NATIONAL OPEN UNIVERSITY OF NIGERIA

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COURSE TITLE: AGRICULTURAL SCIENCE METHODS

EDU 280

AGRICULTURAL SCIENCE METHODS

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Revised Agricultural Science Methods

Introduction

Agricultural education is a teaching and learning process that deals with all aspects of crop and animal production for the use and economic benefits of man. Agricultural Education provides learners with necessary skills required for the effective practice of agriculture with the aim of providing food, job and raw materials for industries to ensure food security and sustainability.

Agricultural Education Methods is a two (2) credit unit course for sophomores offering Bachelor of Science [B.Sc (Ed.)] Agricultural Education. It is also recommended to teachers of Agricultural Science or Agricultural courses in all levels of education as a material for updating their knowledge of methods of imparting agricultural education.

The course consists of 12 units arranged under 4 modules, namely: Methods and techniques of teaching of Agricultural Science, Resources and planning for Agricultural Science Teaching, Organization of Practical Activities in Agricultural Science, and Evaluation in Agricultural Science Teaching

This course guide gives a broad view of the course and guides you on what the course is about, what course materials you will be using and how you can work your way through these materials.

What You Will Learn in this Course

During the course, you will learn about methods and techniques of teaching Agricultural Science, resources and planning for Agricultural Science teaching, organization of practical activities in Agricultural Science and assessment in Agricultural Science teaching

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Course Aims

The overall aims of this course are to:

• introduce you to the basic methods and techniques of teaching agricultural science,
• familiarize you with the resources for teaching agricultural science,
• expose you to the need for proper planning before embarking on teaching any topic in agricultural science,
• explain to you how to organize appropriate practical activities including the selection and proper use of appropriate instructional materials in teaching agricultural science including the planning and management of schools' agricultural programmes, and

• teach you the various tools and techniques for assessing learning outcomes in agricultural science.

Course Objectives

In order to achieve the aims already set out, the course has overall objectives. Apart from this, each of the twelve units has its specific objectives. The unit objectives are enumerated at the beginning of each unit. It is recommended you read them prior to working through the unit. It is advisable to match the objectives with your progress in working through the course by constantly re-assessing to what extent you have gone. In this way, you can be sure that you have done what is required of you by the unit. The general objectives of this course are set out below.

On the successful completion of this course, you should be able to:

i. Discuss the conventional methods of teaching Agricultural Science
ii. List and explain the modem techniques of teaching Agricultural Science
iii. Identify and use different resources for teaching Agricultural Science
iv. Improvise teaching materials where the original ones are not available.
v. Prepare good teaching units and lesson plans
vi. Discuss the role of practical activities in Agricultural Science teaching
vii. Manage practical activities in Agricultural Science effectively
viii. Manage Schools Agricultural Projects effectively
ix. Describe the various techniques that can be used to assess learning outcomes in Agricultural Science
x. Explain performance assessment in Agricultural Science

WORKING THROUGH THE COURSE

To complete this course, you are required to read each study unit of this study material and read other materials which may be provided by the National Open University of Nigeria. You are also expected to carry out exercises and practical activities recommended within the course units. Each unit contains self-assessment exercises and at certain points in the course you would be required to submit assignments for assessment purposes. At the end of the course, there is a final examination. The course should take you about a total of 17 weeks to complete. All units of the course are listed below with an indication of what you have to do and how you should allocate your time to each unit in order to complete the course on time and successfully. Attendance and active participation in organized tutorial sessions would be of immense benefit to you and your colleagues.

Course Materials

Major components of the course are:

1. Course Guide
2. Study Units

3. Textbooks
4. Assignments File
5. Presentation Schedule

Study Units

There are four modules and twelve units in the course. The breakdown is as follows:

Module 1 Methods and Techniques of Teaching of Agricultural Science

Unit 1 Conventional Methods of Teaching Agricultural Science
Unit 2 Demonstration and Modified Lecture method in Teaching Agricultural Science
Unit 3 Modern Methods of Teaching Agricultural Science
Unit 4 Experiential learning in Agricultural Science

Module 2 Resources and Planning for Agricultural Science Teaching

Unit 1 Resources for Teaching Agricultural Science: Instructional Materials and Community Resources
Unit 2 Improvisation in Agricultural Science Teaching
Unit 3 Current curricular challenges in the teaching of Agricultural Science
Unit 4 Teaching Units, Lesson Preparation and Lesson Plan

Module 3 Organization of Practical Activities in Agricultural Science

Unit 1 Laboratory-work and Fieldwork in Agricultural Science
Unit 2 Managing Schools Agricultural Project

Module 4 Evaluation in Agricultural Science Teaching

Unit 1 Assessment of Theory I (Objectives and Essay Questions)
Unit 2 Performance Assessment in Agricultural Science

Each unit of the course material consists of one to two weeks work and includes an introduction, objectives, reading materials, exercises, conclusion, summary, tutor-marked assignment (TMA), references and other resources. Self-assessment exercises are also included in each unit to assist you in determining your level of understanding of the concept under consideration. Sub-units of each unit have been prepared to give you all you need to make a success of the course.

Assignment File

In your assignment file, you will find all the details of the works you must submit to your tutor for marking. The marks you obtain for these assignments will count towards the final mark you obtain for this course. Further information on assignments will be found in the Assignment File itself, and later in this Course Guide in the section on assessment. There are many assignments for this course, with each unit having at least one assignment. These assignments are basically meant to assist you to understand the course.

Assessment

There are three aspects to the assessment of the course. First are self- exercises, second are the tutor-marked assignments and third is the written examination/end of course examination.

The work you submit to your tutor for assessment will count for 30% of your total course work. At the end of the course, you will need to sit for a final or end of course examination of about three hours duration. This examination will count for 70% of your total course mark.

Tutor-Marked Assignment (TMAs)

The TMA is a continuous assessment component of your course. It accounts for 30% of the total score. You are required to submit at least four (4) TMAs before you are allowed to sit for the end of course examination. The TMAs would be given to you by your facilitator and returned after you have completed them.

Assignment questions for the units in this course are contained in the assignment file. You will be able to complete your assignment from the information and materials contained in your reading your study units and, references. You are advised to put in place a study plan which will also incorporate the references in the course material. This will broaden your understanding of the subject.

Ensure each assignment is submitted on or before the deadline given in the presentation schedule and assignment file.

End of course Examination and Grading

The end of course examination for Agricultural Science education will be about 3 hours' duration and has a value of 70% of the total course grade. The examination will consist of questions, which will reflect the type of self-testing, practice exercise and tutor-marked assignment problems you have previously encountered. All areas of the course will be assessed. Utilize the time between finishing the last unit and sitting for the examination to revise the whole course. You might find it useful to review your self-test, TMAs and comments on them before the examination. The end of course examination covers information from all parts of the course.

Course Marking Scheme

Assessment Marks

Assignment 1 – 4 Four assignment, best three marks of the four account at 10% each = 30% of course marks.

End of course examination 70% of overall course marks Total 100% of course materials.

How to Get the Best from this Course

The format of the units is aimed at making reading easy. The sub-units are in a flowing format with each one leading to the next. Each unit starts with an introduction which leads to the statement of objectives. This is an explanation of what we aim at achieving at the end of the unit. This is then followed by the main content which treats in detail the subject matter. The main body of the unit guides you through the required reading from other sources. Self-assessment exercises are interspersed throughout the units. They are to guide you in ensuring that you understand each unit you have studied. Working through these exercises will help you to achieve the objectives of the unit and put you in a better position to face the challenges of assignments and examination.

SCIENCE

CONTENT **PAGES**

MODULE 1 METHODS AND TECHNIQUES OF TEACHING OF AGRICULTURAL SCIENCE

UNIT 1 CONVENTIONAL METHODS OF TEACHING AGRICULTURAL SCIENCE

CONTENTS

1.0 INTRODUCTION

Methods are ways used in teaching materials to students. The choice of methods to be used depends on what is to be taught (Content - Skills, Attitudes, and Values.), who is to be taught, and the expected level of competence**.** Effective teaching for learning of Agricultural Science requires an understanding and effective application of different instructional methods and strategies. This is necessary for the achievement of desired learning outcomes. This unit examines the conventional methods of teaching Agricultural Science. They are said to be conventional in the sense that they are often used by teachers such that they seem to have become customary. We shall examine the meaning, advantages, disadvantages and strategies for appropriate use of Lecture method, Project method, Discussion method, Field trip and Excursion in the Agricultural Science teaching and learning situation.

2.0 OBJECTIVES

By the end of the unit, the students should be able to:

- explain the Lecture method
- list the advantages and disadvantages of Lecture method
- enumerate strategies for effective use of Lecture method
- explain Project method
- list the advantages and disadvantages of Project method
- enumerate strategies for effective use of Project method
- explain Discussion method
- list the advantages and disadvantages of Discussion method
- enumerate strategies for effective use of Discussion method
- explain the term Field Trip and Excursions
- list some advantages and disadvantages of Field Trip and Excursions
- enumerate strategies for effective use of Field Trip and Excursions.

SELF ASSESSMENT EXERCISE 1

i. Mention five reasons why an Agricultural Science teacher must understand and learn how to use various instruction methods of teaching his subject.

3.0 MAIN CONTENT

3.1 Lecture Method in Agricultural Science Teaching

Lecturing is perhaps the most widely used formal educational method in the world for a long time. It is more or less a continuous elucidation by a speaker who wants the audience to learn something from his delivery. Apart from formal educational setting, it is also used in political speeches and religious sermons. The word "Lecture" has its etymological roots in the Latin word *lectus* (to read). Lecture method is essentially a one way flow of communication from the teacher to the students. It is a teacher-centred or teacher-dominated approach. The teacher does most of the talking while the students remain as passive listeners taking down notes. This is why it is sometimes referred to as didactic (*to teach*) approach or talk-and-chalk.

The need to cover a substantial number of topics in the syllabus within a short period of time is often responsible for the use of this method. Habitual use gradually reduces the possibility of the use of other methods apart from the problem of poor understanding and consequently non-use of other methods. It can be used to teach large and small class sizes. The teacher can ask few or no questions during the classroom interaction. It is simply a verbal presentation of concepts and ideas to the students without the use of instructional materials. Information retention is low among the students and meaningful learning is not promote because students are not actively involved in the learning process.

3.1.1 Advantages of Lecture Method

i. It is easy to practice since much prior preparation is not required.
ii. It is a good method of introducing a topic to students.
iii. It is useful in covering a wide range of topics when limited coverage time is available.
iv. It is useful in handling large classes.
v. For students who have general knowledge of a topic, it can be used to provide a clarification of the material or a re-structuring of the material to make it more relevant to a given situation.
vi. It enhances teachers' self-confidence.

3.1.2 Disadvantages of Lecture Method

i. It does not promote meaningful learning since students are just passive listeners and not active participants.
ii. It does not allow for proper evaluation of students during lessons
iii. It does not take individual differences of the learners into consideration in class interaction.
iv. It is a poor method for developing learners' communication skills.
v. It promotes memorization of information (rote learning) without understanding
vi. It is not effective in changing students' attitude.

3.1.3 Strategies for Effective Use of Lecture Method

i. As a vocational science subject, Agricultural Science cannot be taught using the lecture method only. It can however be used in combination with other methods.
ii. With proper planning and time management, the need for 'crowding' students with topics to beat time can be avoided.
iii. Opportunities for asking questions and making comments should be provided by the teacher.
iv. A brief summary of points made during the lesson should be made by the teacher.

