the researcher introduced herself to the students. The next day, the researcher administered the pre-test for group B. A lesson on livestock management was delivered using discovery method, where the researcher gave a task of identifying and describing various indigenous breeds of sheep and goat using diagrams. The lecture lasted for 2 hours after which the researcher evaluated the task presented to the students. Two days were allowed for revision after which the researcher administered a post test. For the third group, the researcher visited federal college of education; Katsina after 2 weeks, on arrival, the researcher introduced herself to the head of department and sought his permission to carry out the experiment. The following day, the researcher introduced herself to the students for some minutes, after which the researcher administered a pre test. The next day, the researcher presented a lesson on livestock management using the conventional lecture method. The lecture lasted for 2 hours. Two days were allowed for revision, and after which a post-test was administered on the same topic.

Therefore, pre-test was taken by the three groups (group A and B and C) but only group A and B were exposed to the treatment variables (Demonstration and discovery method) however, post-test was taken by the three groups (A, B and C). The whole exercise lasted for four (4) weeks. The tests were marked out of40 points and the scores were coded and subjected to analysis.

### 3.6 Procedure for Data Analysis

Simple descriptive statistics (means and standard deviations) were used to answer all the research questions. Data collected were then subjected to t-test statistics to determine students' **academic performance under demonstration and discovery methods.**

The t-test statistics was used to compare the performance of students taught using demonstration and those taught using discovery method. All null hypotheses were tested at 5% level of significance (p=0.05).When t- calculated was greater or equals to t-tabulated (t-cal $\geq$ t-critical), the null hypotheses of no significant difference was rejected but when t-calculated was less than t- tabulated (t-cal $\leq$ t-critical) the null hypotheses of no significant difference was retained (Ozioma, 2011 and Edinyang, 2012).

**Decision Rule**: For the mean, any group among the three groups with the highest mean value was categorized to have performed best. In the test of hypotheses, where the t-calculated value was greater than t- critical value, the null hypotheses was rejected; this implied that there was a significant difference. Whereas, where the t-calculated value was less than the t-critical value, the null hypotheses was retained; this implied that there was significant effect.

# CHAPTER FOUR

# DATA PRESENTATION AND ANALYSIS

This research work is on effectiveness of demonstration and discovery methods in teaching agricultural education in colleges of education in North-west zone, Nigeria. Under this chapter the data collected were analyzed and presented under the following sub-headings:

4.1 Answers to Research Questions

4.2 Test of Null Hypotheses

4.3 Summary of Findings

4.4 Discussions of Findings

## 4.1 Answers to Research Questions

The analysis of data used to answer the three research questions is as presented in Table 3-5

**Research Question One**: What is the academic performance of agricultural education students taught with demonstration method in colleges of education in north-west zone, Nigeria?

**Table 3: Mean and standard deviation of the academic performance of agricultural education students taught with demonstration and lecture methods**

| Method | N | $\bar{x}$ | Std. Dev |
|---|---|---|---|
| Lecture | 72 | 17.71 | 4.42 |
| Demonstration | 134 | 22.10 | 4.21 |

Table 3 shows the effect of demonstration teaching method on academic performance of agricultural education students. The result reveals the mean of 22.10 and standard deviation of 4.42for agricultural education students taught using demonstration method. The agricultural education students that were taught using lecture method had mean of 17.71 and standard deviation of 4.21. From the analysis, those taught with demonstration method had higher mean than those taught using lecture method.

**Research Question Two**: What is the academic performance of agricultural education students taught with discovery method in colleges of education in north-west zone, Nigeria?

**Table4: Mean and standard deviation of the academic performance of agricultural education students in discovery and lecture methods**

| Method | N | $\bar{X}$ | Std. Dev |
|---|---|---|---|
| Lecture | 72 | 17.71 | 4.42 |
| Discovery | 106 | 20.28 | 3.04 |

Result on Table 4 shows the performance of agric education students in lecture and discovery methods. The table revealed that, agric education students performed better in discovery than in the lecture method. The mean score of agric education students in discovery method is 20.28 while the mean score of agric education students in the lecture method was 17.71. This shows that, discovery teaching is more effective in teaching agric education than the conventional lecture method.

**Research Question Three**: What is the academic performance of Agricultural Education students taught with Demonstration and Discovery methods in colleges of education in north-west zone, Nigeria?

**Table 5: Mean and standard deviation of the academic performance of agricultural education students in demonstration and discovery methods**

| Method | N | $\bar{X}$ | Std. Dev |
|---|---|---|---|
| Discovery | 106 | 20.28 | 3.01 |
| Demonstration | 134 | 22.02 | 4.21 |

Table 5 shows the result ofagricultural education students' academic performance in discovery and demonstration methods. The mean score of agric education students in discovery method was 20.28 while the mean score of students in demonstration method was 22.02. This indicated that, students performed better in demonstration method than in discovery method.

This implies that, demonstration method is more effective in teaching agric education courses in colleges of education than discovery method.

**4.2 Test of Null Hypotheses**

Results of test of null hypotheses were presented in Table 6-8

**HO1**: Demonstration method has no significant effects on the academic performance of agricultural education students in colleges of education in north-west zone, Nigeria

**Table 6: t-test analysis showing the effect of demonstration method on academic performance of agricultural education students**

| **Method** | **N** | $\overline{\mathbf{X}}$ | **St. D** | **Df.** | **t-cal** | **t-crit.** | **P** |
|---|---|---|---|---|---|---|---|
| Lecture | 72 | 17.71 | 4.42 | | | | |
| Demonstration | 134 | 22.10 | 4.21 | 204 | 4.86 | 1.96 | .000 |

Table 6 shows the effect of demonstration teaching method on academic performance of agricultural education students. The result reveals the mean of 22.10 and standard deviation of 4.42for agricultural education students taught using demonstration method. The agricultural education students that were taught using with lecture method had mean of 17.71 and standard deviation of 4.21. The t-calculated was 4.86 at .000 significant level. The alpha value of 0.05 was found to be greater than p-value of .000 which indicates that demonstration method has effect on academic performance of agricultural education students. Therefore, the null hypothesis that says demonstration method has no significant effect of academic performance of agricultural education students is rejected and the alternate hypothesis retained.

**HO2**: Discovery method has no significant effects on the academic performance of agricultural education students in colleges of education in north-west zone, Nigeria

**Table 7: t-test analysis showing the effect of discovery method on academic performance of agricultural education students**

| Method | N | $\overline{X}$ | St. D | Df. | t-cal | t-crit. | P |
|---|---|---|---|---|---|---|---|
| Lecture | 72 | 17.71 | 4.42 | | | | |
| Discovery | 106 | 20.28 | 3.04 | 176 | 3.34 | 1.96 | .002 |

Table 7 presents the t-test analysis on the effect of discovery method on the academic performance of agric education students in the northwest colleges of education. The table revealed a t-calculated value of 3.34 and t-critical value of 1.96 at 176 degree of freedom and 0.002 significant level. The alpha value of 0.05 was found to be greater than p-value of .002 which indicates that discovery method has effect on academic performance of agricultural education students. This implies that, discovery method has significant effect on the academic performance of agric education students in Northwest colleges of education. Therefore, the null hypothesis which states that, discovery method has no significant effects on the academic performance of agricultural education students was not retained.

**HO3:** There is no significant difference between the academic performance of agricultural education students taught using demonstration and those taught using discovery method in colleges of education in north-west zone, Nigeria.

**Table 8: t-test analysis showing the difference in the effects of demonstration and discovery methods on academic performance of agricultural education students**

| Method | N | $\overline{X}$ | St. D | Df. | t-cal | t-crit. | P |
|---|---|---|---|---|---|---|---|
| Discovery | 106 | 20.28 | 3.01 | | | | |
| Demonstration | 134 | 22.02 | 4.21 | 238 | 2.65 | 1.96 | .011 |

Table 8 shows the t-test analysis of the difference between the academic performance of agric education students taught using discovery method and those taught using demonstration method. The table revealed that, agricultural education students performed better in demonstration method (x=22.02) than in discovery method (x=20.28). The t-test analysis shows that, t-calculated (2.65) was greater than t-critical (1.96) at 238 degree of freedom and .011 significant level. This shows that, demonstration method is more effective in teaching agricultural education courses in northwest colleges of education than the discovery method. Therefore, the null hypothesis which states that, there is no significant difference between the academic performance of agricultural education students taught using demonstration and those taught using discovery method was rejected.

