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UNIVERSITY FOR DEVELOPMENT STUDIES

FACULTY OF EDUCATION

DEPARTMENT: AGRICULTURAL SCIENCE EDUCATION

**THE ROLE OF INSTRUCTIONAL MATERIALS ON ACADEMIC
ACHIEVEMENT IN AGRICULTURAL SCIENCE AMONG SENIOR HIGH
SCHOOL STUDENTS IN HO MUNICIPALITY IN THE VOLTA REGION OF
GHANA.**

BY

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(UDS/MEA/0009/13)

**THIS THESIS SUBMITTED TO THE DEPARTMENT OF EDUCATIONAL
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DEGREE IN AGRICULTURAL SCIENCE**

2017



Candidate's Declaration

I, Tchordie Juliana hereby declare that this project work is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Name: TCHORDIE JULIANA

Signature:

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Supervisor's Declaration

I hereby declare that the preparation and presentation of this project work were supervised in accordance with the guidelines on supervision of project work as laid down by the University for Development Studies, Tamale, Ghana.

Supervisor's Name: Iddrisu Alhassan Simon

Signature:

Date:



I wish to express my sincere thanks to my husband; Kupualor Darlington, for his inspiration, advice and financial support for this project work to be completed.

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I dedicate this work to my beloved parents, dear husband, children and friends.

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ABSTRACT

The study investigated the use of instructional materials in teaching Agricultural science at the Senior High Schools in the Ho municipality. For the purpose of this study, the research design adopted was the survey design. The target population for this study comprised all Agricultural science students in the Ho municipality in the Volta region of Ghana. The sample size was 500 students and 30 teachers of the Agricultural science programme drawn randomly from public senior high schools in the Municipality. Two different instruments used to collect data were Agricultural Science Achievement Test (ASAT) and the Teachers' Attitude Towards Teaching Agricultural Science Questionnaire (TATTAQ). Data were analysed using the Analysis of Variance tool (ANOVA). The study found that there was a strong relationship between availability and the use of instructional materials and the academic performance of Agricultural science students. It could regularly incorporate the use of instructional materials in teaching and learning sessions.



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INTRODUCTION

1.0 Chapter Overview

This chapter deals with the overall view of the topic under the following subheadings; background to the study, statement of the problem, objectives of the study, research questions, justification of the study, delimitation of the study, operational definition of terms, organization of the study and scope of the study.

1.1 Background to the Study

There is general perception among educators that educational experiences involving the learner actively participating using concrete materials are retained longer than abstract experiences. Instructional materials add element of reality by providing concrete experience to learner. Bolicks (2003) pointed out that there is a strong relationship between teaching with the use of instructional materials and active learning. He argued that while some educators have been fascinated by the potential of instructional materials to enhance teaching and learning, many teachers lagged behind in using instructional materials during teaching and learning. Others expressed doubt that instructional materials could ever incite teaching since instructional materials are an integral part of teaching-learning situation; it is not just to supplement learning but to complement its process. It follows that, if there must be effective teaching-learning activities, utilization of instructional materials will be necessary.

Ema and Ajayi (2004) assert that teaching equipment and materials have changed over the years, not only to facilitate teaching-learning situation but also to address the instructional needs of individuals and groups. Instructional materials are made up of



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objects such as print outs, audio-visual which enhance the successful delivery of teaching. Thus instructional materials are said to be objects or things the teachers can use in the classroom while teaching in order to facilitate teaching activities. However, instructional materials cannot be a substitute for the teacher, but it enhances effective teaching and thorough communication from the teacher to the students. As a result, it has to be judiciously used to convey additional meaning to the students, to develop expected aptitude, skills and knowledge.

Goof (1995) explained that the concept of teaching aids has gone through several evolutionary stages from simple aids to instructional technology and from media to communication and then to educational technology. This therefore suggests that instructional materials are not just objects or equipment used during teaching-learning process but they are those objects improvised by the teacher to make conceptual abstraction more concrete and practical to the learners. Instructional materials are the relevant materials utilized by a teacher during Agricultural Science lessons for the purpose of making the content of the instructions more practical and less vague in the classrooms (Amponsah, 2007).

Education, according to Coombs (1970), consists of two components; inputs and outputs. Inputs consist of human and material resource while outputs are the goals and outcomes of the educational process. Instructional materials, which are educational inputs, are of vital importance to the teaching of any subject in the school curriculum. Wales (2009) further indicates that the use of instructional resources consolidate discovered facts and glue them firmly to the memory of students. Savoury (2010) also asserts that a well-planned and imaginative use of visual aids in lessons should do much to supplement inadequacy of books as well as arouse students' interest by giving them something practical to see and do and at the same time helping to train



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them to think things out themselves. Savoury suggested a catalogue of useful visual aids that are good for teachings such as pictures, post cards, diagram, filmstrips and models. He explained that the selection of materials, which are related to the basic contents of a course or a lesson, helps in in-depth understanding of such a lesson by the students and makes the lesson attractive to them. It can be deduced from the foregoing that, instructional materials are necessary condition to sustain content of the lesson taught and to retain facts and knowledge, which the pupils will gain thereafter. It motivates pupils to learn well and retain their memory on the contents learnt.

Emma and Ajayi (2006) claim that, “without the teacher who is knowledgeable, instructional materials cannot create change and progress, the only time it begins to make impact is when the teacher begins to make use of it and allows it to take over its value”. This knowledge of the teacher cannot be overemphasized in the use and handling of any instructional materials for effective learning.

1.2 Problem Statement

The use of instructional materials in teaching Agricultural Science in Senior High Schools in Ghana has been extensively researched into but many questions still are unanswered (Frimpong, and Koomson, 2000). The need for exploring locally available materials as an alternative for expensive foreign materials in teaching at the Senior High Schools in Ghana is crucial. A resourceful teacher ensures that the best alternative instructional materials are provided for learners’ curriculum and environment so that classroom teaching does not have to be retarded by lack of funds. If teaching must be result oriented, then improvisation of instructional material is not an option but must be supplied to achieve this goal. It thus throws a challenge to Agricultural Science teachers to rise and meet the challenge so as to enhance



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knowledge and skills acquisition among Senior High School students in Agricultural Science. The study therefore investigates the role of instructional materials used in teaching Agricultural Science and to examine their effects on student academic achievement in Agricultural Science among the Senior High School students in the Ho Municipality.

1.3 Objectives of the study

The objectives was to unravel the problems, causes and symptoms of the role of instructional materials and academic achievement in Agricultural Science among Senior High School students in Ho Municipality with the aims of either supporting the existing solution to the problem or bringing new idea to the solution of the problem within a time limit. Objectives must be SMART. This means that it must be Specific, Measurable, Achievable, Realistic and Time-bound. General objectives deal with the overall problem while specific objective deals with the issue and it is time bound.

1.4a The Main objective

The main objective of this study was to highlight the strategic position of instructional materials in teaching and learning of Agricultural Science among Senior High School students in Ho Municipality of Volta Region, Ghana. It sought to:

1. Establish the position of instructional materials in the teaching and learning of agricultural science.
2. Evaluate the effect of instructional materials on the teaching and learning of agricultural science in developing skills and knowledge.
3. Promote the inclusion of instructional materials as inevitable apparatus in making teaching of Agricultural Science pragmatic and result oriented.



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4. Determine the challenges of using instructional materials in facilitating student learning.

1.4 b Specific Objectives

The specific objective for this study was to:

1. assess the roles instructional materials play in teaching and learning Agricultural Science among Senior High School students in Ho Municipality of Volta Region, Ghana.
2. determine the ways instructional materials could be used effectively to improve the academic achievement of Agricultural Science students in Ho Municipality.
3. examine the challenges which confront teachers in the use of instructional materials in teaching and learning process in the Ho Municipality.
4. assess the composite effects of improvising instructional materials by teachers for effective teaching and learning of Agricultural Science in Senior High Schools in Ho Municipality of Volta Region.

1.5 Research questions

The under listed research questions are posed to guide the study:

1. What roles do instructional materials play during the teaching and learning process of Agricultural science at the SHS in the Ho Municipality?
2. In what ways can the use of instructional materials in teaching of Agricultural Science be made more effective to improve performance?
3. What challenges confront teachers in their use of instructional materials in facilitating student learning in Agricultural Science at Senior High Schools?



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4. What are the composite effects of using instructional materials on the teaching of Agricultural Science skills and knowledge development?

1.6 Justification of the study

The significance of the study lies in the benefits it will offer to many stakeholders, (including School Administrators, Ghana Education Service, Agricultural Education Researchers, Ministry of Education and Ministry of Food and Agriculture) through the recommendations. School tutors will benefit from this study through the exposition of various techniques of improvisation to them to enable them improvise instructional materials for their own teaching and learning of Agricultural Science in schools. Again, the Ghana Education Service will benefit from this study in recruiting professionally trained and certificated teachers to teach Agricultural Science in Senior High School. Agricultural science Education researchers will find the literature review in this study useful to extend the frontiers of knowledge in the teaching and learning Agricultural Science. Future research works will find this material very useful as a guide and a resource material.

1.7 De-limitation (Scope) of the Study

The study set out to investigate the role of instructional materials in teaching and learning of Agricultural Science among Senior High Schools in Ho Municipality of the Volta Region of Ghana. The study is therefore restricted to only Agricultural Science students and teachers in the selected schools in Volta Region. Other subjects in the approved WASSCE syllabus are not included. It dealt with the availability and the utilization of such materials in schools and by teachers.



1.8b Organization of the study

This study was organised into five chapters. Chapter one is the introductory part of the study. It comprised the background to the study, problem statement, main and specific objectives, research questions, significance of the study and the scope of the study. Chapter two comprised of literature review on the role of instructional materials in academic achievement of Senior High School students. It reviewed and discussed the issues in the literature both in Ghana and elsewhere. The third chapter is the methodology section that was used for the research. It includes the study design of the population, sample procedure and data analysis. It discussed how data was collected and the instruments used for collecting the data. Chapter four comprised the results and discussions of the research. The fifth chapter presents the summaries of findings, conclusions and recommendation of the study.



LITERATURE REVIEW

2.0 Chapter Overview

This review of related literature consists of views and findings of different writers as documented in books, Encyclopedias and journals. The review focused on the role of instructional materials on academic achievements of students in Agricultural Science at the Senior High Schools. It covered the following sub-headings; the concept and meaning of instructional materials, types of instructional materials, instructional materials and academic achievement and factors affecting improvisation of instructional materials.

2.1 The Concept and Meaning of Instructional Materials

Agina (2005) described instructional materials as concrete or physical which provide sound, visual or both to the sense organs during the teaching and learning process. The components to success in participation and academic achievement include availability of instructional materials in the teaching and learning of Agricultural science at Senior High Schools in Ho Municipality of Volta region, Ghana. According to Adeyanju (1993), instructional materials are used in consolidating concepts and ideas learnt during teaching process. They are useful in the attainment, imagination and observation of skills of the teacher and learners. Imaginations are not self-supporting but are supplementary training devices. This means that instructional materials support, supplement or reinforce learning. Adequacy of instructional materials means that the teacher should ensure that the materials to be used for a particular agricultural science class are enough based on the number of learners using





them (Jacinta, 2003). www.udsspace.uds.edu.gh Adedoyin (1991) define instructional materials as the adjunct use of tools and materials in teaching. By this definition it means instructional materials are used to promote the richest possible learning environment, which helps learners and teachers to achieve specific objectives. The use of instructional material is to facilitate teaching and learning. Isola (2010) also defined instructional materials as objects or devices which help a teacher make a lesson much easier to comprehend. Furthermore, instructional materials are seen as things or objects that bring emphasis, clarify, strengthen and vitalize the teachers' instructions. One common thing all these definitions have is the recognition that instructional materials serve as assistance to the normal process of instruction with the teacher's lesson objectives in mind.

Good cited in Awotua-Efebo (1999) maintain that instructional materials are any devices with instructional content or function that is used for teaching purposes including books, textbooks, supplementary reading materials and audio visual and other sensory materials, scripts for radio and television instruction, programs for computer – managed packaged sets of materials for construction or manipulation (Amissah, 2002).

According to Savoury(2003), a well-planned use of instructional materials in lessons should do much to banish apathy and that selection of instructional materials which are related to the basic activity of a lesson helps in in-depth understanding of such a lesson by the learners because it makes the lesson attractive to them. From this perceptive, we can reaffirm that the term instructional materials would include any materials or equipment that the teacher can profitably use to facilitate teaching and learning by his students. Instructional materials are valuable asserts in learning situations, because they make lessons practical and realistic. Knowledge acquired

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with the use of instructional materials is retained longer than the one acquired without learning aids (Clark, 2005).

Teaching at any level requires that students be exposed to some form of instructional materials. Ikerionwu (2000), referred to instructional materials as objects or devices which help the teacher to make learning meaningful to the learners. Instructional materials, which are educational inputs, are of vital importance to the teaching of any subject in the school curriculum. Wales (1975), opined that the use of instructional materials would make discovered facts glued firmly to the memory of students. A teacher who makes use of appropriate instructional materials to supplement his teaching will help enhance students' innovative and creative thinking as well as help them become enthusiastic(Amoah, & Mereku; 2002).