At the end of each lesson period, the teacher should summarize the key points.

3.2 Project Method in Agricultural Science Teaching

Projects are planned educational activities in which students investigate a particular material, concept or phenomenon on their own. A project method may involve a single learner or group of learners. Projects can be carried out within and outside the school and often have time specification. At the secondary school level, teachers may assign topics for project to students or groups of students. They may also be asked to choose from a list of topics. This method nurture cordiality among learners and encourages originality and creativity. Groups for this method must be representative of the whole class in terms performance such as excellent performers, average performers and below average performers. The project must be meaningful. This involves three major stages, namely; planning, implementation and evaluation. The teacher provides necessary guidance in term of procedure.

Concepts that can be taught and learnt using project method in Agricultural Science include:

(i) Experiments involving the determination of components of soil.
(ii) 3-4-5 method in farm surveying.
(iii) Preparation of Farm Profit and Loss Account.
(iv) Animal Husbandry

3.2.1 Advantages of Project Method

i. It narrows the gap created between students due to individual differences.
ii. Learners are allowed to express their skills independently or within the group.
iii. It helps in developing leadership qualities in learners.
iv. This method is motivational and helps to improve students' interest in the concept.
v. It also improves students' investigational skills.
vi. It is practical and real in nature which encourages meaningful learning.

3.2.2 Disadvantages of Project Method

i. It is time consuming.
ii. It may not be helpful for lazy students who may shy away from participating actively in the exercise.
iii. Individual assessment of members of the group may be difficult.
iv. It could be expensive.
v. There are often differences in the level of interest of learners in a particular topic.
vi. Students may not show interest in other groups' project thereby limiting learning experiences to their own project alone.

3.2.3 Strategies for the Effective Use of Project Method

i. Allow students to have enough time to carry out the project.
ii. Ensure proper procedure for carrying out the project is given.
iii. Use this method occasionally such as once or at most twice a term.
iv. State the guidelines for assessment from the onset and be objective in the assessment.

3.3 Discussion Method in Agricultural Science Teaching

This is a participatory approach in which learners express their opinion about an issue. It is a process of learning in which an issue or topic is viewed by learners from different perspectives and solutions are arrived at through participants' analysis and synthesis. The teacher, even though involved, must not dominate the discussion. A problem or topic for the lesson is presented for discussion and the teacher helps to direct the learners' views towards the lesson objectives. It encourages students' active involvement in learning while the teacher acts as a moderator in the learning process.

3.3.1 Advantages of Discussion Method

i. Discussion method encourages active participation of learners in the classroom which aids learning.
ii. It helps in achieving attitudinal change among learners.
iii. It aids in problem solving.
iv. It encourages constructive thinking by learners.
v. It encourages cordiality among students and between them and their teacher

3.3.2 Disadvantages of Discussion Method

i. Discussion method requires a lot of time.
ii. If it is not well directed, the original focus of the discussion may be lost.
iii. Meaning contributions are achieved when participants are knowledgeable enough about the topic under discussion.
iv. Discussion may be dominated by a few outspoken members of the class.
v. It is only useful among mature students.

3.3.3 Strategies for the Effective Use of Discussion Method

i. It should be used when students have sufficient background knowledge of the concept or topic to be discussed.
ii. Efforts should be made to spread discussion to prevent few individuals from dominating it.
iii. The teacher should guide the discussion to prevent discussants from derailing.
iv. Prior notice of what and when to discuss should be given.

3.4 Field Trip in Agricultural Science Teaching

This is a method that exposes learners to direct or real-life experience. It is a most appropriate method for use in Agricultural Science. It allows learners to discover knowledge in a real-life situation. Students are taken natural life setting on the field or for excursion in agro-allied industries such as commercial fish ponds, Cocoa drinks industries etc or agricultural

research institutes such as Forestry Research Institutes of Nigeria (FRIN) in Ibadan, National Institute for Oil-Palm Research Institute (NIFOR) in Benin and so on. Trips can also be made to forest reserves, dams, lakes, sea and natural sites of educational importance. The setting makes learning more interesting.

The method allows learners to make useful observations and collect information, which cannot be obtained within the classroom. Experiences acquired during field trip endure and are not easily forgotten.

3.4.1 Advantages of Field-Trip Method

i. It provides first-hand learning experience for students.
ii. It helps to arouse the interest of students in the concepts being taught.
iii. It exposes students to various learning experiences on a single trip.
iv. It practically reinforces what has been taught in the classroom.
v. It promotes interaction amongst the students.
vi. It aids retention of information since such experiences are easily recalled.
vii. It helps students to appreciate professionals in agriculture and motivates them for a carrier in agriculture.

3.4.2 Disadvantages of Field Trip Method

i. It is time consuming and encroaches into other lesson periods which may bring conflicts among teachers.
ii. It is expensive especially in terms of transportation and other expenses.
iii. It could be risky especially if it involves travelling. Instances of accidents have been recorded in the past.
iv. It could be a waste of time and resources if not well planned.

3.4.3 Strategies for the Effective Use of Field Trip Method

i. Serious planning must be carried out to ensure effectiveness of the trip as an educative exercise.
ii. The expected field experience must fit into the curricular design and be relevant to the instructional sequence.
iii. An educated pre-trip briefing must be done to ensure the students understand precisely what should be their points of focus.
iv. Field report must be submitted for assessment after the trip, this supplies the necessary feedback to the teacher on the level of achievement of set objectives.

SELF ASSESSMENT EXERCISE 2

a. Briefly explain what is meant by Lecture method.
b. Agricultural Science teachers should stop using the Lecture method in the classroom. Discuss.
c. Identify a concept in Agricultural Science that can be effectively taught using the Project method.

d. Mention four merits of Field-trip over other instructional methods used in the Agricultural Science classroom.
e. Mention four strategies that can be used to make discussion method effective.

4. CONCLUSION

The primary responsibility of Agricultural Science teacher is to transmit the subject matter to learners. This however requires the use of at least one teaching method amongst a number of existing ones. There is really no good or bad method per se but the handling and the content to be taught and learnt make the difference. Sometimes a combination of methods is required for effectiveness. This unit examines some of the conventional ones. Of those examined, the Lecture method is singled out as a teacher dominated approach. The understanding and of different instructional methods make an Agricultural Science teacher more efficient.

5.0 SUMMARY

In this unit we have learnt about:
• conventional methods of teaching Agricultural Science e.g. Lecture method, Project Method, Discussion method and Field trip
• the lecture method is a teacher-centred approach.
• the advantages and the disadvantages of these methods and strategies for improving them.

6.0 TUTOR-MARKED ASSIGNMENT

a. Explain the Discussion method in Agricultural Science teaching.
b. Mention 4 advantages and 3 disadvantages of the Lecture method.
c. Enumerate four ways of making the Project method educational effective. .
d. Briefly explain how you can organize a successful field trip in your school.

7.0 REFERENCES/FURTHER READINGS

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Adelodun R. E. (1993). *A Handbook on Principles and Practice Teaching.* Oyo: Inlet Educational Publishers.

Bello J. Y. (1981). *Basic Principles of Teaching.* London: Oxford University Press

Fasasi R.A. (2012). Improving Learners Attitude and Universal Education Programme- The Effect of Ethnoscience Based Instruction. Proceedings of the 53th Annual National Conference of Science Teachers Association of Nigeria held in Akure. Pp169-177.

UNIT 2 DEMONSTRATION AND MODIFIED LECTURE METHOD IN TEACHING AGRICULTURAL SCIENCE

CONTENTS

1.0 INTRODUCTION

In the first unit, we examined some of the conventional methods of imparting agricultural education. Demonstration and Modified Lecture methods are also used by Agricultural Science teachers. As a science and vocational subject, Agricultural Science teaching has a minimum requirement beyond what other science subjects require. By nature Agricultural Science is activity-oriented. This, therefore, has to reflect in the instructional approach of the teacher. This is where Demonstration and Modified Lecture methods come in.

2.0 OBJECTIVES

At the end of this unit, students should be able to:

- explain the use of demonstration in Agricultural Science teaching
- state the advantages and disadvantages of demonstration method
- enumerate strategies for the effective use of demonstration method
- explain Modified Lecture method in Agricultural Science teaching
- state the advantages and disadvantages of Modified Lecture method
- enumerate strategies for effective use of Modified Lecture method in Agricultural Science

3.0 MAIN CONTENT

3.1 Demonstration in Agricultural Science Teaching

Demonstration in the teaching of Agricultural Science involves teacher interacting with instructional materials while the students watch. Apart from the teacher, students can also make

displays in the presence of their colleagues. It is a good way of showing technical handling of agricultural tools, machines and equipment. Another example is the displaying of disease free crops and infected ones for comparison. Demonstration can be carried out by a single teacher alone or by a student or group of students. It is especially useful when specimens or materials cannot go round the students individually. Demonstrations can be useful in teaching and appraising many skills and examining attitudes and values. Videotapes and pictures can show plant infestation, deformities, and symptoms of diseases in livestock that cannot be described verbally. The shift in classroom dynamic catches the attention learners'. The use of various senses increases what is remembered by the learners.

Most of the activities carried out in our schools today by teachers are through demonstration lessons. It can equally be used to show experiments requiring precision. Beyond this, it is a major method in agricultural extension in terms of result demonstration.

3.1.1 Advantages of Demonstration Method

i. It helps in time management since time spent on trial and error is reduced.
ii. It minimizes destruction of materials or equipment through improper handling or accidents.
iii. It is useful in pointing out and correcting mistakes made previous exercises carried out by the students themselves.
iv. It often attracts the rapt attention of students.
v. It is cost effective especially if the equipment are expensive.
vi. It is an effective way of introducing new topics to learners.

3.1.2 Disadvantages of Demonstration Method

i. Despite the display, students may still not be able to carry out the experiments on their own.
ii. It is often ineffective in large classes because of poor visibility from a distance and distractions.
iii. Achievement of psychomotor objectives through observation from a distance is often difficult if not impossible.
iv. It limits the number of learners who can really benefit from the exercise.

3.1.3 Strategies for the Effective Use of Demonstration Method

i. All materials, tools or equipment to be used must be tested and properly set before the class starts.
ii. Proper rehearsal of what is to be demonstrated must have been done before commencing the class and all necessary logistics put in place.
iii. The location to be from where the demonstration is to be carried out must be selected before commencing the class. The choice must be influenced by the need for learners to see what is being done clearly while being comfortable in their own position. It may require some elevation. This may not necessarily be the front of the class especially if these criteria are not met.
iii. Students should be randomly selected to repeat the demonstration and necessary correction made when noticed.
iv. A summary of work done should be made at the end of the exercise.

SELF ASSESSMENT EXERCISE

a. Briefly explain Demonstration method in Agricultural Science?
b. Identify five Agricultural Science concepts that can be taught using Demonstration method? How can you apply demonstration method in teaching Agricultural Science?
c. Identify three reasons why Demonstration method may not be effective as an instructional strategy.