### 4.3 Summary of Findings

Based on the analyses of the data collected, the following findings were obtained:

1, Demonstration method of teaching improved the academic performance of agricultural education students.

2. Discovery method of teaching improved academic performance of agricultural education students.

3. Demonstration method yielded significantly better results than discovery method of teaching as regards to the academic performance of agricultural education students.

### 4.4 Discussion of Findings

The study revealed that, demonstration method has significant effect on the academic performance of agricultural education students in colleges of education in northwest zone. This was revealed by the findings in Table 3 in which the mean score for students exposed to

demonstration method (22.10) is greater than the mean score for students exposed to the conventional lecture method (17.71). The result of t-test analysis on Table 6 also revealed that demonstration method has significant effect on the academic performance of agricultural education students in colleges of education in northwest zone. This is because; t-calculated (4.86) was greater than the t-critical (1.96) at 5% level of significance (p = 0.000). This finding agreed with what was obtained by Uhumuavbi et al (2009) who found that, demonstration method enhance teaching and learning of agricultural science and promote students performance. Abdulhamid (2010) also reported that, demonstration method has a significant effect on the performance of agricultural science students. This is because, agricultural education is more of practical than theory and demonstration method is a doing method.

Another finding of this study showed that, discovery method is very effective in teaching agricultural education in colleges of education in the northwest zone. Table 4 showed a mean score of students exposed to discovery method (20.28) to be greater than the mean score of student taught with conventional lecture method (17.71). The t-calculated (3.34) on table 7 was also greater than the t-critical (1.96) at 5% level of significance (p =0.002). This therefore revealed that, discovery method has a significant effect on the academic performance of agricultural education students in colleges of education in northwest zone. This finding is in line with the work of Oghenevwede (2010) who found that, discovery method is more effective than inquiry method in teaching biology in secondary schools. Mfon (2011) also reported that, discovery method is an effective teaching method and can be suitable for many subjects especially science based subjects such as agricultural education. This also agreed with the findings of other researchers, Mandrin, *et-al* (2009), whofound that, discovery method has a significant effect on the academic performance of agricultural science students. Mirasi, *et al*.

(2013), also opined that discovery method is very effective in teaching agricultural science and can be used to enhance students' performance.

The study also found that, demonstration method is more effective than discovery method. This finding was presented on Table 5 which showed the means score of students exposed to demonstration method and those exposed to discovery method. The table reveled that, students in demonstration method performed better than those in the discovery method. This is because, the mean score of students exposed to demonstration method (22.02) is greater than the mean score of students exposed to discovery method (20.28). The t-test analysis in Table 8 showed a significant difference between the performance of agricultural science students exposed to demonstration method and those exposed to the discovery method. T-calculated is 2.65 while t-critical is 1.96 which means there is a significant difference. This implies that, demonstration method is more effective in teaching agricultural education courses in colleges of education than discovery method. This finding agrees with that of Adekoya (2011) who found that, demonstration method is significantly more effective than peer-tutoring in teaching agricultural science in secondary schools. Daluba (2013) recommended the use of demonstration method in teaching agricultural science as it allows students the opportunity to observe how things are done step-by-step and then be able to do them independently. Omodara (2012) further suggested that, demonstration method be used in teaching agricultural education since learning is more effective when it is by doing than by just seeing or hearing. This is contrary to the findings ofJohn, (1984) which reported that discovery method was the best method for teaching agricultural science at any level.

# CHAPTER FIVE

## SUMMARY CONCLUSION AND RECOMMENDATIONS

This chapter is presented under the following sub-headings

5.1 Summary

5.2 Contributions to knowledge

5.3 Conclusion

5.4 Recommendations

5.5 Suggestions for Further Study

### 5. 1 Summary

The study was carried out to determine the effectiveness of demonstration and discovery methods in teaching agricultural education in colleges of education in northwest zone of Nigeria. Quasi- experimental design using pre test and post test was adopted for the study. The study had three (3) specific objectives three (3) research questions and three null hypotheses as a guide. The entire 1010 NCE II agricultural education students of the twelve colleges of education in North West zone of Nigeria formed the population for the study. Two colleges were purposively selected for the treatment and one college was used as control. Intact class was used for the experiment. . Data collection phase lasted for four weeks, where pre-test was given before exposing the students to the students to the treatment variables (demonstration and discovery methods). The three colleges were grouped as group A,B and C, federal college of education zaria and Kaduna state college of education were group A and B and were exposed to the treatment variables (demonstration and discovery methods) while federal college of education katsina served as the control group and were exposed to the conventional lecture method only.

In data analysis, mean and standard deviation were used to answer all the research questions, while t-test statistics was used to test all the null hypotheses. All hypotheses were tested at 5% level of significance. The analysis of data used to answer research question one reveled that, students exposed to demonstration method performed better than students exposed to lecture method. The test of null hypothesis also revealed a significant difference in performance between students exposed to demonstration method and those exposed to conventional lecture method, were the t-calculated vales of 4.86 greater the t-critical value of 1.96.

The study also revealed that, discovery method has significant effects on the performance of agricultural education students. In the data analysis used to answer research question two, the result indicated that, students exposed to discovery method perform better than those exposed to conventional lecture method. The test of null hypothesis two also revealed a significant difference in academic performance between students exposed to discovery method and those exposed to conventional lecture method. This is because; t-calculated (3.34) is greater than t-critical (1.96).

Answer to research question three showed that, students taught using demonstration method out performed those taught using discovery. The test of null hypothesis three also showed that, there is a significant difference between the academic performance of agricultural education students taught using demonstration method and those taught using discovery method. This was revealed by the calculated value of t-(2.65) which was greater than t-critical (1.96).

## 5.2 Contributions to Knowledge

The study established that;

1. Demonstration method of teaching significantly enhanced the practical skills of agricultural education students to identify,sort and classifyfeatures of ruminant animals and their body systems (p=0.003)
2. Discovery method of teaching significantly improved the recall ability of agricultural education students to identify and specify various breeds of sheep and goat and classify them scientifically (p=0.001)

## 5.3 Conclusion

Based on the findings of the study, the following conclusions were drawn:-

Demonstration and discovery methods are very effective in teaching agricultural education in colleges of education and can enhance students' academic performance. Demonstration method is more effective than discovery method in teaching agricultural education in colleges of education in northwest zone Nigeria. Both demonstration and discovery methods can be used concurrently to facilitate effective teaching and learning and enhance better performance by learners.

## 5.4 Recommendations

Based on the findings and conclusion of the study, the following recommendations were made by the researcher

1. There is need for curriculum planners to emphasize the importance of using demonstration and discovery methods when teaching agricultural education courses by the teachers in colleges of education

2. Lecturers in colleges of education should be encouraged to use demonstration method in teaching agricultural education as it was found to be more effective than discovery method.

3. There should be provision by the government and private individuals for training and re-training of teachers for them to be effective in their work and carry-out their teaching task more effectively by employing the used of demonstration and discovery methods.

**5.5 Suggestions for Further Study**

a. Similar study can be conducted in other zones of the country( north-east, north central, south-east, south-west and south-south ) to see if similar result will be obtained for proper comparison

b. Further study can be carried out using other methods to see whether there can be any significant difference between the performances of male and female students in other methods.

## REFERENCES


Abdulhamid, A. (2013). Effects of teaching methods on retention of rgricultural Science knowledge in senior secondary schools of Bauchi Local Government Area, Nigeria. International *Journal of Science and Technology*, 4(4), 63-69.

Abimbola, I.O. (2004). *A brief history of teaching. Fundamental Principles and Practice of Instruction*. Ilorin, Nigeria: TundeBabs Printers.