Abdullahi (2003), classified instructional materials into two; visual materials made up of reading and non-reading materials, and audio visual materials comprising electrically operated and none electrically operated materials. According to Aduwa et al, (2005), instructional materials and resources include, audio tape recorders, video tape recorders, slide projectors, still pictures, programmed instructional film strips, maps, chart, graphs and many more. They offer a variety of learning experience individually or in combination to meet different teaching and learning experiences. Ngaroga, (2007), asserted that teaching and learning materials are those that are accessed in the School environment, collected and brought to the classroom for the intended purposes. They should be handled with skill and such a skill is only realized through well-planned training program on instructional materials improvisation. Instructional materials may be used as practice devices with which the students build accuracy, understanding and efficiency. According to Dada (2006), instructional materials involve the fact of producing and using alternative resources. Curzon (2005)



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had earlier noted that the approach of using instructional materials in Agricultural Science teaching and learning assist in proper introduction of new skills, develop understanding as well as show the appropriate way of doing things.

Instructional strategies need to be identified where the use of manipulation are often suggested as some of the effective approaches to instructional material improvisation for Agricultural Science achievement (Gurbuz, 2010; Sherman & Bisanz, 2009). Brudett and Smith, (2003) concluded that those learning institutions with abundant learning and teaching resources, favorable student-teacher ratio, commendable workload and good reward and incentives for teachers perform better than the institutions that do not provide the same. However, in a clear departure from the above views, Orji (2012) and Eke (2010), in their independent studies agreed that instructional materials are not necessary if the learners are intelligent and the teacher has good mastery of the subject matter. Levine (2008) argued that involving learners in classroom activities is what matters most as it makes teaching learner - centered. The finding showed that instructional materials make abstract ideas concrete and easier to understand. Williams (2004) conducted a study on the extent of utilization of instructional facilities in the teaching of Agricultural science in Senior High Schools in Upper-East region of Ghana and found out that instructional facilities appear to be inadequate. The above reviewed works have a relationship with the present study as they all focused on some aspects of instructional materials inadequacy in Senior High Schools in Ghana; however they differed significantly from the present study in content and geographical scope, hence, creating a gap in knowledge in terms of achievement. The interest to fill this existing gap in knowledge is the premise on which this study stands, which is to determine the role of instructional materials on



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academic achievement in agriculture science in Senior High Schools in Ho Municipality in the Volta Region of Ghana.

2.2 Types of Instructional Materials

Instructional media encompasses all the materials and physical means an instructor might use to facilitate students' achievement. This may include traditional materials such as chalkboards, handouts, charts, slides, overheads, real objects and videotape or film, as well as new materials and methods such as computers, DVDs, CD-ROMs, the internet and interactive video conferencing (Unmgrc.unm.edu, 2009). Florano (2011) categorizes instructional media into text media, audio media, visual media, motion media, people media, manipulative media and multi-instructional material media.

These different aids are the basic components in teaching and learning at all levels of education. The instructional materials help students to understand what is being taught when they see and handle the objects themselves (Shankar as cited in Anini, 2011).

Fianu as cited in Boafo-Agyemang (2010) also postulated that instructional materials are either visual or audio-visual. According to him, instructional materials are materials that are considered visual which teachers use to make visual impression.

Instructional materials make impressions on the learner during the lesson for effective understanding of what is taught. They include projected, non-projected, printed and others such as objects or real three-dimensional objects that are produced through locally sourced materials, program instruction and instruction package. Audio-visual materials are anything seen and heard which together with the teacher's voice adds to the effectiveness of instruction or teaching (Rius et al., 2009). An alphabet book, alphabet chart, calendar, chart, easy reader, flash card, flip chart, poster, sentence



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building cards, sentence building grid, syllable wheel, word building cards, word slide are all examples of instructional materials (Leus, 2002).

Akinmoyewa (2001) identified three types of instructional materials as follows;

Audio – equipment – making use of our sense of hearing only. Examples include radio and cassette recorder. Visual equipment involves making use of our sense of sight; that is seeing only. Examples of such materials are pictures, photographs, real objects and globes. Audio Visual equipment – making use of both hearing and sight senses.

Examples of these are video and television.

Bello (2001) also stated the following as types of instructional materials; Chalkboard – The term chalkboard is a versatile device and chalkboard is now used instead of the conventional term blackboard. It can be adapted to any kind of subject and various types of situations. No special talent is necessary to be able to use it because the chalkboard is so common. Teachers tend to forget to make use of it and yet, when it is not there, they find it difficult to teach. In addition, there are hardboards or plywood fixed to the wall with neat surface. These are equally common at all levels of education. They are cheap and durable.

Textbook – Textbooks are very important instructional materials. The content of textbook must take cognizance of the age, aptitude, interest, environment background, ability and the intelligence of their users into serious consideration. They must use appropriate and suitable print size. Also, enough revision exercise must be made readily available to the students which may arouse their interest and fire their instructional materials imagination.



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Still Pictures – These refer to the pictures which are motionless as opposed to the moving pictures of television and movies or cinemas. They are often regarded as a film of a universal language in that they are understood everywhere. Thus, you do not need to be able to read or speak a certain language in order to interpret the message a picture conveys.

Diagrams – These are sketchy visual presentation of facts and ideas, generally patterns or essential feature of a process, an object or an area of all the different types of graphic materials. Diagrams are the most abstract because they include only the key element essential for intelligent interpretation. This implies that adequate prior knowledge and experience of the subject is necessary and appropriate.

Obiwusi (2002) also mentioned some types of instructional materials as follows;

Reading Materials and these materials include textbooks and journals. Audio – Visual materials were also identified as another type. Audio means sound and visual means sight. Audio materials are those ones that we can hear and visualize materials that are visible. Audiovisual materials can further be sub-divided into five categories as follows;

Realist – It means showing facts about something in a true way. They include specimens, mockup and dolls, samples textile product, models and objects of various link of museums. The second categories are pictures and pictorial filmstrips, still films, graph, sketched and diagrams. The third category includes films, slide, motion pictures, radio, television sets, tape recorder, computer and video. The fourth categories are symbolic and graphic representation. Examples include graph, drawing, atlases, charts, cartoon freeze and diagram.



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The last categories are the equipment used for the production or projection of teaching aid. Examples include a slide, projector, overhead projector, and film projector. These are used to explain topics on power points and pictorial illustration.

Community resources come in the form of experts with specialty in some topical areas where their expertise is required as far as the topic to be treated is concerned to deliver lectures to students. Traffic policemen, the health inspectors, artists, musicians, the fire men or postmen can all give useful information that are relevant to what students learn.

Functions of Media

There are three key functions of instructional media: instruction, inspiration, and consolidation (Biggs 2003). Instruction is the objective function of instructional media that involves imparting information or knowledge, skills, attitude that affects learners' behavior. There are various dimensions of this function as; description of facts about what something is or was. Examples include using static and dynamic media to illustrate concept and principles.

Description of principle refers to what an object is and that of the process illustrates the procedure involve in performing the activity.

Inspiration has the subjective function of instructional media and its function includes arousing senses of drama and desire to learn (dramatic quality) but one should beware of the danger of passivity or spectatorship or even of propaganda especially in an entertainment oriented culture, according to Amponsah,(2010).



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Enriching the curriculum to create and influence disposition and motive for developing senses of values. Those media to be used here include radio, television, video tape recorder, films and filmstrip.

Consolidation is also an objective function of instructional media. Recapitulation reinforces or underscores the main point of a lesson.

Test and evaluation try to check whether or not the way you manipulate instructional information has been adequately done to the task.

Instructional Materials and Academic Achievement

There have been several studies on instructional materials and academic achievement. Amissah (2002) conducted a research on the effects of instructional resources on students' performance in West Africa School Certificate Examinations (WASSCE) in Ghana. He correlated material resources with academic achievements of students in ten subjects. Data were collected from the teachers in relation to the resources employed in the teaching. The achievements of students in WASSCE for a period of five years were related with the resources available for teaching each of the subjects. He concluded that material resources have a significant effect on student's achievement in each of the subjects.

Briggs and Wager (1992) also recommended that instructors apply the following exclusion and inclusion criteria in selecting media for the various common learning outcomes. Findings showed a significant effect of material resources on the students' academic performance in these subjects. In the same vein, Sam-Tagoe (2002) similarly investigated the effect of instructional resources on the academic achievements of students in Asante region of Ghana. Five Senior High Schools in the





www.udsspace.uds.edu.gh region were used for this study. He collected WASSCE results for five years and compared achievements of students in schools with adequate material resources and achievements of students in schools with inadequate material resources. He found a significant difference in the achievements of the two sets of students. The schools with adequate instructional materials performed better than those with inadequate instructional materials.

Factors Affecting Improvisation of Instructional Materials

Balogun (2002) identified two main constraints militating against the successful instructional materials improvisation of science equipment. These are the technical and the human factors respectively. While the technical factors relate to the question of degree of accuracy and precision that is possible with the instructional materials improvised, the human factor relate to the teachers' skill in developing the resources while providing the appropriate learning experience to the learners.

Cuzon (2005) reported lack of adequate professional training as a major problem militating against the effective use of local resources for science teaching. Amoako (2010) stressed the need for a definite well planned training programme of instructional materials improvisation for teachers. He suggested regular meaningful workshop on instructional materials improvisation technique for science teachers to up-date their competence.

Relevance of Instructional Materials

The significance of instructional materials in this regard needs to be used further. Opportunity to touch, smell or taste object in the course may in no doubt quickly remind a learner of the fact that he had previously come across but had forgotten. Instructional materials are highly attractive in transmitting information quicker and



faster to the learner and it has been observed that any knowledge gained through practical observation is remembered for a longer period and could be easily recalled. Muyanda (2003) affirmed that the learners learn only 10% of what they hear, 15% of what they see, 2% of what they discuss with others and as high as 50% of what they experience directly or practically. This contention is under scored by this age-old Chinese maxim,

What I hear, I forget

What I see, I remember

What I do, I know (Oshodi, 1993)

Aina and Ogunsanya (2002) observed that the use of available resources and materials for teaching of Agricultural Science enhance the classroom work and contribute directly or indirectly to effective teaching and learning. This is because such a practice affords students the opportunity to learn faster and easily through their senses of smell, taste, sight and touch (feeling).

The relevance of instructional materials stated above complement the Agricultural science lesson to influence one or more of such materials. Therefore, the Agricultural Science class at every point should include teaching materials that serve among other things to help the students to think critically and analytically which motivate them to continuous effort, display individual group achievement as well as produce opportunity for group and individual attitudes.

Adeyemo (2002), stated that the importance of instructional materials in any teaching process include;

They make learning real and permanent

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They relieve and aid the teacher of verbal presentation of facts

They make concept of lesson clear

They attract and hold the attention of pupils in the class

They give room for students' teacher interaction

They assist teachers to present more information in less time

They add variety to what otherwise is a monotonous lesson

They aid students to recall experience they have been exposed to

The instructional materials stimulate students' interest and course of action

They provide direct experience with the realities of the social and physical environment.

Types of Electronic Resources

Some of the most common and economical materials are chalk or marker boards and supplementary print materials including charts, diagrams, and graphs. Other materials, which usually are more expensive, are projected materials, video, and computer-based programmes. This section discussed the types and kinds of instructional materials used in Agricultural Science under the following categories.

1. Projected and electronic materials.
2. Non-projected materials.
3. Phenomenal and Manipulative materials.



Projected and Electronic Materials

Briggs (2004) described film projectors as 16mm wide and shown using a 16mm projector. Some are designed to help teach facts and exact steps of procedure. Others are suitable for general orientation to a subject. Still others are effective in developing understanding of complex problem in Agricultural Science for influencing attitudes. Although, projecting educational films is not always the issue but the effective use of it to portray the ideas of the content of the lessons or topics in hand and teacher process of using it might be something else that students would not be able to comprehend the factual information of the lesson taught using the materials.

Tape recorders are media used in an educational setting to play back pre-recorded audio lessons or activities to a class to provide illustrative audio materials in the context of live lesson or activities. These could either be brought or improvised by the teacher or recorded off air. Emma and Ajayi (2004) argue that, recording have been used successfully in the teaching of languages and laboratories on the handling of equipment. They explained further that, as with all other aids, the effective use of the tape recorder demands careful planning. Its real value derives from its ability to augment visual with audio instructional materials.

The tape recorder is an audio teaching aid. It uses cassette tapes to record learning experiences in class or from radio or television documentaries which can be replayed in class or home. The cassette tape recorder is a very popular instructional material. Amponsah (2000, p. 237) also gave the advantages of tape recorders as follows; that tape recorder is simple to operate; cheaper than most other project and electronic equipment; and usually portable and can be transferred from one place to another.



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The disadvantages of tape recorders include the fact that it is an audio medium and appeals to sense of hearing only, thereby limiting students' comprehension of information compared with television, which appeals to the sense of sight and sound only. Again, recorded tapes become bad when not used often and could damage the play head of the player as a result.

Ajayi and Emma (2004) assert that an overhead projector (OHP) consists of a horizontal table (250x250m) on which the materials to be projected is placed high from the bulb below to the table is condensed by a concave mirror or a bag which passes through the materials to the projector and is focused and turned through 90° by a lens system mounted on a stalk on bracket above the table. The materials to be projected are usually transparent. They further stated that projectors are hardware equipment which enable learners to vividly grasp the contents of software materials such as slides, films strips transparencies, paper and pictures (in the form of still pictures or motion pictures). These are veritable learning or teaching aids in Agricultural Science. The advantages of projectors lie in the powerful visual and audio content of the devices. They have both high and low technology content.

An overhead transparency is a transparent sheet of materials intended for use with an overhead project as a means of showing graphics, text and other information. Opaque projector is a media that projects the instructional materials usage of solid objects on a screen by means of a light, which is concentrated on those objects and a mirror, which reflect the instructional materials usage through a lens source. Solid materials or objects like models, picture, map charts and graphs can be shown through opaque projector with clarity.