3.2 Modified Lecture Method in Agricultural Science Teaching

Even though, Lecture method is still widely used in many classes, its use in Agricultural Science classes and other subjects for that matter has received a number of criticisms. Researchers including the writer have observed that people listening to a lecture start to become distracted after about 10-15 minutes. Modified lecture activities are therefore designed to create a "break" in the lecture. Such "break" should be some activity that creates a change in the pace of the class and re-energizes the learner. The activity does not need to be long and can be as short as 5-7 minutes in an Agricultural Science class. The periodic breaks may help relieve student fatigue, restart the attention clock and provide an opportunity for relevant demonstrations or activities, including questions at the end to ensure that students get the point. An additional reason for this in Agricultural Science is that as a vocational science subject, Agricultural Science requires a minimum level of practical activities in its delivery. Indeed when research studies on instructional methods in Agricultural Science, using quasi-experimental designs, are carried out, the acceptable control group would be taught with Modified Lecture method.

3.2.1 Advantages of Modified Lecture Method

i. It promotes some level of meaningful learning not experienced in when using lecture method only.
ii. It incorporates few questions which is a form of evaluation of students during lessons
iii. It makes the class less boring to learners
iv. It sustains learners' interest during the class interaction.

3.2.2 Disadvantages of Modified Lecture Method

i. It may take longer time to cover the stated topic because of the activities included.
ii. The learners may lose focus because of the short break if it is not properly handled
iii. It is useful in covering a wide range of topics when limited coverage time is available.
iv. Proper skill development cannot be achieved within a short break..

3.2.2 Strategies for Effective Use of Modified Lecture Method

i. The periodic break should come not much longer than 12-15minutes after the commencement of the lecture and after previous break.
ii. The break must be filled with interesting activities even if it is a demonstration of a practical aspect of the concept being taught.
iii. Learners should be more active in the break exercise than the teacher.

4. CONCLUSION

In the teaching and learning of vocational science subjects like Agricultural Science, efforts should be made by the teacher to include activities even if it is only demonstration rather being 'talk-chalk' exercise. This is why the use of Modified Lecture Method is more appropriate than pure Lecture Method in the Agricultural Science classroom.

5.0 SUMMARY

In this unit we have learnt about:

- the Demonstration and Modified Lecture methods
- the advantages and the disadvantages of Demonstration and Modified Lecture methods.
- the strategies for effective use of Demonstration and Modified Lecture methods,

6.0 TUTOR-MARKED ASSIGNMENT

a. Explain how demonstration can be used to teach a named concept in Agricultural Science.
b. Mention 3 advantages and 3 disadvantages of the Modified Lecture method.
c. Enumerate three differences between Modified Lecture and Lecture methods.

7.0 REFERENCES/FURTHER READINGS

Davidson, J. (2003). *The Complete Guide to Public Speaking.* Hoboken, NJ: John Wiley & Sons, Inc.

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Unit 4 Experiential Learning in Agricultural Science

CONTENTS

7.0 References/Further Readings

CONTENT

1.0 INTRODUCTION

Current instructional approaches seem to agree on some factors that facilitate learning through the provision of experiences that allow students to learn through actions, by doing, from experience, through discovery and exploration. One can recall the sayings of the following philosophers:

Tell me and I forget, Teach me and I remember, Involve me and I will learn-~ Benjamin Franklin 1750

I hear and I forget, I see and I remember, I do and I understand-~ Confucius, 450 BC

In essence instructional methods are viewed from the point of learning.

2.0 OBJECTIVES

At the end of this unit, students should be able to:

- explain Experiential Learning
- identify steps in Experiential Learning process
- state students and instructors' roles in Experiential Learning
- enumerate experiential learning opportunities in Agricultural Education
- identify instructional methods that facilitate Experiential Learning in Agricultural Science.

3.0 MAIN CONTENT

3.1 Experiential Learning

Experiential learning is a philosophy and methodology in which educators purposefully engage with students in direct experience and focused reflection in order to increase knowledge, develop skills, and clarify values (Association for Experiential Education, para. 2). In experiential learning situations, learners cooperate and learn from one another in a more semi-structured approach. Instruction is designed to engage students in direct experiences which are tied to real world problems and situations in which the instructor facilitates rather than directs student progress.

3.1.1 The Experiential Learning Process

Experiential learning involves a number of steps that offer student a hands-on, collaborative and reflective learning experience which helps them to "fully learn new skills and knowledge" (Haynes, 2007). Although learning content has been accepted as being important, learning from the *process* is at the heart of experiential learning. During each of the steps of the experience, students will engage with the content, the instructor, each other as well as self–reflect and apply what they have learned in another situation. These steps are:

i. Experiencing/Exploring "Doing"

Students will perform or do a hands-on minds-on experience with little or no help from the instructor. Examples might include: Making products or models, role-playing, giving a

presentation, problem-solving, playing a game. A key facet of experiential learning is what the student learns from the experience rather than the quantity or quality of the experience.

ii. Sharing/Reflecting "What Happened?"

Students will share the results, reactions and observations with their peers. Students will also get other peers to talk about their own experience, share their reactions and observations and discuss feelings generated by the experience. The sharing equates to reflecting on what they discovered and relating it to past experiences which can be used for future use.

iii. Processing/Analyzing "What's Important?"

Students will discuss, analyze and reflect upon the experience. Describing and analyzing their experiences allow students to relate them to future learning experiences. Students will also discuss how the experience was carried out, how themes, problems and issues emerged as a result of the experience. Students will discuss how specific problems or issues were addressed and to identify recurring themes

iv. Generalizing "So What?"

Students will connect the experience with real world examples, find trends or common truths in the experience, and identify "real life" principles that emerged.

v. Application "Now What?"

Students will apply what they learned in the experience (and what they learned from past experiences and practice) to a similar or different situation. Also, students will discuss how the newly learned process can be applied to other situations. Students will discuss how issues raised can be useful in future situations and how more effective behaviors can develop from what they learned. The instructor should help each student feel a sense of ownership for what was learned.

3.1.2 Instructor Roles in Experiential Learning

In experiential learning, the instructor guides rather than directs the learning process where students are naturally interested in learning. The instructor assumes the role of facilitator and is guided by a number of steps crucial to experiential learning as noted by (Wurdinger & Carlson, 2010, p. 13). They must:

i. be willing to accept a less teacher-centric role in the classroom.

ii. approach the learning experience in a positive, non-dominating way.

iii. identify an experience in which students will find interest and be personally committed.

iv. explain the purpose of the experiential learning situation to the students.

v. share your feelings and thoughts with your students and let them know that you are learning from the experience too.

vi. tie the course learning objectives to course activities and direct experiences so students know what they are supposed to do.

vii. provide relevant and meaningful resources to help students succeed.

viii. allow students to experiment and discover solutions on their own.

ix. find a sense of balance between the academic and nurturing aspects of teaching.

x. clarify students" and instructor roles.

3.1.3 Student Roles in Experiential Learning

Qualities of experiential learning are those in which students decide themselves to be personally involved in the learning experience (students are actively participating in their own learning and have a personal role in the direction of learning). Students are not completely left to teach themselves; however, the instructor assumes the role of guide and facilitates the learning process. The following list of student roles has been adapted from (UC-Davis, 2011 and Wurdinger & Carlson, 2010).

i. Students will be involved in problems which are practical, social and personal.

ii. Students will be allowed freedom in the classroom as long as they make headway in the learning process.

iii. Students often will need to be involved with difficult and challenging situations while discovering.

iv. Students will self-evaluate their own progression or success in the learning process which becomes the primary means of assessment.

v. Students will learn from the learning process and become open to change. This change includes less reliance on the instructor and more on fellow peers, the development of skills to investigate (research) and learn from an authentic experience, and the ability to objectively self-evaluate one's performance.

3.1.4 Integrating Experiential Learning (EL) in Agricultural Science Teaching

A primary role for instructors is to identify a situation which challenges students various methods (such as problem-solving, cooperation, collaboration, self-discovery and self-reflection) and decide what the students should learn or gain from the learning experience. When integrating experiential learning into the teaching of Agricultural Science teaching and other subjects , the following steps could be taken as listed by the Faculty Development and Instructional Design Center of Northern Illinois University:

i. Plan.

Once the EL experience has been decided upon, plan the experience by tying it to the course learning objectives and determine what students will need to successfully complete the exercise (resources such as readings and
worksheets, research, rubrics, supplies and directions to off-campus locations, etc.). Also, determine the logistics: how much time will be allotted for the students to complete the experience (a complete class session, one week or more)? Will students need to work outside of class? How will the experience end? What forms of assessment will you employ? Will you use ongoing assessments such as observations and journals (called formative assessment), end of experience assessments such as written reports and projects, self and/or peer assessments, or a combination of all three?

ii. Prepare.

After the planning has been completed, prepare materials, rubrics, and assessment tools and ensure that everything is ready before the experience begins.

iii. Facilitate.

As with most instructional strategies, the instructor should commence the experience. Once begun, you should refrain from providing students with all of the content and information and complete answers to their questions. Instead, guide students through the process of finding and determining solutions for themselves.

iv. Evaluate.

Success of an experiential learning activity can be determined during discussions, reflections and a debriefing session. Debriefing, as a culminating experience, can help to reinforce and extend the learning process. In addition, make use of the assessment strategies previously planned.

3.1.5. Experiential Learning Opportunities in Agricultural Education

George Mason University (2011), Loretto (2011) and Northern Illinois University OTC (2011) identified experiential learning opportunities some of which are adapted for Agricultural Science. These are:

i. Field Work Experiences

These allow students to explore and apply content learned in the classroom in a specified field experience away from the classroom. Field work experiences bridge educational experiences with beyond the classroom experience which can range from neighborhoods and schools to anthropological dig sites and laboratory settings.

ii. Practicum Experiences

They are often a required component of a course of study and place students on industrial attachment to agro-allied establishments for on-the-field practical experience. Students develop competencies and apply previously studied theory and content. Practicum experiences also allow students to design and develop a project in which they apply acquired knowledge and develop new skills.

iii. Student Teaching Experiences

It provides teaching practice student with an opportunity to put into practice the knowledge and skills he or she has been developing in the preparation programme. Student teaching typically involves an on-site experience in a partner school and opportunities for formal and informal reflection on their teaching experience.

3.1.6. Which Instructional Methods Facilitate Experiential Learning in Agricultural Science?

Having identified essential components of Experiential learning, scholars are of the opinion that many instructional strategies exhibit these components in various levels. At the low end (those with little or no experiential learning potential) are the lecture method, discussion method etc, Those approaches with some experiential learning potential were problem solving, laboratory work, case discussions, Concept mapping, computer assisted instruction, , learning cooperatives (where students take the responsibility for teaching themselves), Ethnoscience Instruction,. Those with increasing experiential learning potential are group case assignments, simulation games, field trips, cases

SELF ASSESSMENT EXERCISE

i. Identify five common instructional methods used in teaching Agricultural Science and explain to what extent they facilitate experiential learning

4.0 CONCLUSION

So much effort is expended by many teachers on teaching students to understand a concept or topic. Not minding this, students still decide on what they learn on their own. It is

important, therefore, to periscope teaching from the angle of learning and identify factors that would encourage students to learn. This is the purpose of studying experiential learning.

5.0 SUMMARY

In this unit we have learnt about:

- Experiential Learning
- Experiential Learning Process
- Instructor Roles in Experiential Learning
- Student Roles in Experiential Learning
- Integrating Experiential Learning (EL) in Agricultural Science Teaching
- Experiential Learning Opportunities in Agricultural Education
- Instructional Methods that facilitate Experiential Learning In Agricultural Science.