Adah, O.C (2011). An assessment of students' perception of agricultural science as a course of study in secondary schools in Kogi state. *Journal of Vocational and Technical Educators*, 2(1), 14-19

Adedokun, O.M. and Ejeh, L.U. (2011).*Introduction to Statistical Analysis in Geography and Social Sciences*. Zaria: Esonaj Press.

Adekoya, Y.M. &Olatoye, R.A (2011). Effects of Demonstration, Peer-Tutoring and Lecture Teaching Strategies on Senior Secondary School Students' Achievement in an Aspect of agricultural Science. Olabisionabanjo University, Ogun state, Nigeria. *The Pacific Journal of Science and Technology*, 12(1), 320-330.

Adekunle, M.O. (2000).The role of Teaching Practice in Preparation of Social Studies Teachers. *University of Ibadan Multidisciplinary Journal of Education* 2(8),18-27.

Agatha, C.B.N (2002).*Understanding Teaching*. Yola: Paraclete Publishers

Agboola, O.S.&Oloyede, E.O. (2005). effects of project, inquiry and lecture- Demonstration Teaching Methods on Senior Secondary Student Achievement in separation of mixtures practical test. *Journal of Educational Research*. 2(6), 124-132

Ahmed, A.N.(2002). *Preparation and Presentation of Lesson Notes*. Yola: Paraclete publishers.

Ajoma U.C, (2009). Analysis of Methods and Strategies for Teaching and Learning in Business Education: The place of Information and Communication Technology in Nigeria in *Association of Business Educators in Nigeria*(*ABEN*)(19):110-122

Aliyu, M. M(2000), Subject Method for Business Teachers. More hope Nigeria Enterprise Ilorin, Nigeria. Pp 37-47

Agbulu, O.N (2013). The Impact of Participatory and Expository Approaches on Learning of Agricultural Science in Senior Secondary Schools in Benue State, *International Journal of Educational Technology* 16(1).

Ambrose, N.O. (1986).*Administering Education in Nigeria*: *Problems and prospects*. Ibadan, Hinemann Educational Book.

Amos, D. (1987). The potential role of agriculture in science teaching. *Journal of Research in Education*. 4(1), 223-330.

Akinyemi, O.A and Folashade, A.(2010). Constructivist Practices through guided discovery approach: The effect on students cognitive achievement in Nigeria senior sercondary school physics. *Eurasian Journal of Physics and Chemistry Education*, 2(1): 16 25.

Anna L.B., & Neil A.K. (2005). A document analysis of the pedagogical knowledge espoused in Agricultural Teaching Methods courses. Agricultural science students' performance in Buachi metropolis, Nigeria. *Journal of Research in Education and Soceity* 1(1),12-22.

Ayatse, J.Q.I, (2006).keynote Address in :Ochu, A.O (Ed) Education for national growth and stability. Peacemaker, Lagos, Nigeria pp1-2

Baba, I.(2009). Association of Adequacy Technology and Utilization of office Technology for Teaching Tertiary Institutions in Kogi state, *Business Education Journal* 1 (7).

Berk, R.A. (2005).Survey of twelve strategies to measure teaching effectiveness. *International Journal of Teaching and Learning in Higher Education.* 17(1), 48-62. Retrieved May 24, 2014. From http://www.isetl.org/ijtlhe.

Boice, A. (2000). *Teaching methods*. Retrieved May 23, 2014. From http://serc.cartelon.edu/NAGT workshop/teaching-methods/index.html.

Broadbear, J.T. (2003). Essential elements of lesson designed to promote critical thinking. *BritishJournal of scholarship of teaching and learning*. 30(3), 1-8.

Bossert, G. S, Domuen, E. Buyse, K. Verschueren,(2011). "Predicting a Students Achievement after the Transition to first Grade: A two year longitudinal study" *Journal of Applied Developmental Psychology* 32(3) 45- 57

Bruner, J.S.(1961). "The act of discovery". *Harvard Educationl Review* 31 (1):12

Bulger, J., Morh, D.S. & Walls, R.T. (2002). Stack the deck in favour of your students by using the four aces of effective teaching. *Journal of Effective Teaching*.Retrieved May 24,2014 From http:/www.uncw.edu/ctc/et/articles/burger.

Calton, D. (2006). *Using experimental teaching methods*. Retrieved April 12, 2014. From Davidcarltonbacterian.org.

Catherine, W & Brian, E.M. (2013). Socio-scientific issues-based instruction: An investigation of agric Science students' content knowledge, based on student variables. *Journal of Agricultural Education, University of Kansas* 54(3), 140-156.

Christian, C.A, & Joseph O, D. (2007). perception of head agricultural science teachers regarding problems and challenges of vocational agriculture delivery in secondary schools in Delta State, Nigeria. *Electronic Journal Science*, 11(2), 17-28

Clark, R.E., Kirschner, A.P. and Sweller, J (2012). Putting students on the path to learning: the case for fully guided instruction. American educator, 36 (1), pp 8-13

Cynthia, A.S., Carol, A.C & Amber, L.D (2000). The move to agrisceince and its impact on teacher education. *AmericanJournal of Agricultural Educcation* 41 (4), 120-132.

Dahiru, H.A, Shamim, C Lukwago, G (2014) Academic Performance of Students in Science Subject in Secondary Schools in Makindye Division, Kampal District: *internationaljournal of Joga,* 2(1) (doi)10:4103/0973-6131.53860.

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

David, I. Newcomb, L.H. & Robert, J. (2004). *Methods of teaching agriculture*. New Fersu, Prentice Hal, England.

Ebrahimi A.(2006). The comparison between educational methods. *IranianJournal of Media Education*. 9(1), 31-34.

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 AkwaIbom State, Nigeria. *British Journal of Art and Social Sciences*, 8 (1) 95-101.

Emaikwu, S.O. (2012). Assessing the relative effectiveness of three teaching methods in the measurement of students achievement in mathematics. Benue, Nigeria. *Journal of Emerging Trends in Educational Research and Policy Studies* 3 (4) 479-486.

Grady, R.T. & James, D.E. (2013). Characteristics of effective agriculture teachers. ,Iowa State University. *Journal of Agricultural Education*. 45 (4), 90-98.

Hang, L. (2006). Does student-teacher thinking style match/mismatch matters in students' achievement? *British Educational Psychology Journal*. 26(3),395-409.

Harrison, L. (2011).*Teaching concepts*. Retrieved May 23, 2014. fromhttp://www.ehow.com/way-effective-teaching-concepts.html.

Hatim A. (2011). A comparison of cooperative learning and traditional lecture method in project management department of a tertiary level institution in Trinidad and Tobago. *Journal of Educational Research.* 1(1), 49-64.

Hemming, H.E. (2000). Encouraging critical thinking. *BritishJournal of Education*. 35(2), 173-183.

Herrid, C.F. (2003). The death of problem based learning. *Journal of College Science Teaching*. Buffalo, New York. 32(6),33-37

Howell, R.T. (2003). The importance of the project method in technology education. *Journal of Industrial Teacher Education*. 40(3). Retrieved May 24, 2014. From http;//scholar.lib.vt.edu/journals/jite/v43n3/howell.html.

Imarhiagbe, K.O. (2003). *Instructional methodology, principle and Practice of Vocational Education*. Asaba, Nigeria: Frontline Print & Publishers.

Jada, M.S. (2002). *General methods of teaching: A guide to teacher profession*. Jos: Edu press.

Jahangiri, L., Mucciolo, T.W., Choi, M. &Spielman, A.J.(2008). Assessment of teaching effectiveness in U.S. Dental schools and the effects of triangulation. *Journal of Dental Education*. 72(6), 707-718.

James, E.D and Edward, W.O (1996). Effects of Teaching Approach on problems solving ability of Agricultural Education students with varying learning styles,*Journal of AgriculturalEducation* (37)4pp 38-45

John, H. (1996). The origin of agiscience or where did all that scientific agriculture come from. *Journal of Agricultural Education* 37 (4): 38-45.

Kirschner, P.A., Sweller, J. and Clark, R.E (2006).〞Why minimal guidance during Instruction does not work: an analysis of the failure of constructivist discovery Problem based, experiential and inquiry-based teaching.”*Educational Psychologist,* 41 (2): 75-86.