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Computer Instructional System: Computer as an electro-mechanical machine is used as an instructional system in the field of education. As an electro-mechanical media it accepts data, process and gives output automatically with less energy waste. Computer automatically processes data once it is directed to do so. According to Amoako and Asare, (2003), the computer is among the newer generation of education technologies in developing countries such as Ghana.

The computer has now been found to be most suitable and versatile medium for individualized learning because of its immense capacity as a data processor, used for different games for the children. It can perform numerous mathematical and logical operations without any intervention by men. Amoako (2002) acknowledges three broad ways by which computers contribute to teaching and learning situations and these are; Mass Instruction, Individualized Instruction and Group learning. Mass Instruction is used during the normal class lesson where the computer is used to support mass instruction. Computer assisted package are highly interactive as they are very effective in teaching large group to get the feel of an interactive learning programme. According to Amoako (2002), instructional materials constitute the most versatile and powerful delivery system. Students should be given the opportunity to learn by doing, “experiential learning” as they do, they get things wrong as well get them right. He further gave examples of individualized instruction by computer such as asking learners structural questions, responding to the choices learners make, providing expository information, testing learners, allow students to contribute to computer conferencing and giving students the opportunity to perm mathematical and logical analysis of data.

Group learning where students in group benefit from feedback from each other; because computer assisted learning system can make a highly significant contribution





to a wide range of group learning activities. The computer technology had made it possible for teachers and students to avail themselves of internet facilities where instructors and learners can visit in order to obtain needed information.

Non-Projected Materials

Amoako and Amponsah (2003) assert that non-projected materials are the materials that do not require any form of projection before they can be used. Non-projected materials are different forms of instructional materials that require no process of projection before its operation can take place. These include the following, textual and non-textual, chalk-book, magnetic board / soft/board flip chart, specimen and models. Textual materials and non-textual materials refer respectively to all the print and non-print materials that are used by the teachers and learners for instructional process. The print materials are the textbooks, magazines, periodicals, journals and newspaper while the non-print materials include charts, chalkboard, radio, television films, videotapes, audiotapes, relics, festivals and games. Esu (2004) indicates that together these instructional materials assist the students in acquiring clear concept of subject matter. They also use these materials to develop knowledge and skills.

The textual print materials comprise so large a proportion of all teaching aids that selecting written materials for the teaching of a given unit poses specific problem.

All these are durable materials that Agricultural Science teachers should endeavour to explore and use during teaching and learning processes in order to enrich the concepts of Agricultural Science in the mind of the learners.

Specimen instructional materials are the real objects or things a teacher can use for effective teaching of Agricultural Science concepts. It makes Agricultural Science



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teachers work easier and more participatory. These are objects like minerals, rocks, plants and insects. All these help the learners to see, touch, smell and handle them physically. This gives real natural experiences in learning.

Textbooks are special types of books, which are written to satisfy a special need in the school curriculum (Ajayi and Emma, 2005). They further classified textbooks into four categories; reference, general, coursework and children's textbooks.

Phenomenal and Manipulative Materials

These instructional materials are majorly community based resources that promote the teaching and learning of Agricultural Science, according to Agbenatoe (2014). Phenomenal materials are instructional situations such as events, things, features, settings, festivals and other community resources that are directly apprehended by the learner at their-natural setting constituting this category (Esu, 2004). Phenomenal materials help to bring learners in direct contact with learning experiences that far transcend volumes of recorded literature and weeks of demonization. Despite the fact of these positives, field trips and school journeys that normally bring learners into contact with the phenomenal materials that are under-utilized because of time, financial challenges, knowledge of the teacher, inflexibility of the school time -table and other infrastructural problems. Manipulative materials on the other hand are instructional materials that the learners actually handle skillfully, deal with and manage expertly to bring about the desired behavioral changes. They are important for the development of skills in professional training (Esu, 2004). They promote complete mastery of the content materials and the specific objectives. They also form part of both the instructional and performance evaluation. The greatest significance of these materials is that, with them neither the required learning nor objective

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evaluation can be adhered. They cut across all aspects of skill development and pastry learning. These materials are vital for Agricultural Science lessons because such skills as communication, patient observation and assertiveness are easily demonstrated, learnt and observed through instructional practical.

Guidelines for the Use of Instructional Materials

The use of any instructional materials must be planned, based on its ability to support a specific point in a lesson. A simple process can be used to determine if and where instructional materials are necessary (Amissah, 2002). These include: clearly establishing the lesson objectives; being certain of what the lesson seeks to communicate; gathering the necessary data by researching for support materials; and organizing the materials into an outline or a lesson plan.

The plan should include all key points that need to be covered. These may include important safety considerations; select the ideas to be supported with instructional materials. These materials should be concentrated on key points. Instructional materials should appeal to the student and be based on sound principles of instructional design. If it is practical, it should encourage students' participation. They also should be meaningful to the students, leading to the desired behavioral or learning objectives, and provide appropriate reinforcement. Materials that involve learning physical skills should direct students towards mastery of the skill or task specified in the lesson objective. Instructional materials have no value in the learning process if they cannot be heard or seen. For example, recording of sounds and speeches should be tested for correct volume.



Concepts of Teaching Effectiveness

Balogun (2000), defined effective teaching as the way of passing on the ideas, knowledge, skills, attitude, belief, and feeling to someone with the aim of bringing about particular changes in that person. The changes should then lead to different behaviour. Clark and Stair (2001), defined effective teaching as an attempt to help someone to change some skills, attitudes, knowledge, idea or appreciation, which are of success to them in teaching process by learners.

Okoro (2001) opined that teaching is effective when it is measured by the degree to which the teacher is able to achieve the desired learning outcomes in his pupils. Dalen and Brittel (2002) defined effective teaching as the guidance of pupils through activities that they may acquire the richest learning possible from their experiences. They further indicated that effective teaching is the transmission of knowledge or ideas into someone through interaction between teacher and learners when it comes to developing likelihood of experience and facts. Effective teaching in any educational institution involves a number of interrelated activities in classroom interaction between a teacher and his/her pupils. Sustainable human development and welfare programmes should be plausibly implemented by creative and self-reliant individuals with brilliant resourceful minds and strategic survival instincts that would continually promote pleasant personality. The teacher's responsibility within and outside the classroom is made up of many integrated functions aimed at promoting meaningful teaching and joyful learning in a formal school setting (Amoako, 2012). This can be achieved by using relevant instructional materials. Consequently, teachers' multidimensional responsibilities are often discussed with the view of the teacher as a student, planner, strategist, and guardian, facilitator of teaching and learning as well as manager of learning activities. Good (1993) view the teacher effectiveness as



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ability of a teacher to create a meeting and an interaction between the physical, intellectual and psychological interest of the students and some given subject matter content.

Challenges of the Use of Instructional Materials

It has been said that, using instructional materials to facilitate learning in Agricultural Science instructions is not always the issue but how to use them and its availability, according to Amponsah (2003). Unfortunately, Instructional Materials especially the modern innovation are grossly inadequate in most Senior High Schools in Ho Municipality of Volta Region, Ghana. A lot of problems confronting the use of instructional materials in Senior High Schools in the study area are discussed below:

Lack of Funds: This factor seems to be the reason why most educational institutions are unable to acquire relevant teaching equipment and materials. It has also adversely affected the quality of training and these products (student-teachers) will lack the opportunity to learn and use new techniques in the field. Inadequate funding for teacher education programmes remain a major obstacle working against effective implementation of the programmes. The consequences of the under-funding of this sector are immediate. For example, it results in the inability to purchase instructional materials and effectively train professional teachers. Such instructional materials include computers, text books, laboratory experimental materials, audio visual aids, slides, video clips, electronic white boards, electronic conferencing materials, enough chairs and desks in classrooms to keep students from having to stand to receive lectures.



Teachers' Professional Knowledge and Technical Know How

Adeyanju (2003) hold the view that educational communication and technology is a relatively new area of importance in education especially in developing countries like Ghana. Boafo-Agyeman (2010) assert that it is a slightly technical field and to understand how it can affect the teaching and learning situation in Agricultural Science, one has to understand the operational functionality of the materials. As much as there are different instructional materials, they serve different purposes in the process of teaching and learning. They differ in terms of functionality. Some are multi-dimensional instructional materials capable of performing various functions such as giving logical outcomes and manipulating information.

Amedeka (2007) indicated that inadequate preparatory programmes cause the majority of teachers' inability to demonstrate adequate knowledge and understanding of the structure, function and development of their discipline. Therefore, an effective teacher education programme is a prerequisite for a reliable education system, which lends confidence to both teachers and students when learning is coordinated effectively and professionally. For instance, a teacher who is not computer literate will find it difficult to apply its operation even when and where found necessary or if the teacher has a partial knowledge of the operational function of the materials, might be wrongly used thereby creating a wrong impression for the audience or the students. According to Amponsah, (2007), the usage of instructional materials in the teaching of Agricultural Science at Senior High School depends on the age and date of teacher training. This means that those who are recently trained are more likely to be abreast with modern instruction materials compared with their counterparts who were trained with obsolete instructional materials.



Unavailability of the Materials

Another issue about instructional materials for use is that, the materials are grossly inadequate in the Senior High Schools in Ho Municipality of Volta Region. In a study conducted by Opoku-Asare (2004), it was revealed that teaching materials are grossly lacking in Senior High Schools in Ghana. He reported that on the type of resource materials teachers had in schools, 89% of the respondent claimed that they had to improvise while 57% indicated that they had no access to resource materials at all and this indicates inadequacy of teaching materials in Senior High Schools in Ghana. The few Senior High Schools which indicated the availability of these materials, the materials were rather in poor condition. However, creativity and improvisation are the watchwords in any successful application of instructional materials. Reading out is different from subject and learning situation, so some teachers still fail in improvising for materials that are not available.

Environmental Factors

Part of the application of instructional materials process is the target population for whom the materials are to be used and the site or vicinity where learning should take place. The degree of satisfaction derived by children in respect of comfort and ability of that learning situation is a great deal. For instance, teaching of Agricultural Science content in a very remote area where there is no availability of electricity and the content requires projected materials which may be very difficult for teaching and learning to be effective (Agbadzi, 2009).



Production and Improvisation of Instructional Materials

It has been suggested that the teacher should improvise instructional materials if none is available or if the ones available are very expensive or inadequate. In other words, the teacher should be equipped with skills to improvise instructional materials because our schools lack adequate supply of essential and suitable instructional materials. The teacher should be able to produce simple and inexpensive instructional materials such as charts, posters, maps, pictures, drawings, model and so on, using available local materials. Indeed, there is no limit to the range and variety of simple but effective instructional materials to create if a resourceful and imaginative teacher wants to produce to enhance instructional activities. When teachers are encouraged to acquire and develop basic skills and knowledge in planning, designing and producing materials and are motivated to produce these materials as a regular part of their teaching, they will readily appreciate the need to use materials as necessary and an integral part of their instructional tasks. When teachers are able to produce materials, they will also develop a positive attitude towards using materials creatively in the teaching and learning process.

Agun (1982) suggests the following steps as guide for teachers in the production of instructional materials:

Selection of specific objectives:

The instructional objective must arise from the curriculum objectives, the materials will be highly effective if they are planned, designed, produced and used for specific learning objectives. It must be clear in the mind of the teacher what skills and knowledge the materials will be used to acquire for instance, if the skill is to write an essay from picture flow chart, organizational chart or progress chart. This step in



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production of instructional materials by the teacher is very crucial and should not be compromised.

Identification of the characteristics of the learner:

When the teacher has selected the instructional objectives, it will be followed by identification of characteristics of the learners who will use the materials. The information should be on the needs, interests, level of maturation, cultural and socio-economic background. Other vital information to be collected about the learners included their experiences, areas of strengths and weaknesses. The information will help the teacher to decide on the content of the message, amount of information to be presented and the medium or media for the message.

Selection of the Content of the Message:

The knowledge of the characteristics of the learners will guide the selection of the content of the message that the materials will carry. The content will relate and be relevant to the achievement of the objectives already identified in step 1. In addition, the content should be such that learners will not only find it easy to understand but it will be interesting and challenging to the learners.

Selection of the medium for presenting the message:

The medium may be simple charts, posters, diagrams, pictures, drawings or chalkboard and so on. The message could also be presented through a combination selected for the achievement of the instructional objectives as well as be suitable to the learners.



Determination of the Cost

This step is very important since the schools do more or less provide funds for improvisation of instructional materials. The factor of cost should also be considered in terms of time. The implication of this factor is that the teacher could only produce simple materials that are locally available. The learners on the other hand could be asked to collect materials at home. On the other hand, they could even be given the production or collection of raw materials for the production of the instructional materials as take-home assignments.

Production of the Materials

At the stage of production, teachers should bear these attributes of the materials in mind:

They must be clear;

They must be legible;

They must relate to the instructional objectives set

They must be relevant to the interests, needs and aspirations of the learners;

They must be accurate;

They must be durable; and

They must be portable or manageable.

Evaluation of the Improvised Materials

The teacher might use the first try out of the materials on his class to evaluate them, since it might be possible to tryout using separate samples other than his class, to



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determine the effectiveness of the materials. The feedback exposes the strengths and weakness of the improvised materials such as inaccuracy, complexity, lack of clear objectives over simplicity or irrelevancy. The feedback will be used to improve the quality of the instructional materials (Olaewe, 2012).