6.0 Tutor-Marked Assignment

i. Explain your understanding of the term 'Experiential Learning'.
ii. Mention three roles of an instructor in facilitating learning in Agricultural Science
iii. Mention three roles of a student in facilitating learning in Agricultural Science
iv. Enumerate four instructional methods and examine to what extent they facilitate Experiential Learning.
v. Identify four experiential learning opportunities in Agricultural Education.

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Unit 3 Modern Methods of Teaching Agricultural Science
MAIN CONTENTS

1.0 INTRODUCTION

Increasing level of understanding of how students learn has led to the development of different instructional methods in education. The ultimate aim is to ensure that students learn. However various challenges have been making this objective difficult to achieve. The use of popular traditional lecture method in teaching Agricultural Science has not brought about desired change in learning as earlier observed. Other instructional methods are being regularly developed. We shall shortly examine some of these relatively new methods aimed at improving learning of Agricultural Science among students. .

2.0 OBJECTIVES

By the end of the unit, you should be able to:

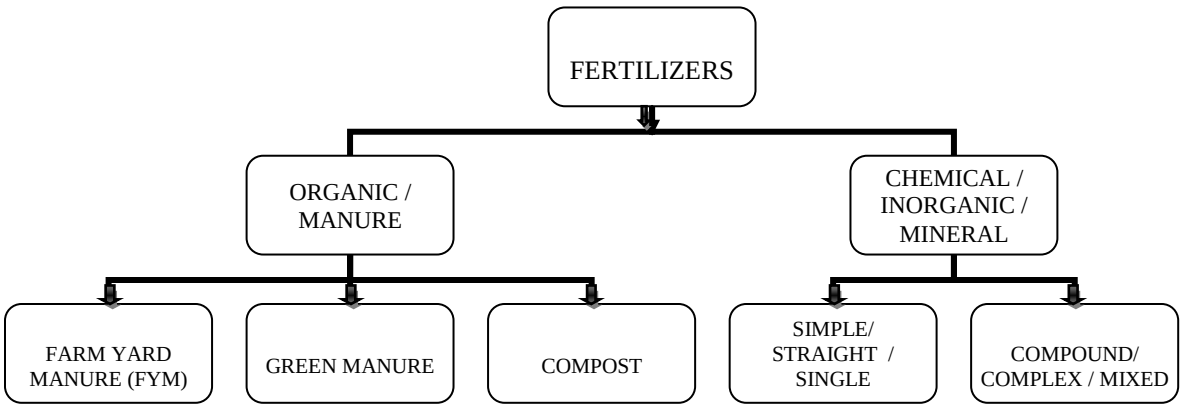
i. explain the following instructional strategies- Concept mapping, Problem-solving, Computer Assisted Instruction and Ethnoscience Instruction in Agricultural Science teaching.
ii. apply Concept mapping, Problem-solving, Computer Assisted Instruction and Ethnoscience Instruction in Agricultural Science teaching.
iii. state the advantages and disadvantages of Concept mapping, Problem-solving, Computer Assisted Instruction and Ethnoscience Instruction in Agricultural Science teaching.
iv. explain some strategies for the effective use of Concept mapping, Problem-solving, Computer Assisted Instruction and Ethnoscience Instruction in Agricultural Science teaching.

3.0 MAIN CONTENT

3.1 Concept Mapping

A concept map is a special form of a web diagram for disentangling a concept and making it clearer to the learner. . Concept mapping is the strategy employed to develop a concept map. A concept map consists of cells or nodes containing a concept, item or question to be broken down into a more understandable steps or sub-divisions and joined together with links or arrows indicating relationship. Concept mapping was developed by Novak and his associates at Cornell University in 1992. According to Nzewi (2001) for the construction of concept maps, students should be guided by the following:
i. Note the keywords, phrases or ideas from lessons or text.
ii. Arrange them in a hierarchy
iii. Draw circles around the concepts
iv. Connect the concepts using arrows or lines
v. Provide examples if possible at the end of each branch.
vi. Cross -link hierarchies or branches where possible.

For example in teaching the concept of fertilizers, a simple concept map shown below would be useful.



The concept map shows that fertilizers can be group into two, namely; Organic fertilizers (also called Manures) and Chemical fertilizers (also called Inorganic or Mineral fertilizers). Organic fertilizers are also sub-divided into: Farmyard manure (FYM), Green manure and Compost while Chemical fertilizers are sub-divided into: Simple fertilizers (also called Straight or Single fertilizers) and Compound fertilizers (also Complex or Mixed fertilizers).

3.1.1 Advantages of Concept Mapping

i. Concept mapping helps students to a holistic understanding of a concept.
ii. It helps learners to understand the relationship between divisions and sub-divisions of a concept or item or topic.
iii. It could be used in assessing the prior knowledge of the students on the topic about to be taught.
iv. It is equally useful in suggesting further exploration of a concept beyond what is originally set out.
v. It helps to emphasize major aspects of a concept.
vi. It helps to simplify difficult concepts and reduce students' anxiety.
vii. It can be used to teach any subject or discipline.
viii. It aids recall and retention of concept learnt.

3.1.2 Disadvantages of Concept Mapping

i. The learners understanding of the concept may be limited to what is represented in the concept map.
ii. It may mislead the learner if the constructor does not have a proper understanding of the concept or how to construct a concept map.
iii. The accuracy of a concept map is affected by many factors such as previous knowledge of the constructor, his/her understanding of the concept, amount of information available to him etc.

SELF ASSESSMENT EXERCISE

i. Identify a concept in Agricultural Science and prepare a concept map for the concept.

3.1.3 Strategies for the Effective Use of Concept Mapping

i. Concept maps should be accompanied by full explanation of the concept or topic.
ii. Concept mapping should be prepared after thorough understanding of the whole topic to prevent misrepresentation

3.2 Problem solving Method

The problem solving approach is a teaching method where the central and essential characteristic is solving problems. It is student-centered. It starts with the identification of a problem by the students or the teacher or from a true-to-life experience. The students then have the task of finding facts that will assist in solving the problem. The teacher offers minimum guidance. It is often touted as the best method of teaching agriculture. The learner passes through the stages below in arriving at a solution.

- Identification of the problem requiring solutions
- Definition and delimitation of the problem
- Collection of necessary data required to solve the problem
- Formulation of hypothesis for solution
- Testing of the hypothesis
- Checking whether the result leads to the solution otherwise the procedure is revised and the process repeated until the problem is solved or he gives up.

The teacher offers minimum guidance at every stage of the process.

3.2.1 Advantages of Problem-Solving Method

i. It assists students to be logical, creative and analytical in their thought and decisions.
ii. It provides opportunities to handle individual differences among learners.
iii. Learning is enhanced when learners are able to link their class work to true-to-life situation
iv. It arouses and develops the interest of the learner in the problem listed for solution.
v. Abstract concepts which may be beyond our common sense reasoning could be tackled effectively.

3.2.2 Disadvantages of Problem-Solving Method

i. It is time consuming.
ii. It could be boring if used often.
iii. It may not appeal to all students because the problem may not be of interest to some of them.

3.2.3 Strategies for Effective Use of Problem-Solving Method

i. Its use must be limited e.g. once a term
ii. The teacher must guide each of the steps to arrive at a useful solution.

3.3 Computer Assisted Instruction (CAI)

Computer-assisted instruction (CAI) is simple an instruction presented on a computer. This is achieved through the development and use of computer programmes that facilitates education of students individually or in group. It is a teaching tool which was first introduced in the 1960s. They enhance teacher instruction in several ways. The lesson materials are usually presented in a way that they appeal to all the senses through the utilization of text, graphics and audio. It provides a solution to some of the problems now facing educational delivery.

3.3.1 Advantages of Computer Assisted Instruction

i. Computer programmes are interactive and can illustrate concepts with the use of animation, sound, and demonstration.

ii. Computer programmes provide students with the opportunity to progress at their own pace.

iii. Computers provide immediate feedback when questions are asked and answers provided instantly.

iv. Computer-assisted instruction can help students with disabilities through specially designed programmes.

v. They help to motivate learners through presentations that the use of animation, sound, and demonstration.

vi. They combined features of computer assisted instruction facilitate learning.

vii. Computer Assisted Instruction can be applied to all ages and forms of educations, from preschool to professional school, tertiary institutions and even in many employment areas.

3.3.2 Disadvantages of Computer Assisted Instruction

i. It requires constant supply of electricity which is erratic in many developing countries.

ii. It requires skill in computer operations.

iii. Computers like any other equipment can mal-function at critical periods.

iv. It sometimes depends on the level of students' proficiency in computer operations.

3.3.3 Strategies for Effective Use of Computer Assisted Instruction

i. The computer programme should be reviewed to ensure the learners understand the context of the lessons and determine which ones fit the needs of their students and how they may enhance instruction.

ii. The computer programme must be simple enough for the level of learners it is planned for.

iii. The animation in the programme must not be distractive or time wasting.

iv. Installation and operation of the programme must be simplified to prevent hitches in the use of the programme.

v. It is often advisable to make available another source of power supply in case the public electric supply is cut off.

3.4 Ethnoscience Instructional Method

It is an instructional method developed in 2013 by Dr. R. A. Fasasi. The method was developed based on the observed underachievement and alienation from science of students in the traditional settings. One of the reasons adduced for this underachievement is the cultural clashes that exist between students' life-world and world of modern science. These clashes are influenced by cultural beliefs embedded in prior knowledge. Scholars believe that this factor is one of the factors that account for underachievement in science and alienation of students from science. Ethnoscience Instructional Method was developed to help learners make meaning out of their experiences in science classrooms by making it easy for them to negotiate a cultural transition from their life-world into the world of school science. The method involves the following steps:

i. The teacher briefly introduces the concept.

ii. The teacher enumerates and explains related common sayings on the concept using available information on previous related cultural beliefs.

iii. Learners respond and are encouraged to list more related common sayings and other prior knowledge.

iv. The teacher presents the new science concept and jointly with the students interacts with relevant ethnoscientific instructional materials.

v. Students compare new concept and related common cultural beliefs and sayings and classify them into:

(a) Compatible sayings

(b) Modifiable sayings

(c) Contradictory sayings

vi. The teacher demonstrates and allows learners to interact with relevant instructional materials.

vii. The teacher asks questions and allows the students to ask questions and takes summary of the lesson.

viii. The teacher gives assignment.

3.4.1 Advantages of Ethnoscience Instructional Method

i. It allows learners to critically re-assess cultural beliefs that are in tandem with scientific concepts.
ii. It arouses learners' interest in the concept being taught.
iii. It helps the learner to know that not all his cultural beliefs are unscientific and is surprised that indeed some of the beliefs are compatible with scientific concepts.
iv. It improves scientific achievements of learners from background where day-to-day activities are still greatly affected by their cultural beliefs and sayings.
v. It is especially useful in subjects and concepts that touch peoples' life Agricultural Science.
vi. It encourages learners' active participation in classes.

3.4.2 Disadvantages of Ethnoscience Instructional Method

i. Additional effort may be required by the teacher to get a collection of science-related cultural beliefs of the community of the learners.
ii. It may be time consuming.
iii. Students may not be too willing divulge some cultural information.

3.4.3 Strategies for the Effective Use of Ethnoscience Instructional Method

i. Accessing available cultural information relating to the concept to be taught makes the teacher better prepared.
ii. Teachers should not allow condemnation of peoples' cultural beliefs and saying. Mutual respect should be guaranteed.