Korb,K.A (2012). Educational psychology, retrieved from *http//korbedpsych:com/index.html*

Lambros, A. (2002). *Problem Based Learningin K-8 Classroom. A Teacher Guide to Implementation*. Califonia: Corvin Press inc.

Lee, J.J. (2007). Correlation comparative study; What is a valid research design? *Hallym International Journal of Aging*. 9(1), 59-76.

Maikano,S. (2010). Comparism between outdoor and indoor laboratory teaching strategies on secondary school students academic achievement and retention in ecology. Paper presented in the seminar at department of science education A.B.U. Zaria

Makama, G.B. (2005). Teaching vocational and technical education. Personal touch production, kafatchan, Nigeria pp 67-104

Mamudu, J.A. &Uhumuarbi P.O (2009). Relative effects of programmed instructional and demonstration methods on students’ academic performance in science. *College student journal*. 43 (2) 37-49.

Mandarin, P. and Preckel, D. (2009). Effect of Similarity-Based Guided Discovery Learning on Conceptual Performance. School Science and Mathematics, 109(3), 133-145.

Myra, P.S. & David, M.S (2005) Teachers, Schools and Society. New York: McGraw-hill.

Mary, M.S. (2002). *Teaching Methods and Techniques*. Yola: ParacleteSangita

Mayer, R. (2004). " Should there be a Three-strike Rule Against Pure Discovery Learning? The case for guided methods of instruction." ***American Psychologist***, 59(1): 14-19.

McCarthy, C.B.(2005). "Effects of thematic-based, hands on science teaching versus a textbook approach for students with disabilities" journal of research in science teaching, 42(3):245-263.

McQueen, R.A &Knussan, C. (2006). *Introduction to research Methods and Statistics in Psychology. England*: Pearson Educational Limited.

Mfon, E.U.(2011). Effects of problem solving, guided discovery and expository teaching strategies on students performance in redox reactions

Mills, H.R. (1990). *Teaching and Training. A Handbook for Instructions*. London: Macmillan Press Limited.

Mandrin, P. and Preckel, D. (2009). Effect of similarity-based guided discovery learning on conceptual performance. *School science and mathematics*, 109(3): 133-145.

Mirasi, W. Osodo, J. Kibirige, I. (2013). Comparing guided discovery and exposition-with-interaction methods in teaching biology in secondary schools, *Journal of science Education, Maseno University, Kisumu, Kenya*,(13):4 pp55 -65.

Mishra, R.C (2007), *Teaching Styles*,NewDelhi, APH, Publishing Corporation, India.

Muhammad, A.S and Ginga, U.A (2012). A comparative study of the effectiveness of concept mapping learning strategy over the expository method of teaching agricultural science to Junior secondary school students in Sokoto State, *Zaria Journal of Educational Studies* 13(1): 89-100

Myra, P.S. & David, M.S. (2005).*Teachers, schools and society.* New York: McGraw-Hill.

National Teacher Institute, NTI (2000). Nigeria Certificate in Education, NCE/DLS, Kaduna.

Nwanosike, M.R.O. (2005). Effect of Environment and Gender Differences on Students' Performance in Agricultural Science in Junior Secondary Schools in Imo State, Nigeria. *Research Journal of Science*. 11(1), 129-134.

Obeka, SS, Bichi, SS and Aminu, Y (2012). Effects of Integrating Instructional Models with Lecture Method on Academic Performance of Senior Secondary School Students of Various Class-Sizes in Environmental Concepts of Zaria Educational Zone. *Journal of Educational Research and Development*. 6(3): 14-18

Obeka, S.S (2010).*Current trend in Geographical and Environmental Education*, Zaria, Ahmadu Bello University Press limited, Zaria.

Obeka, S.S (2009). Epodawaladand Power Stimulation Games of Geographical and Environmental Education. A.B.U., Press Limited Zaria. 28-50.

Obi, C.A (2005), Method in Business Education. Enugu, Oktek Publishers Nigeria LTD.

Oghenevwede, O.E. (2010). Effects of Discovery and Inquiry Approaches, In Teaching and Learning of Biology on Secondary Schools Students' Performance in Delta state Nigeria. *Journal of Research in Education and Society* 1 (1), 30-38.

Olatoye, R.A. &Adekoya, Y.M. (2009). Effect of four teaching strategies on Senior secondary school students' achievement in an aspect of agricultural science, Ogun State, Nigeria .*Journal of educational studies in mathematics,* 7 (3),124-132.

Oludipe, B. &Oludipe, D.I. (2009). Effects of constructivist based teaching strategies on academic performance of students in integrated science at the junior secondary school level. *African Journal for the psychological study of social science*,12(2), 130-140

Omodara A.A.(2012).comparative analysis of the effectiveness of some teaching methods in skills acquisition by agricultural students in colleges of education in Kaduna state Nigeria. Unpublished msced agricultural education thesis, submitted to the faculty of education Ahmadu Bello University, Zaria.

Omorere, A. (2011). The *impact of teacher teaching methods on the academic performance of primary School pupils in Ijebu – ode Local Government Area Ogun State*. Ogun: Ego Booster Books.

Ozioma, C.A. (2011). Influential factors affecting the attitude of students toward vocational/technical subjects in secondary schools in southeastern Nigeria. *Journal of Educational and Social Research*. 1 (2), 49-56.

Peter, O.O., Nephat, N.K. & James O. (2014). Influence of students characteristics on academic performance in senior secondary agriculture in Rachuonyo Sub county Kenya. *International journal of Education and Research*, 2(3), 22-33.

Raymond, U. Ogunbameru, M.T. (2012). *A comparative analysis of two methods of Teaching Financial Accounting at Senior Secondary Schools in Nigeria.*

Ruth, A. (2002). *Microteaching and teacher effectiveness*. Yola: paracleteSangira.

Sequeira, A.H. (2013). Factors contributing to students' academic performance. National Institute of Karnataka, Surathkal. *Journal of Educational research* 1 (8), 283-289.

Tick, A. (2007). *Application of problem-based learning in classroom activities and media*. Retrieved May 24, 2014. From http://bmf.hu/conferences/sami2007/36-Andrea

Tomporouski, I, Philip, P, Catherine, D, Paricia, M, Jack,N, (2008). "Exercise and Childre′s Intelligence, cognition and Academic Performance and Achievement"*Journal ofEducation Psychology* 2(2): 111-131 21-32.

Touvinen, J.E and Sweller, J. (1999)."A comparison of cognitive load associated with discovery learning and worked examples".*Journal of Educational Psychology* 91 (2): 334-341.

Udoh, M.E.(2010). Effects of guided-discovery, student-centered demonstration and the expository instructional strategies on students performance in chemistry. African Research Review 4 (4), 389-398.

Usman, L.A (2008). Using a Selected method of Teaching in Enhancing Slow Learners Academic performance Among Junior Secondary School Integrated Science Students. 115.

Vonstumni, L, Sophie, I, Hell, U, Benedic, J, Chamoro, P, Thomas, K (2011). "The Hungary Mind: Intellectual curiosity is the third pillar of Academic Performance" Perspective on psychological science 6(6): 574-588, Retrieved Feb, 11, 2012

Wendy, J.W., Shannon, A.,David, W.J.& Brian E.M. (2006). The use and design of laboratory instruction in secondary agriscience classroom. *Journal Southern Agricultural Education Research.* 56(1), 125-13

## APPENDIX I

**Introduction Letter from the Department of Vocational and Technical Education**



**DEPARTMENT OF VOCATIONAL & TECHNICAL EDUCATION**
**AHMADU BELLO UNIVERSITY, ZARIA - NIGERIA**

Telephone: 069-51755, 50692

VICE CHANCELLOR: Professor Ibrahim Garba, *B.Sc (Hons) Geology, M.Sc (Mineral Exploration) ABU, Ph.D Geology (London), D.I.C., FNMGS*
INTERIM HEAD OF DEPARTMENT: Dr. Sani Ibrahim, *B.B.Ed, M.Ed, Ph.D (ABU)*

Your Ref: _____ Date: 9th May, 2018

Our Ref: P13EDVE8042

**LETTER OF IDENTIFICATION**
**OKEH GLORIA OLUCHI – P13EDVE8042**

This is to certify that Okeh Gloria Oluchi is a postgraduate student - M.Sc (Ed) Agric Education in the Department. She is carrying out a research on effectiveness of demonstration and discovery methods of teaching agricultural education in colleges of education in North-west zone, Nigeria. kindly give her every assistance she may require .