Agricultural Science Education in Ghana

Hutchison (2013) stated that Agricultural Science education has always been a part of the Ghanaian culture. It included both the formal and informal forms of education that were present prior to the advent of modern education. Modern education in Ghana came with the advent of European missionaries and mercantile enterprises and has largely become the vehicle for social upward mobility. The significance attached to Agricultural Science education has been a yardstick to the continuous presence of the science subject at all levels of the Ghanaian education system.

The Ghanaian Agricultural Science curriculum follows the spiral approach which treats the same themes at different time and in greater depths within each educational level. This is a generalist survey course, which exposes students to the universe. At this stage, the students get the basic exposure to scientific ideas; learn about the history of Agricultural Science and the basic Agricultural vocabulary at this level.

Challenges in Agricultural Science Education

Wagner and Benavente-McEnery (2006) opined that Agricultural Science education is often under attack from many quarters today. Many lament its cost ineffectiveness in light of standardized tests while post-modernists critique the idea there are ever any truths to seek. Others also charged that Agricultural Science education leaves students with little sense of what Agricultural Science is really all about. The idea that





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Agricultural Science is an academic adventure, full of excitement, mystery and tentativeness is seemingly lost. Agricultural Science is poorly served in Senior High Schools with many schools lacking well-equipped laboratories and workshops. This results in poor performance in public examinations such as WASSCE. There were Agricultural Science pass rates of 59% and 51% respectively in the 2000 and 2001 Senior High Schools Certificate Examinations (MoE, 2003). Allotey as cited in Ameyaw-Akumfi (2004) also revealed that, results of the 2002 SSSCE indicated that over 40% failed to get a Grade D in Agricultural Science subjects. The situation becomes even more alarming when students with grade E's are added to the failures and most universities do not accept grade E. Ghana cannot build a strong Agricultural Science and technology base with such results. The use of instructional materials in teaching and learning of Agricultural Science in Senior High Schools in Ho Municipality will ameliorate this situation. According to Ameyaw-Akumfi (2004), Agricultural Science education has not achieved its primary purpose of improving the social, cultural and economic conditions of the country. Ghana's participation in the global knowledge system depends on the development of a strong Agricultural Science and technology knowledge base which is currently the tool for economic and social transformation of nations. Ameyaw-Akumfi asserts that many factors have contributed to this state of affairs resulting in the government of Ghana estimation in 2003 that less than 15% of Ghanaians of ages fifteen years and above were scientifically literate. He identified the following factors as responsible for this state: Inadequate resource allocation to Agricultural Science and mathematics teaching and learning at all levels of education, leading to poorly equipped laboratories and workshops; Inadequate government commitment to the development of Agricultural Science and technology; poorly-developed Agricultural Science and technology

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innovation system resulting in the lack of interaction among the different agencies connected with science and technology; use of uncreative and outmoded methods of teaching and learning in the schools; lack of science practical in most schools and even where they are done, they are designed in cook book manner to confirm known answers; inadequate number of teachers of Agricultural Science; unmotivated teachers and post graduate research in Agricultural Science, technology and mathematics which should form the basis for developing the capacity for innovation and change is very low.

With reference to pre-service teacher preparation, the following weaknesses were identified to affect Agricultural Science education in Ghana. These include low emphasis given to subject matter content during pre-service, disconnection between theory and practical application and the teaching of Agricultural Science at the Basic schools level is conducted in English which is not the mother tongue but a foreign medium of instruction. Unfortunately, most teachers in the Senior High Schools come from a background in the humanities and are ill-prepared for the progressively more complex questions about Agricultural Science that students might throw at them. If teachers are not able to answer students' questions at school with confidence and zeal, their confidence, enthusiasm and spirit of enquiry can be lost (Gluckman, 2011).

Ameyaw-Akumfi therefore suggested that quality teachers and teaching are the single most important determinants of a good Agricultural Science education. The success of Ghana's students in Agricultural Science education and the progress of the nation will depend on quality Agricultural Science teaching and learning which ensures the development of the innate capacities of all students. Quality teaching builds a strong foundation in basic sciences and leads also to the acquisition of better research skills. The country needs to attract, train and retain a new breed of teachers with skills





www.udsspace.uds.edu.gh required in nurturing scientific inquiry and understanding and developing innovative capacity in the youth. Such teachers must be knowledgeable, enthusiastic, dedicated, creative, and reflect on their teaching and students outcomes and must be ready to utilize community resources and new technologies in their work.

Instructional Materials

In order to facilitate effective teaching and learning, it is important for the teacher to use instructional resource or a technology which will be able to address the needs of all learners irrespective of learner's background, intelligence level and academic need. Various aids known as instructional materials may be employed to help a teacher to effectively deliver a subject or lesson to the understanding of all learners (Gyanpanyi, 2014)

Broadly, the term instructional materials as explained by Lewis (2013) refers to a range of educational materials that teachers use in the classroom to support specific learning objectives. He further added that they are those materials that help the teachers to teach with ease and the learners to learn without stress. Ministry of Education (as cited in Agbadzi, 2009) stated that the use of teaching and learning materials is very important at all levels of pre-university education. Instructional materials appeal to the senses of seeing, touching, smelling, feeling and hearing. On the other hand, they are used by teachers to convey and put emphasis on information, arouse interest and ease the learning process (Rius, et al, 2009).

Advantages of Instructional Materials

According to Jekayinfa (n.d.) the selection of materials which are related to the basic contents of a lesson, helps in-depth understanding of such a lesson by the students in

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that they make the lesson attractive to them, thereby arresting their attention and thus, motivating them to learn. Similarly, good instructional materials are those that require the minimum of intervention by the teacher. Nikky (2010) mentioned that some advantages of using instructional materials are that they supplement verbal instructions, make learning permanent and provide variety, helpful in attracting attention of the students and save time and energy. Instructional materials also encourage healthy classroom interaction, help the teacher to create situations for learning for beginners and are helpful in creating positive environment for discipline. They also assist in meeting individual differences as well as providing speech training to the pupils. Olumorin et al. (2012) added that instructional materials can be used to teach large classes, are cheaper to produce and encourage class participation. Instructional materials can be purchased or made by teachers or schools. Richards (2012) asserted that teachers or institutions preparing their own instructional materials hold certain advantages. These include; relevance of materials to learners and institutional needs that reflect local content, issues and concerns; it also develops expertise among staff, giving them a greater understanding of the characteristics of effective materials; the reputation of the institution or teacher is enhanced by demonstrating commitment to providing materials specifically for their students; and finally, flexibility of materials produced as they can be revised or adapted as needed, giving materials greater flexibility than the imported instructional materials and commercial course books. Potential disadvantages include cost; because quality instructional materials require time as well as resources to produce. Materials development is a specialized skill and not all teachers are capable of producing good materials, therefore, teacher-made materials will not normally have the same standard of design and production as commercial materials.





Olumorin et al. (2012) emphasized that www.udsspace.uds.edu.gh some of the factory produced or imported instructional materials have also been discovered to be concept-based on foreign ideas and culture. A locally produced chart will reflect objects that can easily be seen in the child's environment depending on where the child resides or his background.

Criteria for Selection of Instructional Materials

As much as instructional materials are crucial for effective teaching and learning, care has to be taken by the teacher or school when choosing these materials. The choice of instructional material should fulfill the objectives of a lesson to be taught since an aid used in one lesson might not relay the same message when used in another lesson. This implies that there are specific roles that each instructional material plays in the teaching and learning process. Therefore instructional materials if not properly chosen might mislead pupils instead of promoting understanding of a lesson being taught. There is therefore the need for teachers to acquire various materials to satisfy the objectives of different lessons to be taught, understand their roles and more importantly get training on how to use them.

Leus (2002) suggests the following criteria should guide a teacher or school in their selection of instructional materials. They include: Appropriateness, Authenticity, Interest, Organization, Balance and Cost. Farrant (1996:169) explained that a good educational media are those that require the minimum intervention by the teacher. Good instructional material needs little or no explanations, stimulate ideas, demand an active response from the learner, must be appropriate to the maturity and culture of the user as well as be flexible in use. They should also provide enjoyment and be strongly made. This means that in the selection of Instructional materials for instruction, consideration should be given to the mutuality of the material to be used

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by both learners and teachers as a study resource. For instance, instructional materials for science should provide a main source of science content, present specific views about the nature of scientific practices, and how scientific knowledge is developed. This is because instructional materials can serve as a major influence on how Agricultural science should be taught by teachers. Instructional materials should help to produce instruction that actively engage students in the learning process and encourage the inclusion of hands-on engagement with daily occurrences laying emphasis on student responsibility since these are more likely to increase conceptual understanding hence a good instructional materials should fulfill these.

Instructional Materials from Local Resources

Locally sourced instructional materials can be categorized based on their mode of production. These divisions, as adapted from Ogunmilade (as cited in Olumorin, et al. 2012) are: Models and ready-made materials (packages), Local materials which are made by experts in visual resources and Self-made (inexpensive) materials.

Adwetewa-Badu (1992) incorporated puppetry in basic education in the teaching of language and literacy using local materials such as cotton fabrics, old socks, old newspapers, bottle-like plastic containers, straw, raffia, wood shavings, corn tassel, leather, bamboo, egg cartons, coconut fibre, cane, and others. His works encouraged the collaborative effort of both teachers and pupils in producing models for teaching and learning and can be classified as self-made according to Ogunmilade's categorization. He explained that the collection and use of local materials and a variety of materials is vital to help children identify with and explore their environment.





Curzon (2005) produced www.udsspace.uds.edu.gh instructional materials from local leather for pre-school education. Gabrielson and Hsi (2012) as science educators worked hand-in-hand with local teachers in Timon-Leste to use locally-rooted materials as resources and design principles for the successful development of science and mathematics curricular and instructional materials for use in community schools. Locally-rooted materials such as certain palm leaves indigenous to Timon-Leste communities, bamboo, chicken feet and local Timorese baskets were used as instructional resource materials.

This means that local materials are indeed very viable resources in the production of instructional materials at all levels of education and more especially in Basic schools. In order to efficiently produce instructional materials from local resources, sufficient basic skills are needed by teachers. This acquisition of skills can be made possible by constant practice and observation done by professionals. Teachers also must have the knowledge of basic design principles and be familiar with the materials in their environment in order to utilize them in the classroom to support instruction.

Instructional Design Models

Instructional design models present users with a way of understanding an otherwise incomprehensible problem. Instructional design models provide structure and meaning to instructional design problems, allowing designers to discuss design tasks with an appearance of conscious understanding. Envisaging a problem and breaking it down into discrete and manageable units is achieved with the help of models and the importance of a specific model is determined within the context of use. Like any other instrument, a model assumes a specific intention of its user. A model is judged by how it arbitrates the designer's intention, how well it can share a work load and how

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efficiently it moves focus away from itself to the aim of the design activity (Ryder, 2012).

There are many different models in use today for solving instructional design problems. Some of these models have been named after the model designers or the purpose they served. Examples include ADDIE (Analyse, Design, Develop, Implement and Evaluate), Dick and Carey Model, Merrill's First Principle of Instruction, Kemp's Instructional Design Model, Gagne's Nine Events of Training Evaluation, Cathy Moore's Action Mapping. Others include Backward Design/Assessment-Driven Design, Organizational Elements Model, Transactional Distance, Elaboration Theory and Instructional Design Systems (www.instructionaldesign.org). For the purpose of this study, focus will be on the Backward Design. Instructional models can also be adopted and modified to suit the use of the designer (Reiser, et al. 2003) who modified the backward design into their own assessment-driven design process. The idea of Backward Design comes from Wiggins and McTighe (2001) proposed that learning experiences should be planned with the final assessment in mind. It starts with the end, the desired results (goals or standards), and then derives the curriculum from the evidence of learning (performances) called for by the standard and the teaching needed to equip students to perform' (Wiggins &McTighe, 2001). There are three stages to backward design: i. Stage 1: Identify Desired Results; ii. Stage 2: Determine Acceptable Evidence of Learning; iii. Stage3: Design Learning Experiences and Instruction ([instructional design.org](http://www.instructionaldesign.org)).



Methods of Using Instructional Materials for Teaching

It is beneficial that teachers become skilled at using a variety of teaching methods in order to satisfy the range of learning needs and requirements that are present within most classroom environments (Bassey, 2000). Kizlik (2013) explains that teaching methods are mainly descriptions of the learning objective-oriented activities and flow of information between teachers and students. The choice of teaching method(s) to be used depends largely on the information or skill that is being taught, and it may also be influenced by the aptitude and zeal of learners. It is important that all teachers within all environments are aware of the advantages and disadvantages of all methodologies currently being utilized in the classrooms. This awareness will then enable instructors to structure learning occurrence to meet the needs of all persons while satisfying the requirements of the curriculum and upholding student safety. Teaching methods include lecturing, discussion, demonstrations, practical, experiments, note-giving, role playing, questioning, brainstorming, seminars and group work. Other methods include problem solving, inquiry centered learning, field work, discovery learning, Dalton and project-based.

Lecturing is a method of teaching which is usually characterized by one way of communication where information or ideas are normally passed on to students orally while they listen. Adu-Yeboah (2008) asserted that lecturing is the most frequently used method of instruction that has dominated formal education over the years. Blight (2002) asserted that the purpose of the lecture is to clarify information to a large group in a short period of time. Ideas or concepts are presented by the teacher while students listen and take down notes.



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Discussion method is another which can be used with the entire class or in small groups to review information, illuminates ideas or solve problems. It is conducted as a period of oral comments, questions and answers led by the teacher in which class members actively participate (Huze, 2011). Discussion has been described by Brookfield (1995) as both inclusionary and participatory because everyone has some useful contribution to make to the educational effort and because it claims to be successful with actively involving learners.