4.0 Conclusion

Today's learner is faced with so many challenges that a teacher requires vast knowledge and use of different current approaches to be able to arouse and sustain the interest of the learner. Teachers of student teachers, teachers and student teachers must broaden and update the knowledge of instructional methods to be able to meet these challenges.

5.0 Summary

In this unit we have learnt about:
• Concept Mapping including its advantages and disadvantages
• strategies for the effective use of Concept Mapping
• Problem-Solving Method including its advantages and disadvantages
• strategies for the effective use of Problem-Solving Method
• Computer Assisted Instruction including its advantages and disadvantages
• strategies for the effective use of Computer Assisted Instruction
• Ethnoscience Instructional Method including its advantages and disadvantages
• strategies for the effective use of Ethnoscience Instructional Method

6.0 Tutor-Marked Assignment

i. Briefly explain the concept mapping
ii. Mention three ways by which concept mapping can facilitate learning in Agricultural Science
iii. Explain the term Computer Assisted Instruction
iv. Differentiate between steps in Problem Solving Method and Ethnoscience Instruction

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MODULE 2 RESOURCES AND PLANNING FOR AGRICULTURAL SCIENCE TEACHING

CONTENT

Unit 1 Resources for Teaching Agricultural Science: Instructional Materials and Community Resources

CONTENTS

1.0 INTRODUCTION

Teaching and learning process is indeed a complex process whose efficiency requires informed presentation, proper choice and use of materials that would aid learning, conducive environment and correct interpretation and reception by the learner. Materials used in the process are called Instructional materials (also referred to as Teaching Aids) and come under a broader title of resources for teaching and learning. These resources are *sine qua non* for efficient learning of agricultural concepts to achieve set objectives. In this unit, we shall examine some of the resources for teaching Agricultural Science in terms of Instructional materials and community resources.

2.0 OBJECTIVES

By the end of the unit, you should be able to:

· state the meaning of resources in education
· define instructional materials
· state the importance instructional materials
· classify instructional materials
· factors considered in the selection and use of Instructional Materials
· explain what community resources are.

3.0 MAIN CONTENT

3.1 Meaning of Resources

Resources in teaching and learning refer to all forms of aids required by the learner and the teacher to achieve educational objectives that have been set. These include human and material resources. Examples in Agricultural Science are e.g. teachers, extension agents, farmers, textbooks, chalkboard/white board, farm produce, simple tools and equipment, books pictures, drawings, etc. and community resources e.g. farms, abattoir, hatcheries etc.

3.2 What are Instructional Materials?

Instructional material or aids are concrete materials and equipment that a teacher uses for making concepts clearer to the learners. They range from simple objects such as cutlass, seeds, soil, fowls etc to sophisticated machines and equipment such tractors, video tapes, computer, multimedia etc . Instructional materials are also referred as Instructional materials, instructional media or teaching materials / aids or educational media.

3.3 Importance of Instructional Materials

i. They arouse the interest of the learner.
ii. They appeal to all senses of learners.
iii. They create greater impact which aids retention.
iv. It saves time in terms of the effort require to describe verbally objects and experiments.
v. They facilitate the understanding of abstract.
vi. They stimulate reality.
vii. They help to concretize learning.

3.4 Classification of Instructional Materials

There are different ways by which instructional materials can be classified. They include:
i. Classification based on the senses they stimulate: visual, audio and audio-visual.
ii. Classification into print (e.g. books, journals, magazine) and non-print (e.g. models, real objects,).
iii. Classification based on the level of technology: High technology (e.g. Computers, Multimedia) and low technology (e.g. Hoe, cutlass).
iv. Classification based on projection: Projected (e.g. Slide, filmstrips, opaque projector, educational TV, Video, overhead projector) and non-projected media (e.g. Still pictures, realia, models, graphics).

We shall however lay emphasis at this point on the first classification which seems more comprehensive.

a. Visual Instructional Materials

These are materials that appeal to the eyes only. They are seen and observed. They include: Textbooks, newsletters, journals, models, charts, pictures, chalkboard, seeds etc

b. Audio Instructional Materials

These are materials that appeal to the sense of hearing (ear). They are audible. They include: Audio tapes, radio sets, record player etc.

c. Audiovisual Instructional Materials

These are materials that appeal to the senses of sight and hearing. They are seen and heard. They include: Television recordings, video presentations, overhead projector presentations capturing voice and video, live animals etc.

3.5 Factors considered and Use of Instructional Materials

i. Appropriateness - Instructional materials to be used in classroom interaction must be suitable for and related to the topic being taught, type and age group of learners.
ii. Cost – The instructional material must be affordable and should not be too expensive.
iii. Freedom from Distortion- It must be free from all forms of personal bias, misrepresentation, prejudice and falsehood.
iv. Availability – It must not be difficult to access. It should be easily obtainable.
v. Currentness – It should reflect contemporary thought and should not be archaic.
vi. Technical Requirement – It must be technically simple and easy to operate. Complex materials often create problems in the classroom.
vii. Appealability- A good quality instructional material should appeal to learners, arouse and hold their interest.

SELF ASSESSMENT EXERCISE

i. Identify four instructional materials, list the concept you can use each of them to teach in Agricultural Science and explain how you will appropriately use each of them

3.6 Community Resources

Community resources refer to teaching and learning resources available in the community where the school is sited. A number of educational resources are available for the teaching and learning of Agricultural Science. They include materials, natural resources or sites of interest locally available, personnel who are specialists in different areas of agriculture and agro-based industries. Examples include zoological and botanical gardens, parks/games reserves, ponds, lakes, beaches, veterinary doctors, extension agents, Garri processing industry, feed mills etc. It is relatively easier to access resources that are available in the community often because of the goodwill of the local population. It is often an opportunity for students to be exposed to real life situations, have practical experience and share the knowledge of experts in the field. All these activities aid learning and retention. These activities are however time consuming and a lot goes into their successful execution.

4.0 CONCLUSION

Most people who teach are technically competent in terms of knowledge but what separates them in terms of efficiency and effectiveness is their dexterity in the choice and use of instructional materials.

5.0 SUMMARY

In this unit we have learnt about:

- the meaning of educational resources
- what Instructional Materials are
- the importance of Instructional Materials
- the classification of Instructional Materials
- the factors considered in the selection and use of instructional materials
- community resources

6.0 TUTOR-MARKED ASSIGNMENT

i. With examples, identify classes of instructional materials.

ii. Briefly explain five factors that a teacher needs to consider in the choice of instructional materials for an .

iii. Identify ten community resources that can be found in your area and used in teaching agricultural science in your area,

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Unit 2 Improvisation in Agricultural Science Teaching

CONTENTS

1.0 INTRODUCTION

From the previous unit, we can conclude that the need for the use of instructional materials in the teaching and learning of Agricultural Science cannot be overemphasized. However two of the major problems that arise when instructors plan to use instructional materials are non-availability of the material and inadequacy when available. A teacher then has two options i.e.: teaching the lessons without appropriate instructional materials or finding alternative materials that is close to the original material. Improvisation can therefore be defined as utilization of alternative instructional material produced from easily available local materials.

Such materials are available in abundance within the environment. This unit will therefore examine the concept of improvisation in Agricultural Science teaching and how improvised materials they can be produced and used as necessary alternatives.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define improvisation
- state when to improvise
- list four importance of improvisation
- outline the limitations of improvisation.
- list some materials or equipment that can be improvised in Agricultural Science.

3.0 MAIN CONTENT

3.1 Definition of Improvisation in Agricultural Science Teaching

Improvisation can be defined as the process of using available alternative resources in the absence or inadequacy of actual resources. It has also been defined by others like Olagunju (1989) as the act of using materials or equipment obtained from the local environment or designed by either the science teacher or with the aid of local personnel to enhance instruction. The importance of improvisation is accentuated by the need to fill the gap created by inadequacy

of real instructional materials or their complete non-availability. It is a second option to prevent teaching without instructional materials.

3.2 When do you improvise in Agricultural Science Teaching?

The need for improvisation of instructional materials in Agricultural Science class arises when the following occur:
i. When instructional materials are not adequate
ii. When instructional materials are too expensive.
iii. When there is the need to localize instructional materials for technological development
iv. When instructional materials are completely unavailable.

3.3 Importance of Improvement Agricultural Science Teaching

- It enhances students' understanding of Agricultural Science concepts by students.
- It promotes creativity in teachers and students
- It promotes technological independence and advancement in the area of educational resources development and production
- It provides alternatives when real life situations or realia cannot be brought to the classroom. For example when exotic breeds of livestock are not available, photographs can serve as substitutes.
- It promotes active participation of students in the teaching and learning process
- It promotes curiosity among learners.

3.4 Limitations of Improvement in Agricultural Science Teaching

- No substitute can perfectly replace a material. For example a chart of rock samples does not guarantee recognition of the actual rocks when seen by physically.
- Preparation of improvised materials that approximate real objects requires skill to capture as much of the essential properties.

3.5 List of some materials or equipment that can be improvised in Agricultural Science.

REAL INSTRUCTIONAL MATERIALS	**IMPROVISED OPTIONS**
Candler	Closed box with a bulb and an egg shaped top cut
Bunsen burner	Candle, oil lamp, kerosene lamp, and kerosene stove
Hand lens	Reading glass
Measuring cylinder	Babies feeding bottle
Beakers	Cut empty milk tin
Reagent bottles	Empty bottles of drugs
Troughs	Plastic bowls

Calcium carbonate	Chalk or ground egg shell
Sodium chloride	Iodized salt
Beach Sienne	Mosquito net
White Fulani	Photograph of White Fulani
Changes in a growing seed	Animated video of growing seed

SELF ASSESSMENT EXERCISE

i. Identify ten other instructional materials that can be improvised and what form of improvisation you will carry out.

4.0 CONCLUSION

The production and use of improvised instructional materials are great challenges to teachers of Agricultural Science especially at a time when students' population is continuously increasing while fund allocation to education is dwindling. Agricultural Science teachers who are creative, efficient and effective would have no choice than to rise up to the challenge.

5.0 SUMMARY

In this unit, we have learnt about:

i. the definition of improvisation
ii. when to improvise in the Agricultural Science class
iii. list some materials or equipment that can be improvised in Agricultural Science.
iv. list four importance of improvisation
v. outline the limitations of improvisation.

6.0 TUTOR-MARKED ASSIGNMENT

i. What is improvisation in education?
ii. List ten (10) examples of some materials and equipment that can be improvised in Agricultural Science teaching.
iii. Enumerate 5 importance of improvisation in Agricultural Science teaching.
iv. Identify four limitations of improvisation
(c) Outline some of the limitations of improvisation.

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Unit 3 Current Curricular Challenges in the Teaching of Agricultural Science

CONTENTS

1.0 INTRODUCTION

Between 2005 and 2007, the Nigerian Educational Research and Development Council (NERDC), in response national and global reforms in the social and economic sectors coupled with the Millennium Development Goal (MDG) vision statement and the National Economic Empowerment Development Strategy (NEEDS), developed a 9-year Basic Education Curriculum (BEC) to facilitate the achievement of the combined objectives of these laudable programmes. The curriculum was subsequently approved for use in all Nigerian Primary and Junior Secondary Schools starting from September 2008. This development also necessitated having changes in the Senior Secondary Education Curriculum (SSEC). A new one was equally developed. These curricular changes brought about consequential changes in Agricultural Science as a subject at these levels.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain how curricular changes have affected the teaching of Agricultural Science.
- explain the major challenges in the teaching of new agricultural entrepreneurship subjects.