Dr. Sani Ibrahim
Head of Department

## APPENDIX II

**DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION**

**FACULTY OF EDUCATION**
**AHMADU BELLO UNIVERSITY ZARIA, NIGERIA**

Agricultural Education Achievement Test (AEAT)

**PRE-TEST**

5th Oct, 2017
INSTRUCTION: Answer all questions
TIME ALLOWED: 40 Minutes

1. Sheep and Goat are
   a. Small Ruminants ( )
   b. Small non- ruminants ( )
   c. Reptiles ( )
   d. Amphibians ( )
   e. Aves ( )
2. Sheep and goat are
   a. Vertebrates ( )
   b. Invertebrates ( )
   c. Amphibians ( )
   d. Coelenterate ( )
   e. Reptiles ( )
3. All of the followings can be obtained from sheep and goat except
   a. Milk ( )
   b. Wool ( )
   c. Hide ( )
   d. Skin ( )
   e. Feathers ( )
4. Scientific name of sheep is
   a. Homosapiens ( )
   b. Artiodactyla ( )
   c. Ovisaries ( )
   d. Capraspp ( )
   e. Oryzasatiua ( )
5. Scientific name of goat is
   a. Daucuscarota ( )
   b. Hibisinsescnlentus ( )
   c. Capra aegagrus ( )
   d. Bosspp ( )
   e. Dioscoreaspp ( )
6. One of the advantages of intensive system is
   a. High cost ( )
   b. Labour intensive ( )
   c. High yield ( )

d. Pest and diseases ( )
e. Poor quality products ( )

7. One of the disadvantages of intensive system of rearing livestock is
a. High cost ( )
b. Poor housing ( )
c. High yield ( )
d. Pest and diseases ( )
e. Poor quality products ( )

8. The following are advantages of extensive system of keeping livestock, except
a. Low capital intensive ( )
b. Less labour is required ( )
c. No specialization is needed ( )
d. High quality product ( )
e. Low cost is involved ( )

9. The following are advantages of intensive system of keeping livestock, except
a. High yield ( )
b. High quality products ( )
c. Pest and disease incidence ( )
d. High return ( )
e. Good hygiene ( )

10. One of the following is a characteristic of intensive system of keeping livestock
a. Adequate nutrition ( )
b. Poor quality products ( )
c. poor pest and disease control ( )
d. Low yield ( )
e. Poor nutrition ( )

11. One of the characteristic of extensive system of keeping livestock
a. Poor pest and disease management ( )
b. High capital intensive ( )
c. High quality products ( )
d. Adequate nutrition ( )
e. Adequate health management ( )

12. Sheep and goat are examples of
aMonogastrics ( )
b Digastric ( )
c Reptile ( )
d Ruminants ( )
e Reptiles ( )

13. Which of the following is a system of sheep and goat management`
a intensive system ( )
b battery cage system ( )
c deep litter system ( )
d open-ended system ( )
e close-ended system ( )

14. Sheep and goat are in the class

a. Animalia ( )
b. Vertebrate ( )
c. Mammalia ( )
d. Reptiles ( )
e. Amphibia ( )

15. Which of the management system is capital intensive?
a. Extensive system ( )
b. Semi – intensive system ( )
c. Semi – extensive system ( )
d. Range system ( )
e. Intensive system ( )

16. One of the disadvantages of intensive system of keeping livestock
a. High cost ( )
b. Poor housing ( )
c. High yield ( )
d. Pest and diseases ( )
e. Poor quality products ( )

17. The following are advantages of extensive system of keeping livestock, except
a. Low capital intensive ( )
b. Less labour is required ( )
c. No specialization is needed ( )
d. High quality product ( )
e. Low cost is involved ( )

18. The following are advantages of intensive system of keeping livestock
a. High yield ( )
b. High quality products ( )
c. Pest and disease incidence ( )
d. High return ( )
e. Good hygiene ( )

19. One of the following is a characteristic of intensive system of keeping livestock
a. Adequate nutrition ( )
b. Poor quality products ( )
c. poor pest and disease control ( )
d. Low yield ( )
e. Poor nutrition ( )

20. One of the characteristic of extensive system of keeping livestock
a. Poor pest and disease management ( )
b. High capital intensive ( )
c. High quality products ( )
d. Adequate nutrition ( )
e. Adequate health management ( )

21. Semi – intensive system is characterized by:
a. High cost ( )
b,. High yield ( )
c. Moderate pest and disease management ( )
d. Poor nutrition ( )

e. Poor yield ( )

22. Animals are totally indoors under
    a. Intensive system ( )
    b. Extensive system ( )
    c. Semi – intensive system ( )
    d. Semi - extensive system ( )
    e. Range system ( )
23. Animals have partial confinement under
    a. Intensive system ( )
    b. Extensive system ( )
    c. Range system ( )
    d. Open - ended system ( )
    e. Semi-intensive system ( )
24. Animals have free movement under
    a. Intensive system ( )
    b. Range system ( )
    c. Extensive system ( )
    d. Semi-intensive system ( )
    e. Semi-extensive system ( )
25. Which system is characterized by good housing?
    a. Intensive system ( )
    b. Extensive system ( )
    c. semi-intensive ( )
    d. Semi- extensive system ( )
    e. Range system ( )
26. Adequate medication is mostly associated with
    a. Range system ( )
    b. Open- ended system ( )
    c. Extensive system ( )
    d. Intensive system ( )
    e. Semi-intensive system ( )
27. Adequate and clean water is provided to animals under
    a. Extensive system ( )
    b. Semi- intensive system ( )
    c. Semi - extensive system ( )
    d. Free- range system ( )
    e. Intensive system ( )
28. Health management is poor under
    a. Intensive system ( )
    b. Semi - intensive system ( )
    c. Extensive system ( )
    d. Open - ended system ( )
    e. Close- ended system ( )
29. Animals are exposed to hash weather under
    a. Semi - extensive system ( )
    b. Intensive system ( )

c. Open- ended system ( )
d. Deep litter system ( )
e. Extensive system ( )

30. Animals are called scavengers under
a. Deep litter system ( )
b. battery cage system ( )
c. Intensive system ( )
d. Extensive system ( )
e. Closed – ended system ( )

**DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION**

**FACULTY OF EDUCATION**
**AHMADU BELLO UNIVERSITY ZARIA, NIGERIA**

Agricultural Education Achievement Test (AEAT)
**POST-TEST**

DATE: 5th Oct, 2017
INSTRUCTION: Answer all questions
TIME ALLOWED: 40 Minutes

1. Sheep and goats are in which group of animals
   aMonogastrics ( )
   b Digastric ( )
   c Reptile ( )
   d Ruminants ( )
   e Reptiles ( )
2. Which of the following is a system of sheep and goat management`
   a intensive system ( )
   b battery cage system ( )
   c deep litter system ( )
   d open-ended system ( )
   e close-ended system ( )
3. Sheep and goat are in the class
   a. Animalia ( )
   b. Vertebrate ( )
   c. Mammalia ( )
   d. Reptiles ( )
   e. Amphibia ( )
4. Which of these management systems is capital intensive?
   a. Extensive system ( )
   b. Semi – intensive system ( )
   c. Semi – extensive system ( )
   d. Range system ( )
   e. Intensive system ( )
5. Which of thesese management systems produces high yield?
   a. Extensive system ( )
   b. Semi – intensive system ( )
   c. Semi – extensive system ( )
   d. Range system ( )
   e. Intensive system ( )
6. Which of the management systems is an intermediary of the other systems?
   a. Intensive system ( )
   b. Extensive system ( )
   c. Semi – intensive system ( )
   d. Range system ( )
   e. Zero grazing system ( )