Demonstration methods perform activities so that learners can observe the procedure or how it is done in order to help prepare learners to transfer theory to practical application; the teacher performs the skill while students watch. To carry out a demonstration effectively, the intended activity must be carefully planned, kept simple and thorough enough to meet the objectives of the lesson. Demonstrations may be augmented with other visuals and learners are given the opportunity to practice what they have watched. This teaching method helps visual learners, enhances self-confidence, provides opportunity for targeted questions and answers and allows attention to be focused on specific details rather than general concepts (Huze, 2011)

Brainstorming is a process of generating multiple ideas or options in which judgment is suspended until a maximum number of ideas have been generated. Options are then typically analyzed, a best solution identified and a plan of action developed. Students are usually asked to throw out as many ideas as possible in a short time either in groups or whole class while someone often writes the ideas down. Brainstorming actively involves learners in higher levels of thinking, promotes peer learning, critical thinking and creates synergy. It also helps groups reach consensus. Brainstorming requires that learners discipline their inputs to the discussion. Brainstorming may also not be effective with large groups (www.siartc.org).



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Role play according to Kizlik (2013) introduces problem under study dramatically and provides opportunity for students to assume roles of others and thus value another point of view allowing for discovery of solutions and providing occasion to practice skills. Teacher and Educational Development (n.d) adds that role playing dynamically involves members adding diversity, authenticity, and specificity to the learning experience. It also develops problem-solving and verbal expression skills providing practice to build skills for real-world relevance and when actual experiences are not readily available. Role playing provides teacher with prompt feedback about the learners understanding and capacity to apply theories.

Project-based learning is the use of in-depth and rigorous classroom projects to facilitate learning and assess students' competence. It is an instructional method that provides students with complex tasks based on challenging questions or problems that involve the students' problem solving, decision making, investigative skills and reflection that includes teacher facilitation but not direction. It is also focused on questions that drive students to encounter the central concepts and principles of a subject in a hands-on method. It allows students to develop valuable research skills as students engage in design, problem solving, decision making and investigative activities (Buck Institute for Education, 2013).

The variety of teaching methods imply that a teacher has options to choose from but essentially, the selected methods of instruction should build on a foundation of pupils previous knowledge, ensuring that the choice of teaching method encourages children to learn by doing, ensures learning develops from useful experience and experimentations, effective use of instructional aids and creates a conducive learning environment in the classroom. The choice of teaching method must stimulate





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appreciation as well as cognitive growth and help varying groups of pupils to get the most proficient learning out of all lessons.

Instructional Charts and Students' Performance in Practical Agriculture

A chart is a two dimensional object with flat visual materials which may represent diagrams or a combination of pictorial, graphic, numerical or verbal materials prepared to give a clear visual summary of vital processes, concepts or a set of relationships (Huze, 2011). Bassey (2000) asserts that charts are used to present ideas and concepts which may be difficult to understand if presented using the verbal code only. Amissah (1998) noted that the use of instructional charts in teaching instructional improves the students' reading skill and stimulates creativity in the learners. Charts present an abstract rendition of reality because what is presented is shown as effective in the cognitive domain of learning.

Instructional pictures and students' performance in practical agriculture

Pictures are photographic representations of objects, people, places, events, things or concepts. Pictures in this context are still or motionless objects. They may be illustrations in textbooks, periodicals, catalogues, magazines and study prints. Pictures are used to communicate abstract ideas in a more realistic way (Bassey, 1991).

A good picture should have good composition, a clear message, good contrast and sharpness with effective colours (Etim, 1998). Learners can learn from good quality pictures with or without the help of teachers. He went further to state that students taught with instructional pictures performed better than their counterparts taught without pictures.

Filmstrip instructional materials and students' performance in practical agriculture

A filmstrip is a roll of 35 mm transparent film containing a series of related still pictures showing one concept at a time. A filmstrip can either be of a single or double frame format (Ikot, 2008). Filmstrip can be used to teach skills, show relationships in order to convey knowledge to affect attitude through individual and independent study groups or other tutorial groups viewing (Bassey, 1991). He further stated that students taught with instructional materials performed better in their examination. Abaas (2012) in a study discovered that the animated Agricultural Science Instructional packages significantly influenced the academic performance of the selected students. Osokoya (2007) in a study also discovered that there was significant difference between the mean scores of students taught history with video-taped instructional packages and those taught with the conventional lecture methods.

Conceptual Framework

The existing module of conceptual framework in the literature review will be adapted appropriately to reflect on the role of instructional materials on academic achievement in Agricultural science among Senior High School students of Ho Municipality of Volta Region, Ghana.

Summary of Key Concepts Reviewed

The discussion of the roles of instructional materials in teaching and learning of Agricultural Science instructions contained in this literature review, shows that instructional materials when properly used makes instructional process real, more permanent and more appealing. It draws the learners into practical content with those



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abstract concepts in teaching and learning making them become meaningful. The review indicated that there are three broad types of instructional materials used in teaching and learning process. These include projected materials such as slides, films, television, non-projected materials such as textual and non-textual and phenomenal materials.

The review also covered the principles followed in teaching Agricultural science by teachers. Teachers need to observe in selecting and using instructional materials such as principles like instructional tasks, target audience attributes, the economy, specification of guidelines, preparation and preview guidelines. The review further observed some problems associated with the use of instructional materials such as funds, environmental and instructional material factors, teacher's knowledge and technical know-how. The management and maintenance culture over the materials available was also addressed.

Concluding, teachers, being professional in the field of education, especially in Agricultural Science must be aware of the direction the design of production and use of instructional materials should take. Obviously, the efficiency of any instructional materials depends largely on their relevance to the physical environment and cultural background of the learner. We should therefore, embark upon local production and manufacturing of materials for the teaching of Agricultural Science.



METHODOLOGY

3.0 Chapter Overview

This chapter discussed research design, population, sample and sampling technique, instrumentation, reliability and validity of the Instrument, data collection procedures and data analysis procedures used respectively.

3.1 Research Design

Research design adopted for this study was a survey design. Survey design according to Kerlinger and Lee (2000) is a situation where a population is studied in detail so as to generalize the outcomes on the entire population. In sampling, time and costs are saved where the population covers large geographical area. Intervening variables such as accident or breakdown of laws and order can put temporary or permanent stop to the conduct of research process is avoided under survey. The fact that some of the respondents may not be willing to give out honest and unbiased information was overcome by assuring them of the confidentiality of any information they may provide for the purpose of this study. This attribute is best suited for this study and hence, it is adopted.

3.2 Population, Sample and Sampling of Agricultural Science students

The target population for this study comprised all Agricultural Science students and teachers of Agricultural science subjects in Senior High Schools in Ho Municipality of Volta Region. Due to bulk of data expected, 10 public Senior High Schools in Ho Municipality were involved. Agricultural science students were randomly selected from each of the selected public Senior High Schools. Agricultural science teachers



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were purposively selected from each of the selected Senior High Schools. Altogether 500 Senior High Schools students of Agricultural science and 30 Agricultural science teachers constituted the sample for this study.

3.4 Research Instruments

Two different research instruments were used to collect data for this study. They are;

Agricultural Science Achievement Test (ASAT). This instrument was constructed using past WAEC Agricultural Science objective questions for the past 5 years (2010/2011 to 2014/2015). Fifty (50) objective questions were compiled from those years. These were used to measure the level of academic achievement on the content and knowledge taught the students in Agricultural Science. They were used as research instrument for this study.

Teachers Attitude Towards Teaching Agricultural Science Questionnaire (TATTAQ)
The instrument was self-constructed by the researcher. Many items were generated by the personal predisposition of Agricultural Science Teachers to the teaching of Agricultural Science and to the Agricultural Science students. A four (4) point rating scale of (Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD)), were used to measure the feelings and opinions of the Agricultural Science teachers.

3.5 Reliability of the Instrument

Agricultural Science Achievement Test was taken from international sub-regional test set by an accredited examinations body (WAEC). Those items were assumed to possess high reliability index. A Test – retest Method of Reliability was used to determine reliability index of the Agricultural Science Achievement Test (ASAT). The instrument after construction was administered on parallel population outside the



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study area. After three weeks, the same instrument was administered on the same sample. It indicated that each student obtained a pair of scores. Pearson Product Moment Correlation formula was used for the calculation and correlation coefficient of 0.80 was obtained. This indicated strong relationship or correlation between students' results.

3.6 Validity of the Instrument

The two instruments after construction were analyzed for face and content validity by collating the results obtained by the population and relating it with the use of instructional materials in the teaching and learning of Agricultural science in the study area. The analysis was based on the marks obtained by the individual students sampled. Thereafter, some items were modified, recorded or totally removed to improve its face and content validity through expert advice from a statistician.

3.7 Data Collection Procedure

I, as the researcher visited the selected schools personally to seek permission from their Headmasters. When permission was granted, I distributed questionnaires for data collection to the sampled individuals. During the field work, respondents were selected using purposive sampling technique. All completed and retrieved questionnaires were assembled and organized for processing. The administration and collection of questionnaires lasted for a week. Three (3) out of the 30 teachers could not return the questionnaires issued to them, which constituted 10 % and a return rate of 90%. A sample of the questionnaires is contained in Appendix B of this report.



3.8 Data Management and Analysis

The data collected were subjected to statistical analysis using descriptive statistics and measures variability. The main statistical tool used for the analysis of data was one way Analysis of Variance (ANOVA). This tool was used to analyse the effects and differences each of variables had on the students' performance in this study. Frequency distribution tables were used for simple reporting purposes and easy understanding of readers.



RESULTS AND DISCUSSION

1.1 Chapter Overview

This chapter presents the results and discussions of this study. The results presented were based on the views and opinions of respondents involved the study. In this section, the key issues discussed included the demographic data of the respondents, and data related to the main research question/objectives of the study. Data are illustrated in tables and described by research questions posed at the beginning of the study. Table 1 contains data on respondents' gender.

Table 1: Gender of respondents

| Age category | Frequencies | Percentages (%) |
|--------------|-------------|-----------------|
| Male | 24 | 80 |
| Female | 06 | 20 |
| Total | 30 | 100 |

Source: Field work, 2015

The data illustrated in Table 1 revealed that 24 of the respondents were males representing 80% while 6 respondents were females, also representing 20%. This suggested that there were more male respondents than female respondents.



Table 2: Respondents by Level of Education

| Year Group | Frequency | Percentages (%) |
|------------|-----------|-----------------|
| Diploma | 03 | 10 |
| Degree | 22 | 73 |
| Masters | 05 | 17 |
| Totals | 30 | 100 |

Source: Field data, 2015

Table 2 revealed that, out of the total number of respondents involved in the study, it was found that 3(10%) of them were Diploma holders, 22(73%) of them were Degree holders and 5 of the respondents, representing 17% were Master’s degree holders.

From the information contained in Table 2, it is observed that the minimum qualification of respondents is diploma certificate.

Table 3: Number of Years Served by Agricultural Science Teachers at Current Post

| Number of Years | Frequencies | Percentages (%) |
|-----------------|-------------|-----------------|
| 0-5 | 5 | 17 |
| 6-10 | 15 | 50 |
| 11-15 | 8 | 26 |
| 16 and above | 2 | 7 |
| Total | 30 | 100 |

Source: Field data, 2015



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Data on the respondents in Table 3 revealed that, 5 of them had served between 0 and 5 years at the current post representing 17%, 15 of them had served between 6 and 10 years representing 50% of the respondents. In addition, further analysis of data on the number of years taught by the respondents revealed that 8 respondents representing 26% of the sample size had served between 11 and 15 years and the rest (2) of the respondents representing 7% had served above 16 years. Majority of the respondents (50%) had worked between 6 and 10 years at their current posts suggesting that they would have gathered lots of experience teaching students in the subject Agricultural science.

Research Question 1

What roles do instructional materials play during the teaching and learning process of Agricultural science at the SHS in the Ho Municipality?

The research question sought to determine the important roles instructional materials play in the teaching and learning process during the Agricultural science lessons. Data were collected from respondents using a four-point rating scale in a questionnaire is contained in Table 4. For the ease of analysis and interpretation of the data collected on both instruments, the four-point rating scale of SA, A, D and SD were collapsed into two divergent opinions, that is strongly agree and agree were grouped into “agree” while disagree and strongly disagree were grouped into disagree as summarised in Table 4



Table 4: Role of IM in Teaching and Learning of Agricultural Science.

| Category | Agree | Disagree |
|--|-----------|----------|
| Instructional materials do promote learning process in Agricultural Science. | 22(73.3%) | 8(26.7%) |
| Instructional material make the Agricultural Sciences lesson worth while | 23(76.7%) | 7(23.3%) |
| Teacher should use instructional materials whenever they are teaching Agricultural Science. | 21(70%) | 9(30%) |
| Effective use of instructional materials can improve the intellectual development of the learners. | 24(80%) | 6(20%) |
| Teachers should use appropriate instructional materials suitable to the topic being taught during the Agricultural Science lesson. | 26(86.7%) | 4(13.3%) |
| Instructional materials always aid teaching of agricultural lesson. | 25(83.3%) | 5(16.7%) |

Source: Field survey 2015

In Table 4, 22(73.3%) of the teachers agreed that instructional materials promote learning process in Agricultural science whereas 8(26.7%) disagreed with this view. 23(76.7%) of Agricultural science teachers agreed that instructional materials make Agricultural sciences lesson worthwhile although 7(23.3%) did not agree with this assertion. 21(70%) of the Agricultural science teachers supported the view that



teachers should use any instructional materials whenever they are teaching but a 30% did not support this view. 24(80%) of them agreed that effective use of instructional materials can improve the intellectual development of the learner although 6(20%) of them held contrary views. 26(86.7%) of the Agricultural science teachers should use only appropriate instructional materials suitable to the topic as opposed to 4(13.3%) of them accepted an opposite view. Again, 25(83.3%) of the Agricultural science teachers agreed that instructional materials always aid teaching of Agricultural science lesson whereas 5(16.7%) held contrary view points. Data were also collected from respondents regarding their views on the importance of instructional materials to student learning and Table 5 displays a summary of their views.