3.0 MAIN CONTENT

3.1 Curricular Changes affecting Agricultural Science

The 9-year Basic Education Curriculum (BEC) and the new Senior Secondary Education Curriculum (SSEC) are tailored towards current needs for national development. The new Senior Secondary Education Curriculum (SSEC) has a structural link with the contents of the present Junior Secondary Education Curriculum (JSEC). The main thrust of, among others, are to achieve job creation, poverty alleviation, empowerment of the citizens through quality education and value reorientation with the aim of imparting entrepreneurial skills on students in senior secondary schools (NERDC, 2011). One of the subjected affected by the restructuring is Agricultural Science. Previously the subject could be offered by any students in Senior Secondary School (SSS) whether he/she was in the Arts, Commercial or Science class. With the new curriculum, only science students can offer the subject. Of greater importance however is the classification of agriculture under Pre-Vocational Studies (PVS) with Home Economics and Entrepreneurship at the Junior Secondary School (JSS) level. At Senior Secondary School (SSS) level, 34 new subjects were introduced as Trade /Entrepreneurship subjects. Two of these are from Agricultural Science namely: Animal Husbandry and Fisheries. Teachers of Agricultural Science have the task of handling these new subjects.

3.2 Need for Students' Entrepreneurship Teaching and Learning

According to the Consortium for entrepreneurship Education (2006) the benefits of entrepreneurship education include the following:

- Entrepreneurship Education inspires and motivates students to achieve while in school and use their knowledge in real world setting.
- Entrepreneurship Education improves school performance.
- Entrepreneurship Education builds a pipeline that creates productive and thoughtful citizens who contribute to local, regional and national competitiveness.

3.3 Importance of Teaching of New Agricultural Entrepreneurship Subjects and Entrepreneurship in Agricultural Science

i. It promotes positive change in attitude to taking up a career in agriculture.
ii. It promotes self-employment.
iii. It boosts individuals' economic reward and personal satisfaction.
iv. It helps to develop an entrepreneurial mindset.
v. It will lead to reduction in the level of unemployment.
vi. It teaches students goal setting,, self-monitoring, self-evaluation.
vi. It helps to develop managerial skills such as leadership, persistence, focus, vision, , flexibility, technical skills and passion.
viii. It helps to increase agricultural production.
ix. It is useful in reducing the level of poverty among the people.

3.4 What to teach in entrepreneurship in Agricultural Science?

The Agricultural Science teacher has a responsibility to emphasize core entrepreneurial issues not only in Animal Husbandry and Fishery but in Agricultural Science itself. These core issues include:

i. Recognition of opportunities in agriculture.
ii. Generating new ideas to pursue such opportunities
iii. Knowing how to access needed resources.
iv. Development of managerial skill to create and operate a new business venture.
v. Ability to assess the business environment and be ahead of competitors.
vi. Learning how to prepare a business plan

3.5 How to Teach New Agricultural Entrepreneurship Subjects and Entrepreneurship concepts in Agricultural Science

i. Learning experiences must be experiential and problem based.
ii. An interactive pedagogy which leaves the initiative to students must be used.
iii. Teacher should infuse entrepreneurship-related activities in their regular classes in Agricultural Science.
iv. Organizational skills such leadership development and time management should be taught.
v. Improving their financial literacy skills.
vi. Involving them in small scale businesses in agriculture such as poultry and fish pond management

SELF ASSESSMENT EXERCISE

1. Identify five reasons why teaching entrepreneurship subjects will be of benefit to graduates of agriculture and the economy.

4.0 CONCLUSION

Unemployment has become a hydra-headed problem resulting in increasing real threat to national security in form of terrorism, kidnapping, rape, arson, thuggery and so on. Our approach to teaching and learning must therefore change to face these challenges. The more students we train in entrepreneurship subjects such as Animal Husbandry and Fishery to be entrepreneurs and problem solvers, the more jobs they would create leading, ultimately to improved standard of living of the citizenry.

5.0 SUMMARY

In this unit, we have learnt about:

i. curricular changes affecting Agricultural Science
ii. need for students' entrepreneurship teaching and learning
iii. importance of teaching new agricultural entrepreneurship subjects and entrepreneurship in Agricultural Science.
iv. what to teach in entrepreneurship in agricultural science?
v. how to teach new agricultural entrepreneurship subjects and entrepreneurship concepts in Agricultural Science

6.0 TUTOR-MARKED ASSIGNMENT

i. Mention four curricular changes that have been made in Agricultural Science.
ii. Mention five importance of the inclusion of agricultural based Entrepreneurship subjects in the National Curriculum
iii. Briefly describe how you would teach a concept in Animal Husbandry or Fishery using guidelines for Entrepreneurship subjects as enunciated.

7.0 REFERENCES/FURTHER READINGS

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UNIT 4 TEACHING UNITS, LESSON PREPARATION AND LESSON PLAN

CONTENTS

1.0 INTRODUCTION

The responsibilities of a teacher are enormous. The teacher must therefore be a good planner. Achievement of set objectives is a product of planning that must have taken place earlier. Such planning incorporates determination of appropriate objectives, teaching strategies to be used and assessment criteria. An Agricultural Science teacher prepares his daily lessons from the

scheme of work based on the syllabus and the total curriculum organization. The concept of planning will be examined in this unit.

2.0 OBJECTIVES

By the end of the unit, you should be able to:

- explain what planning means
- explain components of Instruction Plan- Curriculum, Syllabus, Scheme of Work/ Teaching Unit or Plan
- enumerating advantages of Lesson Plan/Note
- write sample Lesson Plan/Note for SS 3 Agricultural Science

3.0 MAIN CONTENT

3.1 Concept of Planning

Planning within the context of teaching and learning is all prior preparation by the teacher towards an effective concept delivery in the class. This includes the achievement of set objectives, instructional strategies to adopt in the teaching /learning process and methods of evaluation of the instructional outcomes. The major components of instructional plan are:

i. The curriculum
ii. Syllabus
iii. Scheme of work
iv. Unit of lessons /teaching unit/plan
v. Daily lesson notes

3.1.1 Curriculum

The word "curriculum" comes from the Latin word "*currere*", which means: "to run or to run a course". Scholars have attempted to define the term in several ways. For our purpose, Curriculum is an organized set of formal learning experiences aimed at achieving specific learning. It is an umbrella term for various educational concepts including school subjects or courses such as Physics, Geography, Economics and Agricultural Science, out-of – classroom teaching activities such as Inter-house Sports Competition, Debate competition etc. and lastly a programme of guidance required for necessary adjustment for school, home and the larger environment social requirement.

3.1.2 Syllabus

The syllabus is a curriculum breakdown by subject acting as a guide for the school. It is drawn from the curriculum, subject by subject. Details of what should be taught during the term or semester are enunciated in the syllabus. Syllabus like curriculum is a product of stakeholders in education. They include Ministry of Education Officials, Educationists, Curriculum Specialists, Examination Bodies, Professional Bodies like Mathematics Association of Nigeria (MAN), Science Teachers Association of Nigeria (STAN) etc.

3.1.3 Scheme of Work/Teaching Unit or Plan

A scheme of work /Teaching Unit or Plan is a breakdown of the contents of what student are expected to learn in a given period. It is a systematic arrangement of subject matter and activities

within a specified time period, such as a semester, a term or an academic calendar. Scheme of work/teaching unit consists of units, topics, concepts and themes to be covered within a stated period of time. It is drawn from the syllabus. Topics to be taught are broken down into instructional units (which include activities). It is from this scheme or teaching unit that the classroom teacher plans particular lesson(s) to be taught within particular period(s) often on a weekly basis covering the whole term or semester.

3.1.4 Lesson Plan/ Notes

A lesson plan is a representation of the teacher's preparation for a specific lesson or series of lessons. It is normally a plan for teaching a class, a job or a lesson. Lesson plans are essentially a teacher's plan of action. It specifies what the teacher wants to teach within a stated period of time. It interprets the actual learning activities from the scheme of work. It explains what is to be done within a lesson period of twenty-five, forty or fifty minutes and sometimes double period of eighty minutes. It is a record of what is taught and learnt during each lesson period. It is a stepwise enunciation of what is to be learnt in class. Lesson plans are written by teachers usually on a weekly basis at the primary and secondary levels. The Head of Department vets it and appends his signature at the beginning of the week.. It is written based on the concept being taught, the instructional materials available for teaching it, the age and class of the students. Generally a lesson plan should include the following:

i. the subject
ii. the class of the learners
iii. the period duration
iv. the instructional objectives for the lesson
v. the instructional method
vi. the instructional materials
vii. the topic or subject matter or problem for study and discussion (content)
viii. the procedure for attaining the objective
ix. evaluation and assignment
x. references.

3.1.5 Advantages of Lesson Plan/Note

i. It enhances smooth delivery of the content in the class.
ii. It increases the confidence of the teacher in the class.
iii. It enables the teacher to manage teaching time well.
iv. It allows the teacher to reflect about the lesson before class delivery.
v. It assists a teacher relieving another teacher in his/ her absence
vi. It assists supervisors in assessing the teacher's performance.

SELF ASSESSMENT EXERCISE

i. Differentiate between the following- curriculum, syllabus, scheme of work and lesson plan,

3.2 Sample Lesson Plan/Note for SS 3 Agricultural Science

Week 2
Name of Teacher:
Subject: Agricultural Science
Topic: Crop Improvement

Sub-Topic: Meaning, Aims and Methods of Crop Improvement
Class: SS3
Duration: 2 periods of 40 minutes each
Date: 13th October-17th 2014
Content: Definition, aims and three methods of Crop Improvement
Reference Book:
i. STAN (2009). Essential Agriculture for Senior Secondary Schools
ii. NERDC (2008). Nigerian Secondary Schools Project. Agriculture for Senior Secondary Schools
Instructional Objectives: At the end of the lesson, the students should be able to:
i. define the term Crop Improvement
ii. enumerate six aims of Crop Improvement
iii. list three methods of Crop Improvement
Instructional Strategies: Discussion, Concept mapping, questioning, guided inquiry and Demonstration.
Instructional Materials: Seeds of infested and resistant varieties of Cowpea, and Maize. Cocoa pods etc.
Entering Behaviour: Students are familiar with different varieties of Cowpea.

Entering Behaviour Test:
i. What type of cowpea varieties do you buy in the market?
ii. What differences do you notice between brown and white varieties of cowpea found in the market
Instructional Procedures:
Step I:
The teacher asks the students why infested seeds of Maize are cheaper than healthy insect free seeds. The students are likely to talk about the quality of the seeds
Activity I: Students are asked to examine two varieties of Cowpea seeds, one infested while the other is insect- free. They are to identify three differences between them.
Step II: The teacher then defines Crop Improvement as the process of improving the qualities and increasing the quantity of available crops and their varieties. It is the process of working on existing varieties of crops and developing from them new and improved breeds.
Step III: The students are the guided through discussion to identify the aims of Crop Improvement. They are guided to identify the following aims among others:

1. It increases total yield from crops.
2. It increases the quality of crop produce such as nutritional values, harvest-ability etc.
3. It helps to develop crops that meet the needs of growers and consumers.
4. It is used to develop crops that are resistant to pests and diseases.
5. It helps to produce early maturing crops.
6. It is used to produce crops that adapt well to the environment.
7. It is used to produce crops with uniform agronomic characteristics.
8. Improvement of harvesting qualities of crops.
9. Improvement of nutritional values of crops.