7. The management system that involves lower cost is s
   a. Intensive system ( )
   b. Extensive system ( )
   c. Semi – intensive system ( )
   d. Semi - extensive system ( )
   e. Grazing system ( )
8. In which system do you expect high quality products?
   a. Intensive system ( )
   b. Extensive system ( )
   c. Semi – intensive ( )
   d. Semi – extensive ( )

s e. Range system ( )

9. In which system do you expect low quality products
   a. Intensive system ( )
   b. Extensive system ( )
   c. Semi – intensive system ( )
   d. Semi - extensive system ( )
   e. Range system ( )
10. Sheep and Goat are
   a. Small Ruminant ( )
   b. Small non- ruminate ( )
   c. Reptiles ( )
   d. Amphibians ( )
   e. Aves ( )

11. Sheep and goast are
   a. Vertebrates ( )
   b. Invertebrates ( )
   c. Amphibians ( )
   d. Coelenterate ( )
   e. Reptiles ( )
12. All of the following can be obtained from sheep and goat except
   a. Milk ( )
   b. Wool ( )
   c. Hide ( )
   d. Skin ( )
   e. Feathers ( )
13. Scientific name of sheep is
   a. Homosapiens ( )
   b. Artiodactyla ( )
   c. Ovisaries ( )
   d. Capraspp ( )
   e. Oryzasatiua ( )
14. Scientific name of goat is
   a. Daucuscarota ( )
   b. Hibisinsescnlentus ( )
   c. Capra aegagrus ( )

d. Bosspp ( )
e. Dioscoreaspp ( )

15. One of the advantages of intensive system is
    a. High cost ( )
    b. Labour intensive ( )
    c. High yield ( )
    d. Pest and diseases ( )
    e. Poor quality products ( )
16. One of the disadvantages of intensive system is
    a. High cost ( )
    b. Poor housing ( )
    c. High yield ( )
    d. Pest and diseases ( )
    e. Poor quality products ( )
17. The following are advantages of extensive system of keeping livestock expect
    a. Low capital intensive ( )
    b. Less labour is required ( )
    c. No specialization is needed ( )
    d. High quality product ( )
    e. Low cost is involved ( )
18. The following are advantages of intensive system of keeping livestock except
    a. High yield ( )
    b. High quality products ( )
    c. Pest and disease incidence ( )
    d. High return ( )
    e. Good hygiene ( )
19. One of the following is a characteristic of intensive system of keeping livestock
    a. Adequate nutrition ( )
    b. Poor quality products ( )
    c. poor pest and disease control ( )
    d. Low yield ( )
    e. Poor nutrition ( )
20. One of the characteristic of extensive system of keeping livestock
    a. Poor pest and disease management ( )
    b. High capital intensive ( )
    c. High quality products ( )
    d. Adequate nutrition ( )
    e. Adequate health management ( )
21. Semi – intensive system is characterized by:
    a. High cost ( )
    b,. High yield ( )
    c. Moderate pest and disease management ( )
    d. Poor nutrition ( )
    e. Poor yield ( )
22. Animals are totally confined under
    a. Intensive system ( )

b. Extensive system ( )
c. Semi – intensive system ( )
d. Semi - extensive system ( )
e. Range system ( )

23. Animals have partial confinement under
a. Intensive system ( )
b. Extensive system ( )
c. Range system ( )
d. Open - ended system ( )
e. Semi-intensive system ( )

24. Animals have free movement under
a. Intensive system ( )
b. Range system ( )
c. Extensive system ( )
d. Semi-intensive system ( )
e. Semi-extensive system ( )

25. Which system is characterized by good housing?
a. Intensive system ( )
b. Extensive system ( )
c. semi-intensive ( )
d. Semi- extensive system ( )
e. Range system ( )

26. Adequate medication is mostly associated with
a. Range system ( )
b. Open- ended system ( )
c. Extensive system ( )
d. Intensive system ( )
e. Semi-intensive system ( )

27. Adequate and clean water is provided to animals under
a. Extensive system ( )
b. Semi- intensive system ( )
c. Semi - extensive system ( )
d. Free- range system ( )
e. Intensive system ( )

28. Health management is poor under
a. Intensive system ( )
b. Semi - intensive system ( )
c. Extensive system ( )
d. Open - ended system ( )
e. Close- ended system ( )

29. Animals are exposed to hash weather under
a. Semi - extensive system ( )
b. Intensive system ( )
c. Open- ended system ( )
d. Deep litter system ( )
e. Extensive system ( )

30. Animals are called scavengers under
    a. Deep litter system ( )
    b. battery cage system ( )
    c. Intensive system ( )
    d. Extensive system ( )
    e. Closed – ended system ( )

## APPENDIX III

**LESSON PLAN**

**Demonstration Method Lesson I**

| | |
|---|---|
| Name | Okeh Gloria Oluchi |
| Reg number | P13EDVE8042 |
| Course | Agricultural Education |
| Degree in view | M.Sc Agricultural Education |
| College | Federal college of education, zaria |
| Level` | NCE II |
| Number of students | 134 students |
| Sex of students | Males and Females |
| Course code/Title | AEAT/Livestock management systems |
| Topic | Sheep and Goats Management systems |
| Module | Scientific classification sheep & goat |
| Teaching method | Demonstration Method |
| Teaching Aids | Chalkboard, Chalk, Duster and Cardboards containing diagrams of Sheep and Goat |
| Date | May, 2018 |
| Time | 9am |
| Duration | 2hrs |
| Previous Knowledge | Students where asked questions on sheep and goats and breeds available in their locality. They were asked some terminologies associated with sheep and goats such as the name of a male sheep, female sheep, male goat, female goat, newly born sheep and newly born goat etc. |
| Behavioural Objectives | At the end of the lesson, student should be able to<br>i. Define the term ruminant animals<br>ii. Classify sheep and goat from kingdom to specific level. |

| | |
|---|---|
| | iii. Differentiate between sheep and goat with regards to scientific classification |
| Introduction | The teacher introduced the topic by writing the topic on the board "Ruminant Animals" "system of sheep and goat management. |
| Presentation | The teacher presented the topic step – by- step as follows:<br>Step I: Definition of ruminant animals<br>Step II: Classification of sheep and goat<br>Step III: Differences between sheep and goat with regards to classification<br>Step IV: systems of keeping sheep and goat<br>Step V: the teacher displays the teaching aids. |
| Summary and Conclusion | The teacher concludes by summarizing the topic briefly |
| Evaluation | The teach evaluate the lesson by asking students to:<br>i. Define the term ruminant animals<br>ii. Who can state the complete scientific classification of sheep and goat<br>iii. Who can mention one difference between sheep and goat |
| Assignment | The teacher gave assignment to student as follows<br>i. List the different breeds of sheep<br>List the different breeds of goat. |

**LESSON PLAN**

**Demonstration Method Lesson 2**

| | |
|---|---|
| Name | Okeh Gloria Oluchi |
| Reg number | P13EDVE8042 |
| Course | Agricultural Education |
| Degree in view | M.Sc Agricultural Education |
| School | Federal college of education, Zaria |
| Level` | NCE II |
| Number of students | 134 students |
| Sex of students | Males and Females |
| Course code/Title | AEAT/Livestock management system |
| Topic | Sheep and Goats Management system |
| Module | Intensive semi intensive and extensive systems of sheep and goat management |
| Teaching method | Demonstration Method |
| Teaching Aids | Visit to the departmental farm(livestock section) |
| Date | May, 2018 |
| Time | 9am |
| Duration | 2hrs |
| Previous Knowledge | Students were asked questions on sheep and goats and breeds available in their locality. They were asked some terminologies associated with sheep and goats such as the name of a male sheep, female sheep, male goat, female goat, newly born sheep and newly born goat etc. |
| Behavioural Objectives | At the end of the lesson, student should be able to<br>i. Explain sheep and goats management systems<br>ii. State the advantages of each system.<br>iii. State the disadvantages of each system |

| | |
|---|---|
| Introduction | The teacher introduced the topic by briefing the students about the visit to the farm and showing them the various systems of keeping ruminants available on the farm |
| Presentation | The teacher presented the topic step – by- step as follows:<br>Step I: Intensive, Extensive and Semi-intensive System<br>Step II: Advantages of Intensive, Extensive and Semi-Extensive System<br>Step III: Disadvantages of Intensive, Extensive and Semi-Extensive system |
| Summary and Conclusion | The teacher concludes by summarizing the lesson briefly |
| Evaluation | The teach evaluates the lesson by asking students to:<br>i. Mention the three livestock management systems<br>ii. State the advantages of intensive, extensive and semi-intensive system<br>iii. State the disadvantages of intensive, extensive and semi-intensive system |
| Assignment | The teacher gave assignment to student as follows<br>i. state the different systems of poultry management<br>ii. state the different breeds of poultry. |