Table 5: Importance of Instructional Materials to Students

| Variables | Agree | Disagree |
|---|-----------|-----------|
| The teacher's knowledge and skills is a factor for the use of instructional materials | 18(60%) | 12(40%) |
| It creates opportunity for students to use all their senses | 20(66.7%) | 10(33.3%) |
| It enables fast and slow learners to learn at their own pace | 21(70%) | 9(30%) |
| Students are active when instructional materials are used. | 24(80%) | 6(20%) |

Source: Field survey 2015

Table 5 contains data that further expounds on the roles played by Instructional materials in the teaching and learning process. 18 respondents (60%) of the teachers held the opinion that knowledge and skill are key factors related to the effective use of



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instructional materials while 12 respondents(40%) of them did not agree with the assertion. 20 respondents(66.7%) of agricultural science teachers held the view that instructional materials in teaching agricultural science creates opportunity for students to use all their senses (recognition, seeing etc) although 10 respondents (33.3%) did not agree with this position. 21 respondents(70%) of agricultural science agreed with the view that instructional materials in Agricultural science teaching enables fast and slow learners to learn at their own intellectual pace while 9 respondents(30%) of them opposed this view point. 24 respondents(80%) of the Agricultural sciences teachers agreed that students participate actively when instructional materials are used to accompany teaching whereas 6 respondents(20%) held contrary views. 23 respondents(76.7%) of the teachers held the view that using instructional materials during Agricultural science lessons provides greater inquisitional and longer retentions of facts and concepts in Agricultural science although 7 respondents(23.3%) of them did not agree.

Research Question 2

In what ways can the use of instructional materials in teaching of Agricultural Science be made more effective to improve performance?

The research question sought to establish the various teaching strategies or methodologies available to the teachers of agricultural science programme that would enable them improve their performance as teachers and consequently bring about improved student performance. Relevant data was sought from respondents regarding ways deemed very effective in helping students acquire the relevant knowledge and skills in agricultural science as presented in Tables 7 and 8.



Table 7: Distribution of TATAQ Item into Subscale

| | ITEMS | <i>f</i> |
|---------------------------|--------------------|-----------|
| Q1 Learning Environment | 1, 2, 4, 8, 15 | 5 |
| Q2 Quality of Instruction | 9, 10, 11, 14, 16 | 5 |
| Q3 Teachers role | 3, 5, 6, 7, 12, 13 | 6 |
| | Total | 16 |

Source field survey 2015

To determine the degree of importance of the mean score TATAQ subscale their intervals of scores are chosen as shown 8.

Table 8: Importance of TATAQ subscales mean score

| Interval of the score | Interpretation |
|-----------------------|--|
| 0.01-2.00 | Instructional materials not important |
| 2.01-4.00 | Instructional materials important |
| 4.01 and above | Instructional materials very important |

Source: field survey 2015

Based on the field survey, 2015 findings on table 8 above, the intervals of score for respondents who held the view that Instructional Materials were not important for



teaching and learning of Agricultural Science in Senior High Schools was 0.01- 2.00.

This was insignificant.

Table 9: Instructional Materials and Teaching Effectiveness According to TATTAQ in Selected schools

| CODE | SUBSCALE | ITEMS | INTERPRETATION |
|------|------------------------|-------|--|
| Q1 | Learning Environment | 11.50 | Instructional Materials are very important |
| Q2 | Quality of Instruction | 10.60 | Instructional Materials are very important |
| Q3 | Teacher's Role | 14.60 | Instructional materials are very important |
| | Grand Mean | 36.70 | Instructional materials are very important |



Source: Field survey 2015

From Table 9, the selected schools were given codes Q1, Q2 and Q3 for easy identification of other factors which are likely to influence the use of Instructional Materials in teaching and learning of Agricultural Science in Senior High Schools in Ho Municipality of Volta Region, Ghana. These factors included learning

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environments such as small class size, adequate seats, chalk, chalk- boards and markers. The total score for these variables was 20. For the schools sampled for learning environment as it affects the use of instructional materials in teaching and learning of Agricultural Science in Senior High Schools, the average score was 11.50, which is significant. This implies that good learning environment impacts positively on the use of instructional materials in teaching and learning of Agricultural Science in the sampled Senior High Schools in Ho Municipality of Volta Region, Ghana.

The quality of instruction coded Q2 represented the qualification and competence of the teachers as reflected in teaching and learning of Agricultural Science in relation to the use of instructional materials. This was obtained through personal observations among the sampled schools. The total scores obtained in the sampled schools were averaged to 10.60 over 20. It is an average positive response that quality of instruction impacts on the use of instructional materials in the teaching and learning of Agricultural Science in Senior High Schools in Ho Municipality of Volta Region, Ghana.

The Teacher's Role in impacting on the use of instructional materials involved how often and efficient a teacher uses instructional materials to influence the teaching and learning of Agricultural Science in teaching and learning of Agricultural Science in the selected Senior High Schools. This was coded Q3 and the average score for the sampled schools were 14.60 over 20. This signified that teacher's role was very important in the efficient and effective use of instructional materials in teaching and learning of Agricultural Science in Senior High Schools in Volta Region, Ghana.

To investigate the interaction effects of Teacher Attitude towards the teaching Agricultural Science, One way Analysis of Variance (ANOVA) was used. Other



conditions for applying www.udsspace.uds.edu.gh ANOVA to data analysis include; random sampling and independence of groups concerned should be more than two; homogeneity of group variance and normality of population distribution. Response values used are contained in Table 10 below

Table 10: Responses of Agricultural Science Teachers to TATTAQ

| TYPE | SA | SA ² | A | A ² | D | D ² | SD | SD ² |
|------------|----|-----------------|---|----------------|---|----------------|----|-----------------|
| Tangible | 7 | 49 | 5 | 25 | 3 | 9 | 2 | 4 |
| Intangible | 2 | 4 | 3 | 9 | 3 | 9 | 5 | 25 |
| Total | 9 | 53 | 8 | 34 | 6 | 18 | 7 | 29 |

Source: Field survey 2015

Table 11: Responses from Agricultural Science Teachers to TATTAQ

| SUM | TOTAL | <i>df</i> | VARIANCE |
|-----------------|-------|-----------|----------|
| SST | 84 | 7 | 12 |
| SS _b | 65 | 3 | 21.7 |
| SS _w | 19 | 4 | 4.8 |

Source: Field survey 2015



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HYPOTHESIS: The effective use of instructional materials in the teaching and learning of Agricultural Science enhances the academic performance of students at Senior High Schools.

The hypothesis was tested at an alpha level of 0.05(level of significance).

It implies that there is significant relationship between academic performances of students taught by teachers who use tangible instructional materials than those who did not use tangible instructional materials to teach Agricultural Science at Senior High School. It can therefore be concluded that the use of instructional materials in teaching agricultural science enhances students' academic performance.

Research Question 3

What challenges confront teachers in their use of instructional materials in facilitating student learning in Agricultural Science at Senior High Schools?

The research question essentially seeks to examine the challenges teachers of Agricultural science programme face in their effort to use instructional materials to facilitate learning. Respondents' opinions sought on certain items related to the use of instructional materials and data obtained are captured in Table 6.



Table 6: Summary Table on Agric Science Teachers Responses

| Variables | Agree | Disagree |
|--|--------------|-----------------|
| Agricultural Science lessons are not Interesting whenever a teacher uses instructional materials | 10(33.3%) | 20(66.7%) |
| Teachers always misuse instructional material during Agricultural Science lesson | 8(26.7%) | 22(73.3%) |
| Instructional materials consequently aid the the teacher's use of verbal presentation of fact in the teaching of Agricultural Science | 24(80%) | 9(30%) |
| Effective use of instructional materials can improve the intellectual development of the learners | 24(80%) | 6(20%) |
| Teachers should use appropriate instructional materials suitable to the topic being taught during the Agricultural Science lesson | 26(86.7%) | 21(70%) |
| Agricultural Science could be taught | | |





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| | | |
|-------------------------|----------|-----------|
| instructional materials | 7(23.3%) | 23(76.7%) |
|-------------------------|----------|-----------|

Source: Field Survey 2015

In Table 6, 10 respondents or 33.3% of the Agricultural science teachers agreed with the view point that Agricultural science lessons are not interesting whenever a teacher uses instructional materials whereas 20 respondents(66.7%) of them disagree with this view point, saying that Agricultural Science lessons are interesting whenever teachers use instructional materials to teach it. 26.7% of the Agricultural science teachers always misuse instructional materials during Agricultural science lessons but 22 respondents (73.3%) of them disagreed with this statement thus affirming that teachers do not misuse instructional materials during Agricultural science lesson. 80% of the Agricultural science teachers agreed with the view that instructional materials consequently aid the teachers of verbal presentation of facts and concepts in the teaching of Agricultural science whereas 6 respondents (20%) of them disagreed with this view point. 9(30%) of the Agricultural science teachers agreed that teachers encounter problems in selecting instructional materials for 21 respondents (70%) of them disagreed with this assertion and confirmed that teachers do not encounter any problem selecting instructional materials.

23.3% of Agricultural science teachers agreed that Agricultural science could be taught effectively without the use of instructional materials whereas 76.7% of them disagreed with this assertion and confirmed that agricultural science could not be taught effectively without the use of instructional materials. It is observed here that majority of respondents accept the relevance of the use of instructional materials in delivering effective lessons in agricultural science.

Research Question 4

What are the composite effects of using instructional materials on the teaching of Agricultural Science skills and knowledge development?

Comparison is made of the performance of students whose teachers use concrete instructional materials in teaching with the performance of students whose teachers did not use concrete instructional materials in teaching the students. The purpose was to determine the differences or similarities in performance of the two groups of students. Table 13 contains the relevant data as presented.

Table 12: Comparison of performance of students on the use of abstract materials

| TYPE | SA | SA ² | A | A ² | D | D ² | SD | SD ² |
|----------|----|-----------------|----|----------------|----|----------------|----|-----------------|
| Concrete | 15 | 225 | 13 | 169 | 17 | 289 | 21 | 44 |
| Abstract | 10 | 100 | 12 | 144 | 23 | 529 | 16 | 256 |
| Total | 25 | 325 | 25 | 313 | 40 | 818 | 37 | 697 |

Based on the hypothesis that students taught by teachers using instructional materials perform better than those taught by teachers without using instructional materials, we fail to reject the null hypothesis and conclude that students taught by teachers who use instructional materials are more likely to perform better than those taught without the use of concrete materials. For the purpose of this study, concrete was used for tangible instructional materials.



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Significant difference between the performance of students whose teachers use concrete instructional materials and the performance of students whose teachers use abstract instructional materials to teach Agricultural Science in Senior High School is quite clear. This finding is in line with Aderonmu's (2001) assertion that as a result of the modern innovation in education and advancement in technological know-how, instructional materials have been found to be indispensable in effective transmission of knowledge in all subject area. He said, with modern technology, instructional production will correspondingly improve to help the students to assimilate more meaningful and interesting materials.

Most of the schools listed for this study are well equipped with, for instance, libraries though, it is noted most books are outdated while some are not fully developed. They lack basic Agricultural Science equipment, and they only contain reading chairs and tables with some skeletal equipment. Despite the strategic position of Agricultural Science in the Senior High School curriculum, most of the schools have no expansion programme to facilitate improved learning process proportionately to the ever increasing population of students who need the subject.

The problem of lack of funds which is the pivot on which teaching and learning revolve in some schools, the cost of bringing new books and replacing books which have deteriorated together with public spending cost (as presently the case of Ghana) has led to the provision of basic materials which will permit an extension to teaching development. The inadequate or lack of instructional materials in some schools have deprived many students the opportunity to access and utilize learning resources even if these were available. This is one of the major factors for the poor performance of Senior High School students in Agricultural Science in internal and external examinations in Ho Municipality of Volta Region, Ghana. Therefore, it can be better



said that lack of fund and high cost of instructional materials militate against their procurement which negatively impacts on the academic performance of students.