Step IV: The students are led to identify the three methods of Crop Improvement. These are:

i. Introduction
ii. Selection
iii. Hybridization or Crossbreeding

Summary

The teacher briefly reminds the students of what they have been taught during the lesson. These include the meaning, aims and methods of Crop Improvement.

Evaluation

(1) Explain what you understand the term Crop Improvement
(2) Enumerate six aims of Crop Improvement
(3) List three methods of Crop Improvement

Assignment

a. Mention five crops that were alien to Nigeria and are now planted in the country?
b. Mention five crops that originated from West Africa and are now planted in other parts of the world?

4.0 CONCLUSION

One of the qualities of an efficient teacher is his/her planning proficiency. Success in the class is largely a result of good planning. It is essential for efficient delivery of curricular objectives. In planning, the teacher is responsible for providing a formidable platform for learning. Planning therefore makes or mars a teacher.

5.0 SUMMARY

The highlights of this unit include:

- the responsibilities of a teacher in instructional planning
- explanation of components of Instruction Plan- Curriculum, Syllabus, Scheme of Work/ Teaching Unit or Plan
- enumeration of advantages of Lesson Plan/Note
- writing of a sample Lesson Plan/Note for SS 3 Agricultural Science

6.0 TUTOR-MARKED ASSIGNMENT

(i) Briefly explain planning in by the teacher in concept delivery in the classroom.
(ii) Prepare a Lesson note for a specific Agricultural Science topic for a particular class covering a week of three periods.

7.0 REFERENCES/FURTHER READINGS

Federal Ministry of Education (2014) .Agricultural Science Curriculum for Senior Secondary Schools

Gabanja, S.P.T. (1991). *Modem Methods in Science Education in Africa*. Owerri: Totan.

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Module 3 Organization of Practical Activities in Agricultural Science

UNIT 1 LABORATORY WORK AND FIELDWORK AGRICULTURAL SCIENCE

CONTENTS

1.0 INTRODUCTION

Practical activities are so central to Agricultural Science that classroom interactions without such activities make teaching and learning process incomplete. Most concepts taught in Agricultural Science demands going to the Laboratory and or Field for concretization of learning. Sometimes it is the classroom that is turned into laboratory. The growing use of Information and Communication Technology in education makes this even easier. The locale for practical activities in Agricultural Science can either be in the laboratory or the field and often both. We shall examine these in this unit.

2.0 OBJECTIVES

At the end of the unit, you should be able to:

- describe laboratory work in Agricultural Science
- enumerate advantages and disadvantages of laboratory work in Agricultural Science
- describe fieldwork in Agricultural Science
- enumerate advantages and disadvantages of fieldwork in Agricultural Science
- describe combined strategy in Agricultural Science

3.0 MAIN CONTENT

3.1 Laboratory Work in Agricultural Science

Laboratory work refers to the performance of practical activities, experimental procedures and demonstrations within the confines of a place called Laboratory. It involves

activity based hands-on classroom interactions with materials within the four walls of a room and in which close to true-to-type interactions take place. Such activities include:

i. Soil experiments e.g. Sedimentation experiment, Riddle's experiment, Soil Capillarity, Determination of Water Retention (or Holding) Capacity (WRC), Rocks identification and reactions to acid etc.

ii. Formulation of rations for livestock involving the grinding and mixture of feedstuffs such as Fishmeal, Bone meal, Maize, Groundnut Cake (GNC), Oystershell, Wheat offal, vitamins etc.;

iii. Identification of Simple farm tools and equipment such as secateurs, shears, hand-trowels, dibbers, garden fork, hand fork, candlers, theodolite, ranging poles, gunter chains etc.;

iv. Crop species identification;

v. Symptoms identification from crop specimen;

vi. Identification of external and internal parts of small livestock like rabbits and poultry.

v. Castration process using Burdizzo

3.1.1 Advantages of Laboratory Work in Agricultural Science

The use of Laboratory for practical activities has a number of merits. These include:

i. Interaction with real objects motivates learners;

ii. The environment for the practical is conducive and can be controlled for instance the laboratory may have air-conditionals or ceiling fans;

iii. Learners have the opportunity of closer interactions with materials;

iv. It is easier to detect lazy students;

v. It gives the teacher enough opportunity to assess affective and psychomotor learning outcomes of students.

3.1.2 Disadvantages of Laboratory Work in Agricultural Science

i. Materials are easily damaged.

ii. Limited skill acquisition is achieved.

iii. It is less effective for large classes.

3.2. Fieldwork in Agricultural Science

Fieldwork refers to practical activities in the natural or real locale of the activities. They are practical activities that take place *in situ*. It is a true-to type practical interaction. Learners are taken to the farm, abattoirs, poultry, fish ponds etc. Some of the practical activities that can take place during fieldwork are:

i. Tillage operations e.g. land clearing, ploughing, harrowing and ridging;

ii. Crop management from planting to harvesting;

iii. Livestock management from birth to culling;

iv. Use of machines and equipment such as tractors, mowers;

v. Operational use of simple tools like secateurs shears etc;

vi. Identification of symptoms of diseases on real life plants:

vii. Farm surveying

3.2.1 Advantages of Fieldwork in Agricultural Science

i. It gives the students real true-to-life practical experience.

ii. It helps in the retention of information as the students interact with the scientific

process.

iii. A change in normal routine of learners improves the interest in learning.
iv. It allows the learners to interact with materials in their habitat.
v. It exposes previously unforeseen challenges.
vi. At the end of their educational endeavour, learners are not strangers in the working environment.
vii. It gives the teacher an opportunity to point out other incidental concepts or topics.
viii. Teachers have a better chance of assessing students' learning outcomes in the affective and psychomotor domains

3.2.2 Disadvantages of Fieldwork in Agricultural Science

i. The stress involved may discourage learners.
ii. Learners are exposed to greater level of danger on the field.
iii. Greater level of distraction is experienced on the field.

SELF ASSESSMENT EXERCISE

i. Mention five reasons why Agricultural Science practical requirements are different from those of other basic science subjects

3.3. Combined Practical Strategy in Agricultural Science

Combined strategy involves the use of both laboratory work and fieldwork in the teaching and learning of Agricultural Science. This strategy involves having part of the practical activities in the laboratory and the other part on the field. This strategy takes combines the advantages of the two methods. Initial exposure in the laboratory arouses the interest of the learner before getting to the field. In some other instances, the field exposure comes first before the laboratory experience. Empirical evidences have revealed the effectiveness of this strategy. Some of the practical activities that can be carried out using this strategy are:

i. Identification and demonstration of how to use survey tools and equipment in the laboratory and division of land into plots with the use of the 3-4-5 method on the field;
ii. Identification and demonstration of how to use simple farm tools in the laboratory and field use of the tools;
iii. Identification of rock samples in the laboratory before moving digging and blasting sites;
iv. Demonstration of milking process through improvised materials before visits to diary farms.

4.0 CONCLUSION

The success of teaching and learning experience is in what the learner has actually learnt. Any effort aimed at ensuring that active learning takes place is not misplaced. Laboratory work and Field work are practical methods that would enhance learning. A combination of the two have been empirically proven to have synergistic effects in enhancing learning outcomes in Agricultural Science.

5.0 Summary

The highlights of this unit include:

i. a description of laboratory work and fieldwork in Agricultural Science
ii. an enumeration the advantages and disadvantages of both laboratory work and fieldwork in Agricultural Science
iii. a description of combined strategy in Agricultural Science

6.0 TUTOR-MARKED ASSIGNMENT

i. Mention four differences between Laboratory work and fieldwork.
ii. Identify a concept in Agricultural Science and explain how you will use the combined strategy in teach it.
iii.

7.0 References/Further Readings

Fasasi R. A. (2003): The Comparative Effects of Fieldwork and Laboratory Work on Students' Achievement in Agricultural Science. Dissertation. Faculty of Education, University of Ibadan

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UNIT 2 MANAGING SCHOOLS AGRICULTURAL PROJECT

CONTENT

1.0 INTRODUCTION

There are three major dimensions to science which are: Content (scientific knowledge), method (scientific process) and application (scientific product). Content and application change overtime but the scientific processes are basically stable. In view of this, emphasis is today placed on scientific processes. Attainment of these processes can be achieved by learners through practical activities. Equally, vocational science subjects like Agricultural Science cannot be effectively learnt without engagement in practical activities. Practical work cannot therefore be overemphasized. In Agricultural Science, practical work comes in various forms. One of the

most effective forms is the Project. This is why the establishment of agricultural projects is a major curricular requirement in schools offering Agricultural Science.

2.0 OBJECTIVES

At the end of the unit, you should be able to:

- explain what is meant by Agricultural Project
- enumerate seven importance of Schools Agricultural Project
- identify steps in establishing Schools Agricultural Project
- examine the management of Schools Agricultural Project

3.0 MAIN CONTENT

3.1 Schools Agricultural Projects

Schools Agricultural Projects are projects involving the production, management and business of crops and livestock for the primary aim of educating and training learners in a school environment. The aim is to achieve the objectives of agricultural education as stated by the National Policy on Education which are:

i. to stimulate and sustain students interest in agriculture;
ii. to enable students acquire useful knowledge and practical skills in agriculture;
iii. to prepare students for further studies in agriculture; and
iv. to prepare students for occupations in agriculture.

The policy suggests a series of activities to ensure the achievement of these objectives. These include:

a. Each student should be guaranteed adequate equipment, farm space, farm structures and regular supply of fertilizers and animal feeds.

b. schools must keep farms where crops are grown with at least one specie of livestock from each of the following two groups:

i. pigs, rabbit and poultry;
ii. goat, sheep and cattle and where feasible, fish pond.

The common features of schools agricultural project are:

i. It is established as a resource material for teaching and learning:
ii. It is managed by teachers and students:
iii. It is not aimed at making commercial profit but may generate some profits for sustenance of the project and:
iv. It should be structured to facilitate the acquisition of specific skills by learners;

Examples of Schools Agricultural Projects are: Schools poultry, fish pond, rabbitry, snailry, sheep and goat farming, apiary, piggery, maize farm, horticultural garden, tree farm etc.

3.2 Importance of Schools Agricultural Project

The following are some of the importance of Schools Agricultural Project:

i. It stimulates the interest of learners in agriculture;
ii. It develops practical skills needed in the practice of agriculture in learners;

iii. It provides the platform testing innovations;
iv. It teaches the business of agriculture for profit making;
v. It trains learners for occupations in agriculture;
vi. It trains learners for further studies in agriculture;
vii. It boosts food production in the country.