**LESSON PLAN**

**Discovery Method Lesson I**

| | |
|---|---|
| Name | Okeh Gloria Oluchi |
| Reg number | P13EDVE8042 |
| Course | Agricultural Education |
| Degree in view | M.Sc Agricultural Education |
| College | college of education, gidanwaya |
| Level` | NCE II |
| Number of students | 106 students |
| Sex of students | Males and Females |
| Course code/ Title | AEAT/ Livestock management system |
| Topic | Sheep and Goat Management systems |
| Module | classification of sheep & goat |
| Teaching method | Discovery Method |
| Teaching Aids | Chalkboard, Chalk, and Duster |
| Date | May, 2018 |
| Time | 11am |
| Duration | 2hrs |
| Previous Knowledge | Students where asked questions on sheep and goats and breeds available in their locality. They were asked some terminologies associated with sheep and goats such as the name of a male sheep, female sheep, male goat, female goat, newly born sheep and newly born goat etc. |
| Behavioural Objectives | At the end of the lesson, student should be able to<br>i. define the term ruminants<br>ii. Classify sheep and goat from kingdom to specific level.<br>iii. Differentiate between sheep and goat with regards to scientific classification |

| | |
|---|---|
| Introduction | The teacher introduced the topic by writing on the board "system of sheep and goat management and linked it with the previous knowledge of the students. Then the teacher went on to present the lesson. |
| Presentation | The teacher presented the topic step – by- step as follows:<br>Step I: definition of ruminants<br>Step II: intensive, semi intensive and extensive system of keeping sheep and goat<br>Step III: advantages and disadvantages of the various systems of keeping sheep and goat. |
| Summary and Conclusion | The teacher concludes by summarizing the topic briefly |
| Evaluation | The teacher evaluate the lesson by asking students to:<br>i. Define the term ruminant animals<br>ii. State the systems of keeping sheep and goat<br>iii. Mention the advantages of each system of keeping sheep and goat |
| Assignment | The teacher gave assignment to student as follows<br>iv. state the different breeds of sheep<br>state the different breeds of goat |

**LESSON PLAN**

**Discovery Method Lesson 2**

| | |
|---|---|
| Name | Okeh Gloria Oluchi |
| Reg number | P13EDVE8042 |
| Course | Agricultural Education |
| Degree in view | M.Sc Agricultural Education |
| School | college of education, gidanwaya |
| Class ` | NCE II |

| | |
|---|---|
| Number of students | 106 students |
| Sex of students | Males and Females |
| Course code/Title | AEAT/Livestock management system |
| Topic | Sheep and Goats Management systems |
| Module | Scientific classification of sheep & goat |
| Teaching method | Discovery Method |
| Teaching Aids | Chalkboard, Chalk, and Duster |
| Date | May, 2018 |
| Time | 11am |
| Duration | 2hrs |
| Previous Knowledge | Students were asked questions on sheep and goats and breeds available in their locality. They were asked some terminologies associated with sheep and goats such as the name of a male sheep, female sheep, male goat, female goat, newly born sheep and newly born goat etc. |
| Behavioural Objectives | At the end of the lesson, student should be able to<br>i. Define the term ruminants<br>ii. State the scientific classification of sheep and goat |
| Introduction | The teacher introduced the topic by writing on the board "S |
| Presentation | The teacher presented the topic step – by- step as follows:<br>Step I: definition of ruminants<br>Step II: classification of ruminants<br>Step III: the teacher gives the students a task identify the various indigenous breeds of sheep and goat by making a well labeled diagram of each breed and indicating the origin and features. |
| Summary and Conclusion | The teacher concludes by summarizing the topic briefly |

| | |
|---|---|
| Evaluation | The teach evaluates the lesson by asking students to:<br>i. Define the term ruminants<br>ii. State the scientific classification of sheep and goat |
| Assignment | The teacher gave assignment to student as follows<br>i. state the different systems of sheep and goat management and the different breeds of sheep and goat |

**LESSON PLAN**

**Lecture Method Lesson I**

| | |
|---|---|
| Name | Okeh, Gloria Oluchi |
| Reg number | P13EDVE8042 |
| Course | Agricultural Education |
| Degree in view | M.Sc Agricultural Education |
| College | Federal college of education, Katsina |
| Level` | NCE II |
| Number of students | 72 students |
| Sex of students | Males and Females |
| Course code/Title | AEAT/ Livestock management system |
| Topic | Sheep and Goats Management systems |
| Module | Explanation and classification of sheep & goat |
| Teaching method | Lecture Method |
| Teaching Aids | Chalkboard, Chalk, and Duster |
| Date | May. 2018 |
| Time | 12pm |
| Duration | 2hrs |
| Previous Knowledge | Students where asked questions on sheep and goats and breeds available in their locality. They were asked some terminologies associated with sheep and goats such as the name of a male sheep, female sheep, male goat, female goat, newly born sheep and newly born goat etc. |
| Behavioural Objectives | At the end of the lesson, student should be able to<br>i. Explain sheep and goats and domestic animals<br>ii. Classify sheep and goat from kingdom to specific level.<br>iii. Differentiate between sheep and goat with regards to scientific classification |
| Introduction | The teacher introduced the topic by writing on the board "system of sheep and goat management" and linked it with the previous knowledge of the students. Then the teacher went on to present the lesson. |
| Presentation | The teacher presented the topic step – by- step as follows:<br>Step I: Sheep and goats as domesticated animals<br>Step II: Classification of sheep and goat<br>Step III: Differences between sheep and goat with regards to classification |
| Summary and Conclusion | The teacher concludes by summarizing the topic briefly |
| Evaluation | The teach evaluate the lesson by asking students to:<br>i. Explain sheep and goat<br>ii. Who can mention the classes of sheep and goat<br>iii. Who can mention one difference between sheep and goat |

| | |
|---|---|
| Assignment | The teacher gave assignment to student as follows<br>i. Write the different breeds of sheep<br>ii. Write the different breeds of goat. |

**LESSON PLAN**

**Lecture Method Lesson 2**

| | |
|---|---|
| Name | Okeh Gloria Oluchi |
| Reg number | P13DVE8042 |
| Course | Agricultural Education |
| Degree in view | M.Sc Agricultural Education |
| School | Federal college of education, Katsina |
| Class ` | NCE II |
| Number of students | 72 students |
| Sex of students | Males and Females |
| Course code/ Title | AEAT/ Livestock management systems |
| Topic | Sheep and Goats Management systems |
| Module | Explanation and classification sheep & goat |
| Teaching method | Lecture Method |
| Teaching Aids | Chalkboard, Chalk, and Duster |
| Date | May, 2017 |
| Time | 9 am |
| Duration | 2hrs |
| Previous Knowledge | Students were asked questions on sheep and goats and breeds available in their locality. They were asked some terminologies associated with sheep and goats such as the name of a male sheep, female sheep, male goat, female goat, newly born sheep and newly born goat etc. |
| Behavioural Objectives | At the end of the lesson, student should be able to<br>iv. Explain sheep and goats management systems<br>v. State the advantages of each system.<br>vi. State the disadvantages of each system |
| Introduction | The teacher introduced the topic by writing on the board "system of sheep and goat management and linked it with the previous knowledge of the students. Then the teacher went on to present the lesson. |
| Presentation | The teacher presented the topic step – by- step as follows:<br>Step I: Intensive, Extensive and Semi-intensive System<br>Step II: Advantages of Intensive, Extensive and Semi-Extensive System<br>Step III: Disadvantages of Intensive, Extensive and Semi- |

| | |
|---|---|
| | Extensive system |
| Summary and Conclusion<br>Evaluation | The teacher concludes by summarizing the topic briefly<br>The teach evaluates the lesson by asking students to:<br>i Mention the three livestock management systems<br>ii State the advantages of intensive, extensive and semi-intensive system<br>iii State the disadvantages of intensive, extensive and semi-intensive system |
| Assignment | The teacher gave assignment to student as follows<br>i. Write the different systems of poultry management<br>ii. Write the different breeds of poultry. |