Table 13: Students Academic Performance on Academic Achievement Test (AAT)

The academic performance of sampled students in selected Senior High Schools in the study area was analysed based on the test administered to them. This was correlated with the availability or non-availability of instructional materials in their respective schools. Questions on Agricultural Science were collated and 50 objective questions were assembled for the Senior High School students in the study area. 500 students in 10 public Senior High School in Ho Municipality were randomly selected. The students constituted research subjects for the Table 13.

| | f | x | t | x^2 | fx |
|-------------|-----|------|--------|---------|--------|
| Class-Marks | | | | | |
| 0 – 9 | 85 | 4.5 | 382.5 | 20.25 | 382.5 |
| 10 – 19 | 70 | 14.5 | 1015 | 210.25 | 1015 |
| 20-29 | 43 | 24.5 | 1053.5 | 600.25 | 1053.5 |
| 30-39 | 37 | 34.5 | 1276.5 | 1190.25 | 1276.5 |
| 40-49 | 54 | 44.5 | 2403 | 1980.25 | 2403 |
| 50-59 | 112 | 54.5 | 6104 | 2970.25 | 6104 |



| | | | | | |
|-------|-----|--|---------|----------|--------|
| 60-69 | 30 | www.udsspace.uds.edu.gh 64.5 | 1935.5 | 4160.25 | 1935 |
| 70-79 | 35 | 74.5 | 2607.5 | 5550.25 | 2607.5 |
| 80-89 | 18 | 84.5 | 1521 | 7140.25 | 1521 |
| 90-99 | 16 | 94.5 | 1521 | 8930.25 | 1521 |
| TOTAL | 500 | 495 | 19819.5 | 32752.50 | 19855 |

⇒ Source: Field survey 2015

$$\text{Mean } (\bar{x}) = \frac{\sum fx}{\sum f}$$

$$\sum fx = 19855$$

$$\sum f = 500$$

$$\therefore \text{Mean} = \frac{19855}{500}$$

$$= 39.71\%$$

Discussion of Key Findings

The mean average score for all the students tested was 39.71%. This fell short of the average pass mark of 50%. Therefore, the inadequacy or poor instructional materials in the sampled schools have impacted negatively in the teaching and learning of Agricultural science in Senior High Schools in Ho Municipality of Volta Region, Ghana.

Based on the 500 students examined, 85 of them scored between 0-9% and 70 students scored 10-19% while 43 students scored between 20-29%. 37 students scored 30-39% and 54 students scored 40-49% while 112 students scored 50-59%. This





implies that over 20% of the candidates scored 50-59%, which means that majority of the students were of average performance. Also, 30 students scored between 60-69% while 35 students scored between 70-79%. Students who scored 80 -89% were 18 while those who scored 90-99% were 16.

219 of the 500 students examined scored below 50% while 281 scored above 50%.

The score with the highest frequency was 50-59%.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Chapter Overview

This study investigated the strategic roles or position of instructional materials in enhancing quality academic achievement in the teaching and learning of Agricultural Science among Senior High Schools in Ho Municipality of the Volta Region, Ghana. Five hundred (500) students and thirty (30) teachers of Agricultural Science subject were randomly selected with two research instruments, which were self-constructed by me as the researcher, for the collection of the information. Ten (10) public Senior High Schools in Ho Municipality of Volta Region were randomly selected for the study. The main statistical tool used to analyse data generated from the field was one way analysis of variance. The calculation was done at an alpha level of 0.05 or at 95% confidence level. Other statistical methods were used to analyse the data including frequency count, percentage spread, mean, mode, median and standard deviation respectively. A summary of the key findings, implications/ conclusions, recommendations and suggestions for further studies are presented below.

Summary of Key Findings

This study established convincingly that there is strong relationship between instructional materials and students' academic achievement in Agricultural Science. Empirical evidence gathered indicated that the learning environment, quality of instruction and teacher's professional roles played in the learning environment, all combined to enhance students' academic achievement in Agricultural Science. It was



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strongly established that there is powerful contribution of instructional materials to effective teaching and learning of Agricultural Science.

Furthermore, the study revealed that if all the factors identified in this study are considered collectively (composite effects), instructional materials play significant roles in enhancing skills development, positive learning and effective teaching.

This study investigated the strategic place of instructional materials on student academic achievement in Agricultural Science among Senior High Schools in Ho Municipality of Volta Region, Ghana. It was observed that Agricultural Science teachers have profile that make them competent teachers and their teaching result-oriented. 80% of them obtained first degree in Agricultural Science or agricultural education while 20% of them have master's degree in Agricultural Science or Agricultural Science education.

Evidence obtained from data analysed revealed that there is strong relationship between usage of instructional materials for teaching and students' academic achievement and learning. It was also established that there is powerful contribution of instructional materials to effective teaching and learning of Agricultural Science. It was observed further that factors such as quality of instructional learning environment and professional roles of teachers have significant place during the teaching and learning of Agricultural Science.

It was also established that the key challenges teachers face in the use of instructional materials is their unavailability, inadequacy and the high cost of acquiring such materials among others.



Conclusions

Based on the findings of the study, a number of conclusions can be arrived at. The study established that there is a strong relationship between availability and usage of instructional materials for teaching Agricultural science and students' academic achievement in that subject at the Senior High School level. What this suggests for administrators and other relevant authorities in institutions is that teaching and learning materials should be provided for departments such as agricultural science to enable teachers use them to enhance teaching and learning. The finding does not imply any causal relationship between availability and usage of instructional materials and students' academic performance. The strong relationship established between availability and usage of instructional materials only suggests that, when instructional materials are available, teachers are most likely to use them to enhance their teaching and this probably may lead to improved performance. It can therefore be concluded that, the availability of instructional materials is very likely to encourage teachers' use of them in their lessons and this may result in improved students' performance in agricultural science in particular. Also there is powerful contribution of instructional materials to effective teaching and subsequent academic achievement in Agricultural Science by Senior High School students in Ho Municipality of Volta Region, Ghana..

It further concluded that, factors such as quality of instruction, learning environment, availability and usage of instructional materials in teaching and learning of Agricultural Science makes its teaching result-oriented. The study has a lot of various stakeholders in education industry. Curriculum planners and evaluators would make use of the findings of this study to expand the horizon of curriculum requirements needed to enhance effective teaching in agricultural science. Inspectorate division of the Ministry of Education will use empirical literature in this study to reinforce the



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need for provision, availability and production of instructional materials. Ghana Education Service (GES) will adopt most of the techniques and approaches highlighted in this study as criteria in recruiting and appointing professionally qualified and certified agricultural science teachers to the Senior High School.

Agricultural Education researchers will make use of empirical literature and strategies itemized here to extend frontiers of knowledge whenever symposia, conferences and workshop are organized to up-date teachers' knowledge and skills in the use of instructional materials.

Recommendations

Based on the findings and conclusions that there is a strong relationship between the availability of instructional materials and their usage by teachers, it is hereby recommended that, school authorities together with their collaborators put in measures to ensure the regular provision of relevant instructional materials in their institutions. Beyond the provision of these materials, authorities must also put in measures to monitor the regular use of these materials in the teaching and learning by teachers so as to assist in improving students' academic performance.

It also recommends that teachers of Agricultural science make most of the concepts in the subject more practical oriented by exposing students to the use of instructional materials through practical work so as to engender meaningful learning rather than instrumental learning. Curriculum planners and developers should begin to align content of agricultural science to the practical use of instructional materials so that teachers will have no choice but to engage these materials in their lessons.



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It further recommends that Heads of senior High schools assign only teachers who have specialised in Agricultural science education so that they can employ appropriate methods in teaching so as to help students achieve highly in their academic pursuit.

Regarding the challenges of providing the relevant instructional materials in their appropriate quantities in the institutions for use by teachers in teaching Agricultural Science at the Senior High Schools, it is recommended that the school authorities together with the Parent-Teacher Association (PTA) and the Ghana Education Service collaborate to provide the requisite instructional materials for use by teachers to improve teaching and learning.

In addition, the study recommends to teachers to employ a variety of teaching and learning methods that would offer students different opportunities to acquire knowledge and skills relevant to their field of specialty. Teachers are encouraged to use strategies such as field trips or excursions, field projects, hands-on assignments to mention but a few to give students exposure in the field. It is expected that, if students are actively engaged in such activities, they will acquire the desired knowledge and skills envisaged in their study.

Future research to explore more variables that enhance teaching and learning of Agricultural Science such as location of school (school site), availability of land in the school, teacher and student attitude towards the teaching and learning of Agricultural Science are possible areas further research can be carried out.



Abban, T. R. (Unpublished). "The use of local materials for some art and craft works in Ghanaian Schools" Department Of General Art Studies, Kwame Nkrumah University Of Science And Technology, Ghana.

Adebayo, J.B (2002). The Use Of instructional materials Regarded To Teaching. Ibadan, University Press Ltd.

Adu-Yeboah, C. (2008) Transacting the Social Studies Programme in Junior High Schools in the Obuasi Municipality In The Ashanti Region of Ghana. Mphil.Thesis, Department of Basic Education of the Faculty of Education, University of Cape Coast, Ghana

Adwetewa-Badu, B. (1992) Puppetry in Basic Education, PG Dip. Kwame Nkrumah University of Science and Technology, Ghana: Accra: Afram Printing Press.

Adeleke, (2002) Selection, Utilization and Evaluation of Instructional Media In Fundamental Technology, Ibadan. Retrieved From [Http://Www.Tpron-Line.Org](http://Www.Tpron-Line.Org), 2013

Adeyanju, J.L. (2003). Teachers Perception of The Effects and Use Of Learning Aids in Teaching: A Case Study of Winneba Basic and Senior High Schools In Ghana. Retrieved From Internet (Www.Google.Com On, 10th July 2008)

Agbadzi, E. K. (2009). Design and Construction of Selected Instructional Materials for Visual Arts In Ghanaian Colleges of Education. MA Thesis. Department of General Art Studies, Kwame Nkrumah University of Science and Technology, Ghana

Aguokogbuo, C.M. (2000) Curriculum Development and Instructional Materials Implementation for Africa: Nsukka. Mike Social Press.

Amedika, M. (2007) The Status and Quality of Continuous Assessment in Senior High Schools in Ghana.

Amissah, P. A. K., Sam-Tagoe, J., Amoah, S. A. & Mereku, K. D. (2002) Teacher Education: Its Principles And Practice. Ghana. Faculty of Professional Studies In Education, University of Education, Winneba.

Ameyaw-Akumfi, C. (2004) The Promotion of Science Education in Ghana: A Paper Delivered by Minister of Ports, Harbours and Railways at the First National Forum On Harnessing Research, Science and Technology for Sustainable Development in Ghana, Held at the Accra International Conference Centre, 15-19 March, 2004.

Amponsah, A. (2007) A Guide to the Selection of Instructional Materials: Asempa Printing Press Ltd, Ghana

Anamuah-Mensah, J. & Asabere-Ameyaw, A. (2014) Science and Mathematics in Basic Schools In Ghana. [Powerpoint Presentation] Retrieved July 10, 2014 from Www.Jamensah.Com/Presentations/Basic%20Science-Maths.Ppt



www.udsspace.uds.edu.gh

Asoga, A and Allen, K. (2003): Instructional Materials Improving Students Teaching Practice Exercise in Nigeria Teacher's Colleges' Academic Review.

Ayodele E.A, (2002). The Design and Development of Economics Curriculum: Ibadan Press, Ibadan.

Bell, J. (2005). Doing Your Research Project: A Guide for First-Instructional Materials Researchers in Education, Health and Social Science: Fourth Edition: Open University Press

Bennett, D. & Pye J. (2003) Usage Of Instructional Technology in Teaching Middle School Social Studies: Meridian: A Middle School Computer Technology Journal,6(1) Retrieved On 24th October, 2008; From [Http://Www.Nesu.Edu/Jan99/Vfieldtrip/Index.Html](http://Www.Nesu.Edu/Jan99/Vfieldtrip/Index.Html).

Biggs (2003). Instructional Design Principles and Applications: Eagle Wood Cliffs, N.J. Educational Technology

Bolick, C., Berson., Coutts, C. & Heinacke, W. (2003). Technology Applications in Social Studies Teacher Education, a Survey of Social Method Faculty. Contemporary Issues in Technology and Teacher Education; 3(3) Retrieved on 15th September, 2008 From [Http://Www.Citejournal.Org/Vol3/Iss3/Socailstudies/Articles1.Cfm](http://Www.Citejournal.Org/Vol3/Iss3/Socailstudies/Articles1.Cfm)

Breakick, K. (2003): Principle and Practice of Education: University Press Ltd. Instructional Materials cited, Ile-Ife, Nigeria.

Buba, P., Z. (2003). An Investment in Ineffective Use Of Instructional Materials in Teaching Social Studies In School: Unpublished.

Chamunorwa, J. (2010). The Importance of Learning and Teaching Aids in the Education Process: Retrieved November 27, 2012 From [Http://Zvavanhu.Mywapblog.Com/The-Importance-of-Learning-and-Teaching.Xhtml](http://Zvavanhu.Mywapblog.Com/The-Importance-of-Learning-and-Teaching.Xhtml)

Cameron, A.C. and Trivedi, P.K. (1998) Regression Analysis of Count Data, Econometric Society Menographs, No30, Cambridge University Press.

Clark, L.H. and Starri, I.S (2001) Senior High Schools Teaching Method, Paris Watched Press Ltd.

Derek, R. (2000) Educational Technology in Curriculum Development, London, Hopper and Row Press Ltd.

Emma, E. & Ajayi, D.T. (2004) Educational Technology: Methods, Materials, Machines. Jos Nigeria: Jos University Press Ltd.

Ghana Education Service (2012) Basic Education Curriculum: Retrieved May 30, 2013 From [Http://Www.Ges.Gov.Gh/?Q=Content/Basic-Education-Curriculum](http://Www.Ges.Gov.Gh/?Q=Content/Basic-Education-Curriculum).

Huze, E. (2011). A Comparative Study of the Teaching and Learning of Basic Design and Technology in Private and Public Schools (A Case Study of Junior High Schools in the Ejisu-Juaben Municipality) MA Thesis. Department of General Art Studies, Kwame Nkrumah University of Science and Technology: Ghana.



www.udsspace.uds.edu.gh

Kizlik, B. (2013) Instructional Methods Information. Retrieved August 2, 2013 from [Http://Www.Adprinstructional materialsa.Com/Teachmeth.Htm](http://Www.Adprinstructionalmaterials.Com/Teachmeth.Htm)

Kerlinger, L.F and Lee, H.(4th Ed). (2000): Foundation of Behavioural Research. Mexico, Wadsworth Publication.