3.3 Steps in Establishing Schools Agricultural Project

Establishing an agricultural project in a school requires proper planning. Such plan must be informed by the objectives of schools agricultural projects. Some of the recommended steps in planning are:

i. Carrying out proper feasibility study to determine the most appropriate project to embark on. Things to consider include cost, environment, space availability, sustainability, marketability, educational relevance, how the project would serve as instructional resource, etc.;
ii. Preparation of a business plan:
iii. Sourcing for fund for the establishment and running of the project. Fund can sourced from government agricultural grants, schools running grants, non-governmental organisations, interested community leaders etc.;
iv. Commencement of the project on a small scale;
v. Embarking on gradual expansion;

3.4. Management of Schools Agricultural Project

The management of Schools Agricultural Project should be guided by the objectives of the projects. Some of the recommended management practices for successful achievements of set objectives are:

i. Learners should be engaged in all aspects of the project;
ii. Proper and regular records of all activities carried out must be kept. Recording must be done by the learners through the guidance of the teacher and the books kept by the teacher.
iii. Marketing should be done by the students which must not interfere with their studies.
iv. Sales on credit must be discouraged.
v. Regular visits for learning purposes in groups must be organised by the teacher for the students.
vi. Rules and regulations must be established for proper management of the project and these must be strictly followed;
vii. Agricultural Science prefect must selected based on seriousness and interest
viii. A committee comprising of Agricultural Science teachers, the Agricultural Science prefect, nominated representatives of Agricultural Science students, representatives of the school management and in some cases representative of the government must meet regularly to assess the progress of the farm;
ix. Prices of products should not be far lower than market prices of such products;
x. Active managers of the projects especially students should be occasionally remunerated;
xi. The level of attention required by the project and its size determines whether or not an attendant will be employed.

SELF ASSESSMENT EXERCISE

i. List the steps involved in establishing a poultry in school from conception to point of laying eggs

4.0 CONCLUSION

The inherent requirements of agriculture make it compulsory for prospective agriculturists to pass through not just conventional learning process but one incorporating training. This is what agricultural projects offer learners. Therefore agricultural education will not be complete without practical training through agricultural projects as analysed in this unit.

5.0 SUMMARY

The highlights of this unit include:

i. explanation what Agricultural Project is understood to mean;
ii. enumeration of seven importance of Schools Agricultural Project;
iii. identification of basic steps in establishing Schools Agricultural Project;
iv. suggestions on how to manage of Schools Agricultural Project

6.0 TUTOR-MARKED ASSIGNMENT

i. Give five reasons for the establishment of agricultural projects in schools.
ii. Identify four likely challenges that managers of schools agricultural projects
iii. If you are given the task of making the initial preparation for the establishment of a school poultry, explain five points you will address.

7.0 REFERENCES/FURTHER READINGS

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Module 4 Assessment in Agricultural Science Teaching

MODULE 4 ASSESSMENT IN AGRICULTURAL SCIENCE TEACHING

UNIT 1 ASSESSMENT OF THEORY I (OBJECTIVES AND ESSAY QUESTIONS)
CONTENTS

1.0 INTRODUCTION

Many teachers struggle to teach and impart knowledge. Try as he may, his effort may not translate into learning. The teacher teaches but the student is the one that learns. The expected end product of teaching is learning. A teacher therefore needs to know whether the students have actually learnt. A feedback mechanism should therefore be put in place to achieve this objective. This is what is referred to as assessment. It is at the end of assessment that a teacher is able to evaluate the learning process and takes cogent decisions based on the result. He/ She can decide to continue to teach particular concept again or to move on to the next one, use another teaching method or continue with the old one and who and who not to promote. There is a difference between three commonly used words in this respect i.e. measurement, assessment and evaluation. Measurement is the process of using a standard instrument to determine the attributes of a physical object. Assessment is a process of obtaining information relative to set objectives or goals. Evaluation, on the other hand, is process of obtaining information about a goal, objective, procedure, standard or a given situation to make a judgement. A scholar rightly said "We measure distance; we assess learning and evaluate results in terms of some set of criteria". We are, for our current purpose, interested in assessment in Agricultural Science.

2.0 OBJECTIVES

At the end of the unit, you should be able to:

- define Assessment
- describe tools for cognitive assessments
- set essay and objective type questions
- enumerate tools for affective and psychomotor assessments

3.0 MAIN CONTENT

3.1 Definition of Assessment

Assessment is a process through information is obtained relative to known objectives or goals. It is a broad term that includes testing. A test can be said to be a special form of assessment. Tests are actually assessments made under controlled conditions for administration. All tests are assessments but not all assessments are tests. Assessment of learning can be done in three levels which are representative of the three broad areas or domains of learning. These are cognitive,

affective and psychomotor. Assessment tools include tests, examinations, projects, classwork, assignments etc.

3.2 Tools for Cognitive Assessments

Cognitive Assessments aims at determining the ability of the learner to recall what has been learnt. The tool for this is mostly tests. Tests are instruments specifying detail tasks required to determine learners' level of performance and ascertain knowledge gained after teaching. Tests in this case include the objective and essay tests. Objective tests include Multiple Choice Questions (MCQ), completion and short answer tests and true or false items. Essay tests are in form of short and long essay tests.

3.2.1 Objective Tests

As stated earlier, these include:

i. Multiple Choice Questions (MCQ)- It is also known as Multiple Choice Tests. It involves the introductory portion and the options with the correct answer and the distractors. For example:

Which of the following is not an agricultural greenhouse gas?
A. Water vapour
B. Carbon dioxide (CO_2)
C. Methane (CH_4)
D. Nitrogen (N)

ii. Completion and Short Answer Tests: These are tests requiring a word or short phrase answer. The question must not be ambiguous or having multiple answers when one has just one answer in mind. For example:

Burdizzo is used for …….. .

The instrument (Burdizzo) is used for only one thing: castration

iii. True or False items: In this type of tests, there are only two options and each has a 50-50 chance of being correct. For example:
All legumes add Nitrogen to the soil (True or False) .

3.2.2 Essay Tests

These are questions used to assess whether learners are able to clearly express personal ideas based on their understanding of concepts taught. They are in form of short and long essay tests.

Short essay test requires brief response and sometimes with specified maximum number of sentences. For example:

What is Agricultural Marketing?

Long essay test requires detailed response to the question. For example:
With the aid of diagrams, explain in detail the process of egg formation in poultry.

SELF ASSESSMENT EXERCISE 1

i. Construct five objective questions from the topic-Rock Weathering
ii. Construct three essay questions from the topic-Agricultural Mechanisation.

3.3 Tools for Affective and Psychomotor Assessments

Affective domain assessment aims at determining the feeling or interest of the learners while Psychomotor domain assessment aims at testing dexterity in terms of using ones appendages. Various tools are used for these. For affective domain assessment, tools used include: Observation, Interview, check list, questionnaire while tools such Observation, Inter-rater assessments etc. are used for psychomotor domain assessment. Detail discussion of this will be done in the unit on practical

4.0 CONCLUSION

Assessment, you will agree, is indispensable in teaching and learning situation. It is both a platform for determining level of performance not only for the learners but also for the teachers. It is therefore essential that teachers be well tutored on the nitty-gritty of assessment.

5.0 SUMMARY

In this unit, we have learnt about:
i. the definition of Assessment
ii. tools for cognitive assessments
iii. how to set essay and objective type questions
iv. tools for affective and psychomotor assessments

6.0 TUTOR-MARKED ASSIGNMENT

i. Briefly explain the differences between Measurement, Assessment and Evaluation.
ii. Construct twelve objective tests on Husbandry of a specific cereal crop.
iii. Construct five short essay tests and five long essay tests on digestion in farm animals.

7.0 REFERENCES/FURTHER READINGS

Ali Anthony, (1997). *Strategic Issues and Trends in Science Education,* Onitsha: Africa Cape Publisher International Limited.

Aliyu Abdullahi (1981). *Science Teaching in Nigeria*: Atoto Press, Ilorin.

UNIT 2 PERFORMANCE ASSESSMENTS

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4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
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1.0 INTRODUCTION

Agricultural Science as a vocational science should be activity based and practical oriented. In view of this, a subject of this nature requires additional methods of assessment apart from the objective and essay tests. It is therefore necessary to assess the process of obtaining a product apart from the product itself. An assessment tool is required for this. An example is the management of school poultry with layers in stock. Various activities are involved ranging from daily feeding and cleaning to drug administration. All these form the process while eggs produced for the product.

2.0 OBJECTIVES

At the end of this unit, you should be able to:
i. explain performance assessments
ii describe procedure in performance assessments
iii. assessing Process/ Procedure and Products

13.0 MAIN CONTENT

3.1 Performance Assessments

Performance Assessments are designed to judge students' abilities to the use knowledge from what has been taught and research skills. The techniques try to establish what a person can do as distinct from what he knows. Work samples and skill samples can tell us this. We are also interested in the tasks involved in creating the product so that we will be able to diagnose weaknesses in the instructional design, the learning process, or both. The assessments usually require learners to manipulate equipment, solve problems or make analysis. The steps involved in getting the product is the procedure and this is the major area of assessment in performance assessment.

Performance assessment strategies consist of three components:
i. The task i.e. what is to be done.
ii. The format for students' response.
iii. A predetermined scoring system.

3.2 Procedure

This refers to the step wise steps method of accomplishing a task. Various tasks are expected to be accomplished by the teachers of Agricultural Science. These include planting and managing crops with the current spacing, managing livestock, manipulating a microscope, taking land measurements in surveying, he should be able to set up a simple soil experiments and so on. The procedure involved in these tasks is as important as the results. Correct results will only be obtained through correct procedure. It is through the procedure that basic skills are learnt. Process assessment is therefore carried out during the procedure. It can be used to assess the psychomotor and affective domains. Observation techniques are useful in these instances.

For effectiveness in procedural assessment, steps in the procedure need to be listed and each assessed based on how well they are carried out. The efforts involved and the level of complexity influences the weighting or scores attracted by the steps.

3.3 Assessing Process/ Procedure and Products

Scales are often used when process and products are assessed. Such scales include:

- interest inventory
- self-concept scales
- ranking method
- rating scales.
- anecdotes
- checklists
- sociometric techniques
- interviews
- attitude scales
- questionnaire

For instance, in carrying out the moulding experiment in soil texture analysis of soil samples, the ability to produce an unbroken cycle from clay soil attracts higher score. Ability to measure accurately amount of water drained in a measuring cylinder in soil experiment to determine water retention capacity of soil samples attract higher scores because of the possibility of error of parallax. Strict adherence to procedural steps is also scored. The expected outcomes also influence what and how assessment is carried out. The teacher develops appropriate criteria for judging the learner and considers alternatives to his being the sole judge of the work such as involving other knowledgeable peers. Finally he needs to reflect on the grading pattern and how information from the variety of assessment methods can be incorporated into a pool and used in determining achievement. There are three ways a teacher assesses a learner in this case. They are:

i. Through observation of how the work is being carried out. This can be done through informal and structured observations.
ii. By questioning the learner on what he has done (Narratives). This is done through interviews.
iii. Looking at and assessing what has been done by the learner. This can be done through open-ended questions and performance tests.

SELF ASSESSMENT EXERCISE

As a teacher of Agricultural Science, you have the task of using performance assessment to assess a learner carrying out sedimentation experiment, describe how you will successfully do this

4.0 CONCLUSION

The increasing job requirements for candidates seeking for employment make it mandatory that teachers produce learners who can deliver on the job. The use of performance assessment gives us an idea of how well prepared are our learners for such challenges.

5.0 SUMMARY

In this unit, you have been taught:

i. what performance assessments are
ii the description of procedure in performance assessments
iii. tools for assessing Process/ Procedure and Products and how.

6.0 TUTOR-MARKED ASSIGNMENT

i. Explain three reasons for Performance assessment.
ii. Explain the major issues in designing performance tests.
iii. Identify a concept in Agricultural Science that can be assessed using performance assessment and design a scale for its assessment.

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