## APPENDIX IV

**PRE TEST AND POST TEST SCORES**

**PRE-TEST SCORES**

Group A (Demonstration Method)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 5 | 6 | 3 | 7 | 10 | 11 | 2 | 4 | 6 |
| 3 | 4 | 8 | 9 | 4 | 5 | 11 | 9 | 2 | 7 |
| 3 | 4 | 8 | 9 | 4 | 5 | 11 | 9 | 2 | 7 |
| 3 | 5 | 5 | 3 | 4 | 9 | 11 | 6 | 4 | 9 |
| 4 | 7 | 9 | 2 | 10 | 7 | 5 | 3 | 4 | 8 |
| 6 | 2 | 9 | 11 | 6 | 5 | 5 | 4 | 2 | 5 |
| 3 | 5 | 5 | 3 | 4 | 9 | 11 | 6 | 4 | 9 |
| 4 | 7 | 9 | 2 | 10 | 7 | 5 | 3 | 4 | 8 |
| 3 | 4 | 8 | 9 | 4 | 5 | 5 | 3 | 4 | 8 |
| 10 | 11 | 2 | 4 | 6 | 4 | 4 | 5 | 4 | 7 |
| 4 | 2 | 5 | 6 | 3 | 7 | 10 | 11 | 2 | 4 |
| 3 | 4 | 8 | 9 | 4 | 5 | 11 | 9 | 2 | 7 |
| 6 | 2 | 9 | 11 | 6 | 5 | 5 | 4 | 2 | 5 |
| 4 | 7 | 9 | 2 | | | | | | |

Group B (Discovery Method)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 6 | 7 | 2 | 6 | 8 | 11 | 10 | 3 | 4 |
| 6 | 2 | 9 | 11 | 6 | 5 | 5 | 4 | 2 | 5 |
| 5 | 8 | 5 | 4 | 3 | 4 | 6 | 2 | 3 | 2 |
| 3 | 5 | 5 | 3 | 4 | 9 | 11 | 6 | 4 | 9 |
| 4 | 7 | 9 | 2 | 10 | 7 | 5 | 3 | 4 | 8 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **4** | 5 | 6 | 3 | 7 | 10 | 11 | 2 | 4 | 6 |
| 3 | 4 | 8 | 9 | 4 | 5 | 11 | 9 | 2 | 7 |
| 3 | 6 | 7 | 2 | 6 | 8 | 11 | 10 | 3 | 4 |
| 6 | 2 | 9 | 11 | 6 | 5 | 5 | 4 | 2 | 5 |
| 5 | 5 | 3 | 4 | 9 | **4** | **2** | **4** | **4** | **3** |
| **2** | **5** | **3** | **6** | **2** | **5** | | | | |

Group C (Lecture Method)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 5 | 6 | 3 | 7 | 10 | 11 | 2 | 4 | 6 |
| 3 | 4 | 8 | 9 | 4 | 5 | 11 | 9 | 2 | 7 |
| 3 | 6 | 7 | 2 | 6 | 8 | 11 | 10 | 3 | 4 |
| 6 | 2 | 9 | 11 | 6 | 5 | 5 | 4 | 2 | 5 |
| 3 | 5 | 5 | 3 | 4 | 9 | 11 | 6 | 4 | 9 |
| 4 | 7 | 9 | 2 | 10 | 7 | 5 | 3 | 4 | 8 |
| 3 | 6 | 7 | 2 | 6 | 8 | 11 | 10 | 3 | 4 |
| 6 | 2 | | | | | | | | |

**POST TEST SCORES**

Group A (Demonstration method)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 11 | 12 | 25 | 21 | 16 | 19 | 27 | 25 | 26 | 28 |
| 28 | 17 | 15 | 19 | 20 | 21 | 23 | 20 | 24 | 26 |
| 21 | 11 | 20 | 12 | 16 | 17 | 16 | 18 | 28 | 13 |
| 20 | 20 | 21 | 19 | 12 | 14 | 16 | 21 | 27 | 17 |
| 11 | 12 | 13 | 11 | 16 | 15 | 20 | 17 | 19 | 21 |
| 21 | 23 | 11 | 12 | 20 | 9 | 16 | 8 | 6 | 19 |
| 21 | 11 | 20 | 12 | 16 | 17 | 16 | 18 | 28 | 13 |
| 20 | 20 | 21 | 19 | 12 | 14 | 16 | 21 | 27 | 11 |
| 11 | 12 | 13 | 11 | 16 | 15 | 20 | 17 | 19 | 17 |
| 21 | 23 | 11 | 12 | 20 | 9 | 16 | 8 | 6 | 22 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 11 | 12 | 25 | 21 | 16 | 19 | 27 | 25 | 26 | 28 |
| 28 | 17 | 15 | 19 | 20 | 21 | 23 | 20 | 24 | 26 |
| 21 | 11 | 20 | 12 | 16 | 17 | 16 | 18 | 28 | 13 |
| 20 | 20 | 21 | 19 | | | | | | |

Group B (Discovery method)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 21 | 11 | 20 | 12 | 16 | 17 | 16 | 18 | 28 | 13 |
| 20 | 20 | 21 | 19 | 12 | 14 | 16 | 21 | 27 | 11 |
| 11 | 12 | 13 | 11 | 16 | 15 | 20 | 17 | 19 | 11 |
| 21 | 23 | 11 | 12 | 20 | 9 | 16 | 8 | 6 | 7 |
| 11 | 12 | 25 | 21 | 16 | 19 | 27 | 25 | 26 | 28 |
| 28 | 17 | 15 | 19 | 20 | 21 | 23 | 20 | 24 | 26 |
| 21 | 11 | 20 | 12 | 16 | 17 | 16 | 18 | 28 | 13 |
| 20 | 20 | 21 | 19 | 12 | 14 | 16 | 21 | 27 | 11 |
| 11 | 12 | 13 | 11 | 16 | 15 | 20 | 17 | 19 | 11 |
| 21 | 23 | 11 | 12 | 20 | 9 | 16 | 8 | 6 | 7 |
| 19 | 22 | 23 | 18 | 21 | 20 | | | | |

Group C (Lecture method)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 11 | 12 | 25 | 21 | 16 | 19 | 27 | 25 | 26 | 28 |
| 28 | 17 | 15 | 19 | 20 | 21 | 23 | 20 | 24 | 26 |
| 21 | 11 | 20 | 12 | 16 | 17 | 16 | 18 | 28 | 13 |
| 20 | 20 | 21 | 19 | 12 | 14 | 16 | 21 | 27 | 14 |
| 11 | 12 | 13 | 11 | 16 | 15 | 20 | 17 | 19 | 18 |
| 21 | 23 | 11 | 12 | 20 | 9 | 16 | 8 | 6 | 10 |
| 20 | 20 | 21 | 19 | 12 | 14 | 16 | 21 | 27 | 11 |
| 11 | 12 | | | | | | | | |

## APPENDIX V



Plate 1: Head of department introducing the researcher to the experimental group at F.C.E Katsina



Plate 2: Exams officer introducing the researcher to the experimental group at F.C.E Zaria



Plate 3: Experimental Teaching at F.C.E Zaria




Plate 4: Experimental Teaching at F.C.E Katsina



Plate 5: Experimental Teaching at K.S.C.O.E Gidan/Waya