Muodumogu, C. A. (2003) Teachers' Perceptions of the Use of Instructional Materials for Teaching.

Olaewe, O. O. (2014). The Strategic Place of Statistical Methods in Analysis Data and Making Inferences in Scientific Research Journal of Education Research and Behavioural Sciences Vol3 No 10 Pages 343-346

Olobe, N. P. (2006). Teachers Instructional Material Utilization Competencies In Secondary School In Sub-Sahamn Africa: Conference Proceedings Of The 6th International Instructional Technology Conference. From Www.Google.Com/Search

Wiggins,G. P. & Mctighe, J. (2001) Understanding by Design: Retrieved August, 2014 from [Http://Edutechwiki.Unige.Ch/En/Backwards_Design](http://Edutechwiki.Unige.Ch/En/Backwards_Design).

Wittiwich, W. A. (2001) Audio –Visual Material, Nature and Uses, Hollings and New York Press Ltd

Yoleye E. A. (1994). An Instructional Materials Guide for Teachers: London Cassel Ltd.

Yusuf, M. O. (2005). Information and Communication Technology and Education: Analysis of the Nigerian Policy for Information Technology. International Educational Journal, 2005, Vol., 6(3),Pp.



APPENDIX A

UNIVERSITY FOR DEVELOPMENT STUDIES

QUESTIONNAIRE FOR DATA COLLECTION

Questionnaire on the role of Instructional Materials in the teaching and learning of Agriculture science Among Senior High Schools in Ho Municipality This questionnaire is to seek answer to questions on the role of instructional materials in the teaching and learning of Agriculture. This is purely for academic purpose. Your identity would not be disclosed to anybody what so ever, that is why we do not require your name on the questionnaire.

1. A Farming practice that promotes soil erosion is
2. Bush Burning
3. Contour ploughing
4. Mulching
5. Strip cropping
6. Which of the following groups of crops has been correctly matched to its examples?
7. Fruits → pawpaw, cashew and carrot
8. Grain legumes → soya bean, groundnut and Millet Cereals Maize, rice and sorghum
9. Tree crop → cocoa, cassava and coconut



10. Which of the following practices are required in the regular maintenance of lawns?
 11. Cutting, rolling and pruning
 12. Cutting, weeding and rolling
 13. Weeding, pruning and staking
 14. Staking, rolling and pruning
15. Use the activities listed below to answer questions 4 and 5
16. Incineration
17. Biogas production
18. Recycling of waste products
19. Compost preparation
20. Which of the activities results in the production of manure?
 21. I
 22. II
 23. III
 24. IV
25. Electric power can be generated by
 26. I only
 27. II only
 28. I and III only
 29. II and III only
30. Which of the following factors would favour the siting of an industry in a locality?
 31. Ease of transportation
 32. Nearness of the market



33. Availability of raw materials
34. I and II only
35. I and III only
36. II and III only
37. I, II and III only
38. Which of the following features must be present in a good fishpond?
39. An out let
40. Grassed walls
41. A screen
42. I and II only
43. I and III only
44. II and III
45. I, II and III
46. Pollination is the
47. Fusion of pollen grains and the stigma
48. Transfer of pollen grains from anthers to the stigma
49. Formation of pollen grains in the anther
50. Attraction of insects and birds to the flower
51. The vertical section through the soil showing distinct soil layers is known as
soil
52. Erosion
53. Fertility
54. Profile
55. Structure



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56. Using the malting ratio of 1:60 determine the number of male goats required to serve 720 female goats.
57. 6
58. 12
59. 15
60. 70
61. If a fish pond is stocked with clarias and Tilapia, the presence of the clarias will cause.
62. A decrease in tilapia population
63. An increase in the acidity of the pond
64. An increase in the alkalinity of the pond water
65. An increase in the plankton population in the pond.
66. One of the varieties of pineapple is
67. Amazonian species
68. Pea red
69. Tafo hybrid
70. Smooth cayenne
71. A fungal diseases which forms galls on black spores on the tassels and cobs of maize is known as
72. Blast
73. Rust
74. Smut
75. Steak
76. Which of the following cultural practices conserves the forest?
77. Cover cropping



78. Crop rotation
79. Mechanized farming
80. Shifting cultivation
81. Yam is propagated through its tuber because the tubers bears
82. Adventitious roots
83. Buds
84. Internodes
85. Nodes
86. In fowls, incubation takes
87. 7 days
88. 10 days
89. 21 days
90. 30 days
91. All the following activities promotes soil conservation except
92. Growing of cover crops
93. Practicing land rotation
94. Over cropping
95. Erecting of wind breaks
96. Which of the following layers of the soil contains the largest population of living organisms?
97. Top soil
98. Sub soil
99. Parent material
100. Bed rock



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101. The type of soil likely to be water logged is
 102. Clay
 103. Loam
 104. Sandy
 105. Sit
 106. Linstructional materialse is added to soil mainly to
 107. Increase water permeability
 108. Destroy micro – organisms
 109. Remove carbonates
 110. Reduce acidity
 111. Green manure becomes beneficial to soil when
 112. The soil is free from pests
 113. It is grown with fertilizer
 114. It is ploughed into moist soil just before flowering
 115. It is ploughed into moist soil after harvesting.
 116. Consider the following statements about formation of soil
 117. Lichens aid the formation of soil from rocks
 118. The action of week carbonic acid on rocks is chemical
 119. High temperatures follow instructional materialsmediately by very
cold conditions can result in weathering of rocks.
 120. Molten magma from volcanic solidifies to give rise to soil direct.
 121. I and II only
 122. II and IV only
 123. I, II and III only
 124. II, III and IV only



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125. Soil conservation can be achieved through
126. Introduction of green manure
127. Intercropping
128. Agroforestry
129. Mixed cropping
130. Which of the factors listed below are considered when selecting a site for a poultry farm?
 131. Well drained flat land
 132. Suitable temperature
 133. Land for future expansion
 134. Proximity to source of water and electricity.
 135. I only
 136. I only II only
 137. II, III and IV only
 138. I, II and IV only
139. A livestock parasite that can be controlled by the drenching method is
 140. Mite
 141. Round worm
 142. Tick
 143. Tsetsefly
144. Which of the following practices promotes the growth of more lateral branches in a hedge plant?
 145. Watering the plants regularly
 146. Pruning the plants regularly
 147. Application of fertilizers to the plants



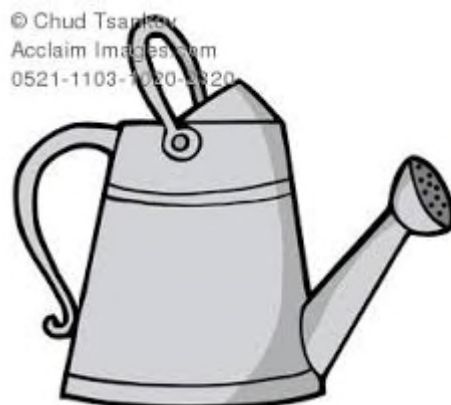
148. Erecting a fence to support the plant.
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149. The diagram below illustrates a garden tool. Use it to answer questions 27 and 28



150. The diagram above illustrates a
151. Hand fork
152. Hand towel
153. Hoe
154. Secateurs
155. The diagram illustrated is use to
156. Remove roots and other obstacle from the soil
157. Remove weeds
158. Transplant seedlings
159. Stir soil on garden beds.
160. The main reason for screening water flowing from rivers into fish ponds is to
161. Make the water clear
162. Reduction in the number of stray fish
163. Reduction in the number of water weed
164. Prevent over flooding.



165. www.udsspace.uds.edu.gh
Weeds are removed from a fish pond in order to prevent
166. Absorption and usage of dissolved oxygen in the water.
167. Reduction of the amount of faecal contamination of water
168. Penetration of sunlight essential for photosynthesis.
169. Regulation of the amount of the organic manure in water.
170. Vegetative propagation method is commonly used in the cultivation of
171. Banana
172. Cocoa
173. Cowpea
174. Pawpaw
175. A soil may lose its fertility through
176. Leaching
177. Over cooling
178. Shifting cultivation
179. Ridging
180. The diagram below illustrates a farm equipment use. Use the diagram
to answer questions 33 and 34



- 181.
182. The diagram illustrates a
183. Dibber

184. Sickle www.udsspace.uds.edu.gh
185. Knapsack sprayer
186. Watering can
187. The equipment illustrated is use to
188. Harvest cereal crops
189. Transplant seedling
190. Spread liquid pesticides in tiny droplets
191. Sprinkle water on plants.
192. In poultry production, temperature is an instructional materialsportant factor during brooding because the chicks
193. Have to overcome stress of transportation
194. Needs adequate ventilation
195. Have no access to natural vegetation
196. Have not developed features
197. The major advantages of crop rotation is the
198. Control of insect pest and diseases of crops
199. Increase in the amounts of seeds in the seed bank
200. Faster absorption of nutrients by the soil.
201. Emergence of weeds.
202. Which of the following post-harvest practices are associated with maize?
203. Threshing and milling
204. Shelling and decortication
205. Dehusking and shelling
206. Decortication and dehusking



207. Which of the following livestock parasites can be controlled by drenching?
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208. Mites
209. Round worm
210. Tsetsefly
211. Tick
212. Drainage in a clayey soil can be improved by
213. Addition of organic manure
214. Addition of chemical fertilizer
215. Application of mulching material
216. Application of wood ash
217. The most effective way of preventing disease among farm animals is
218. Quarantining the farm animals
219. Observing farm hygiene
220. Breeding disease resistant varieties.
221. Which of the following signs is associated with parturition in cattle/
222. The belly becomes distended and drops.
223. The vulva becomes contracted
224. Difficulty in urination
225. The udder becomes smaller
226. Which of the following management practices ensure the raising of healthy chicks?
227. Controlling of human traffic to the brooder house
228. Debeaking chicks when they are two weeks old
229. Ensuring good ventilation in the brooder house



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230. Visiting older chicks first before the brooding chicks.
231. I and II only
232. III and IV only
233. I, II and III only
234. I, III and IV only.
235. Which of the following methods could be used to control water logging.
236. Drainage irrigation
237. Irrigation
238. Leaching
239. Mulching
240. The difficulty encountered by pigs in losing body heat through perspiration could be overcome by
241. Deworming
242. Using dry bedding in the sty
243. Providing fresh clean water in the sty
244. Avoiding overcrowding of pigs in the sty.
245. Maize is a cereal because it
246. Produces seeds
247. Has narrow leaves
248. Has long roots
249. Grows in marginal soil
250. The relative proportion of various particle sizes in a given soil sample is called
251. Coarseness



252. Profile www.udsspace.uds.edu.gh
253. Structure
254. Texture
255. Yam is propagate through its tuber because the tuber bears
256. Buds
257. Internodes
258. Nodes
259. Adventitious root
260. Which of the following activities is carries out in a crop production nursery?
261. Mulching
262. Pruning
263. Picking out
264. Transplanting
265. Groundnut cake use as feed for farm animals is a main source of
266. Carbohydrates
267. Minerals
268. Vitamins
269. Proteins
270. Dipping is practiced in farm animals production because it
271. Controls endoparasites
272. Prevents bacterial attack
273. Controls ectoparasites
274. Improves upon growth rate.



UNIVERSITY FOR DEVELOPMENT STUDIES

FACULTY OF EDUCATION

DEPARTMENT OF AGRICULTURAL SCIENCE EDUCATION

TAMALE

**QUESTIONNAIRE FOR TEACHERS ON THE ROLE OF INSTRUCTIONAL
MATERIALS IN ENHANCING TEACHING AND LEARNIN OF
AGRICULTURAL SCIENCE AMONG SENIOR HIGH STUDENTS IN**

Instruction: I will like you to please complete this questionnaire correctly and carefully by ticking. All the information given will be treated as confidential. Thanks for your anticipating cooperation.

SECTION "A" PERSONAL DATA

NAME OF SCHOOL:

.....

AGE: **MARRIED:** **SINGLE:**

.....

GENDER: MALE: **FEMALE:**

.....

QUALIFICATIONS: DIPLOMA

B.ED



Others please

Specify: -

Teaching Experience: Below 1 Year

: Just a Year

: 2 – 5 Years

: 6 – 10 Years

: 11- 15 years

: 15 and above

SECTION “B”

Please note the following abbreviations

SA = Strongly Agree

A = Agree

D = Disagree

SD = Strongly Disagree



Rate of use on instructional materials by Teachers

How often do you use the following instructional materials?

| Materials | Often | Occasionally | Not at all |
|--------------------|-------|--------------|------------|
| Textbooks | | | |
| Chalkboards | | | |
| Maps and Charts | | | |
| Overhead Projector | | | |
| Television | | | |
| Cartoons | | | |
| Computer programme | | | |
| Special materials | | | |
| Video Recorder | | | |
| Festivals | | | |
| Almanacs | | | |
| Radio | | | |





QUESTIONS

A SA D SD

The teachers' knowledge and skills is another factors for the use of materials

Even the purchased or improvised, there is no Agricultural Science laboratory in the school for storage

Most schools cannot afford the cost of manufacturing

It creates opportunity for students to use all their senses

It enables fast and slow learners to learn at their own pace

It provides meaning and useful source of information on the teacher

Students participate actively when instructional materials are used

It creates an opportunity for students to use all their senses

It provides greater inquisitional and longer retention of factual concepts in Agricultural Science.



